

**Optimum Staffing Study of the
Public Works Department**

SUNNYVALE, CALIFORNIA



September 5, 2006

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1. INTRODUCTION AND EXECUTIVE SUMMARY

1. INTRODUCTION AND EXECUTIVE SUMMARY

The report, which follows, presents the results of the Optimum Staffing Study of the Public Works Department conducted by the Matrix Consulting Group. The project team conducted a study of the current service delivery functions and service components of the Department of Public Works based upon organizational structure, cost, workload, staffing, equipment, demand, frequency, performance and such other factors as deemed appropriate, to identify opportunities to reduce costs, improve productivity, and enhance effectiveness.

This first chapter introduces the analysis – outlining principal objectives and how the analysis was conducted – and presents an Executive Summary.

1. AUDIT SCOPE AND OBJECTIVES.

As stated in the Request for Proposal, the selected consultant team was to perform a comprehensive organizational analysis of the Department's existing operations and current staffing levels. The analysis was to be fact based and include all aspects of public works service provision, including the areas of water, sewer and storm drain operations; property management; trees and landscaping; fleet management; engineering; solid waste and recycling; traffic and transportation; street maintenance; streetlight maintenance; and water pollution control operations.

Analysis was to focus on:

- Organizational structure, including the division of labor and manager/supervisor span of control;
- Effectiveness of staffing levels in each division. Topics of consideration were to include, but not be limited to, staff assignments, planned leave, worker's compensation leave, disability, workload, skill levels, training, and cost-effective

shift scheduling in applicable areas;

- The use of overtime;
- Evaluation of the call-back system for after-hour service; and
- Benchmarks and other objective indicators of program effectiveness.

The approach of the project team in meeting this scope is portrayed below.

- Develop an in-depth understanding of the key issues impacting the Public Works Department. The Matrix Consulting Group conducted interviews with Public Works Department staff at all levels of the Department. Interviews focused on goals and objectives, management systems, the use of technology, the levels of service provided by the Department, the resources available to provide those services, etc.
- Develop a profile of the Public Works Department. The Matrix Consulting Group conducted interviews with Departmental staff and other key staff in the City to document the current organization of services, the structure and functions of the Department, budgets, workload data, management systems, inventory of the infrastructure, etc.
- Conduct a comparison of the Public Works Department program and practices to 'best management practices.' The 'best management practices' included comparisons to the American Public Works Association's, *Public Works Management Practices Manual*, standards developed by the American Water Works Association, such as *G200: Distribution Systems Operations and Management*, and the experience of the project team. The project team also conducted a comparative survey of Public Works Departments in other cities to compare the Public Works Department's programs and practices to these other cities.
- Evaluate the staffing, organization structure, and service levels in the Public Works Department. This included interviews with key staff to develop an understanding of the current service delivery model, evaluation of the adequacy of current service levels, work practices, work planning and scheduling systems, productivity and staffing levels, the plan of organization, and asset management.

The objective of this assessment was to identify opportunities for improvement in the operational and economic efficiency of the Department and practicable opportunities for enhancing the quality of its product and services.

The following section provides an executive summary of the report.

2. EXECUTIVE SUMMARY

The Matrix Consulting Group has prepared this summary of the recommendations and their fiscal impacts contained in the attached report. This summary is presented in the table below.

Chapter 5 – Engineering Division		
Index	Recommendation	Cost Increase/(Decrease)
5.1	The plan of organization for the Engineering Division should be modified.	(\$322,900)
5.2	The management of the capital improvement program should be improved.	NA
5.3	An additional two Civil Engineers should be authorized as project managers of capital projects.	\$276,900
5.4	A Civil Engineer should be authorized for long-term infrastructure planning.	\$138,500
5.5	An Engineering Assistant II should be authorized for Land Development Review.	\$127,200
5.6	The Engineering Division should enhance the automated permit information system.	NA
5.7	The Engineering Division should enhance cost recovery for Land Development Engineering.	\$21,250 in additional annual revenue
5.8	The Engineering Division should develop its own checklists for their staff's processing and plan checking of applications.	NA
5.9	The Engineering Division should develop a Land Development Engineering procedures manual.	NA
Chapter 6 – Traffic and Transportation		
6.1	A full range of traffic and transportation programs should be developed and delivered.	NA
6.2	An additional Traffic Engineer position should be authorized.	\$131,900
6.3	The Administration Division should schedule "office hours" for its support staff in the offices of the Traffic and Transportation Division.	NA

Chapter 7 – Field Services		
Index	Recommendation	Cost Increase/(Decrease)
7.2	The Maintenance Crafts Worker class description should be updated and the salary range evaluated before the vacant position is filled.	NA
7.3	The Field Services Division should allocate 1.4 full-time positions to streetlight maintenance and repair.	NA
7.4	The Field Services Division should develop a replacement program for streetlights.	\$70,000
7.5.1	The frequency with which distribution valves are exercised should be adjusted.	NA
7.5.2	A one-person crew should be utilized for fire hydrant maintenance, and the level of service for preventive maintenance of fire hydrants should be enhanced.	NA
7.5.3	The level of service and crew size for preventive maintenance of pressure reducing valves should be reduced.	NA
7.5.4	The level of service for flushing blow off valves should be increased.	NA
7.5.5	The frequency of meter testing for commercial water meters should be increased and the crew size for residential meter replacement reduced.	NA
7.6	The water Distribution Program should develop and install an energy conservation plan.	NA
7.7.1	The Field Services Division should develop a proposal for consideration of the City Council regarding the costs and benefits of enhancing the extent of seal coat treatments.	NA
7.7.2	The Field Services Division should evaluate the cost-effectiveness of some of its preventive maintenance practices for streets.	NA
7.7.3	The Field Services Division should evaluate the pavement condition of one-half of its street system each year.	NA
7.7.3	The Field Services Division should address the limitations with the MTC pavement management system.	NA
7.7.4	The crew size for crack sealing should be adjusted.	NA
7.8	The Field Services Division should monitor the costs of removing wastewater lateral plugs and installing lateral cleanouts.	NA

Chapter 7 – Field Services (Cont'd)		
Index	Recommendation	Cost Increase/(Decrease)
7.9	The Field Services Division should increase the extent of sewer mains that it televises on an annual basis.	\$50,000
7.10	The Field Services Division should enhance the level of service for sewer cleaning.	NA
7.11	The two City parks that are plumbed for reclaimed wastewater should use reclaimed wastewater for irrigation.	NA
7.11	Upon conclusion of the cost of service study, the Field Services Division and the Water Pollution Control Plant should collaborate in the preparation of a plan to continue implementation of the reclaimed wastewater master plan.	NA
7.12	The class title of Public Works Supervisor should be modified to Public Works Manager. The class title of Senior Public Works Leader should be modified to Public Works Supervisor.	NA
7.13	The Field Services Division should acquire and install a commercial off-the-shelf maintenance management system.	\$148,750 in one-time costs and \$35,000 in annual ongoing costs
7.14	A Public Works Supervisor position should be added.	\$138,500
Chapter 8 – Fleet, Trees and Landscaping		
8.2.1	The Lead Equipment Mechanics should allocate most of their time to the repair and maintenance of equipment.	NA
8.2.2	The Equipment Mechanic Assistant should be utilized more effectively for preventive maintenance.	NA
8.3	The fleet inventory should be reduced.	NA
8.4	The replacement cycle for street sweepers should be adjusted.	\$15,000
8.5.1	The City should improve job-related information made available to fleet staff.	NA
8.5.2	The City should revisit the process used for sale of surplus fleet equipment.	NA
8.5.3	The City should evaluate some of the procedures used for transporting vehicles to and from Fleet and the frequency of preventive maintenance.	NA
8.6	Landscape maintenance should be outsourced.	(\$625,000)
8.7	Scheduled tree maintenance should be outsourced.	(\$411,900)
8.8	Streamline supervisory staffing in the concrete maintenance crew.	(\$93,700)

Chapter 8 – Fleet, Trees and Landscaping (Cont'd)		
8.9	The Fleet, Trees and Landscaping Division should be consolidated with the Field Services Division.	(\$263,000)
Chapter 9 – Water Pollution Control Plant		
Index	Recommendation	Cost Increase/(Decrease)
9.2	The City should contract with a consulting engineering firm for the preparation of a wastewater treatment plant master plan.	\$450,000 in one-time costs
9.3	The Finance Department and the Public Works Department should develop financial plans and a schedule for the replacement of failing infrastructure at the Water Pollution Control Plant.	NA
9.4	The number of support staff at the Water Pollution Control Plant should be reduced.	(\$265,400)
9.5	The effectiveness with which MAXIMO is utilized to manage the maintenance and repair of equipment at the Water Pollution Control Plant should be improved.	NA
9.6	The Water Pollution Control Plant should consider, in consultation with plant operators, twelve-hour shifts for plant operators.	NA
Chapter 10 – Solid Waste		
10.1.1	The Solid Waste Division should develop additional strategies to increase participation by multi-family dwellings in recycling.	NA
10.1.2	The Solid Waste Division should develop additional strategies to increase participation by businesses in recycling.	NA
10.3	If the City does not substantively expand its recycling goals and program for multi-family dwellings and businesses, one of the two positions allocated to recycling education should be eliminated.	NA
Chapter 11 - Administration		
11.1	The Department should develop an information technology strategic plan.	NA
11.2	The role of the City Property Manager/Senior Administrator in Property Management should be clarified.	NA
11.3	The Public Works Department should develop, as planned, a formal succession planning strategy.	NA
11.4	The Public Works Department should evaluate opportunities to streamline signature authority for City forms.	NA
11.5	The City should enable approval of invoices online using the City's automated financial system.	NA
11.6	The Public Works Department should evaluate the extent and quality of Departmental performance measures, activities and service delivery plans.	

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11.7	The Public Works Department should develop a training plan for its employees based upon a needs assessment	NA
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2. PROFILE

2. PROFILE

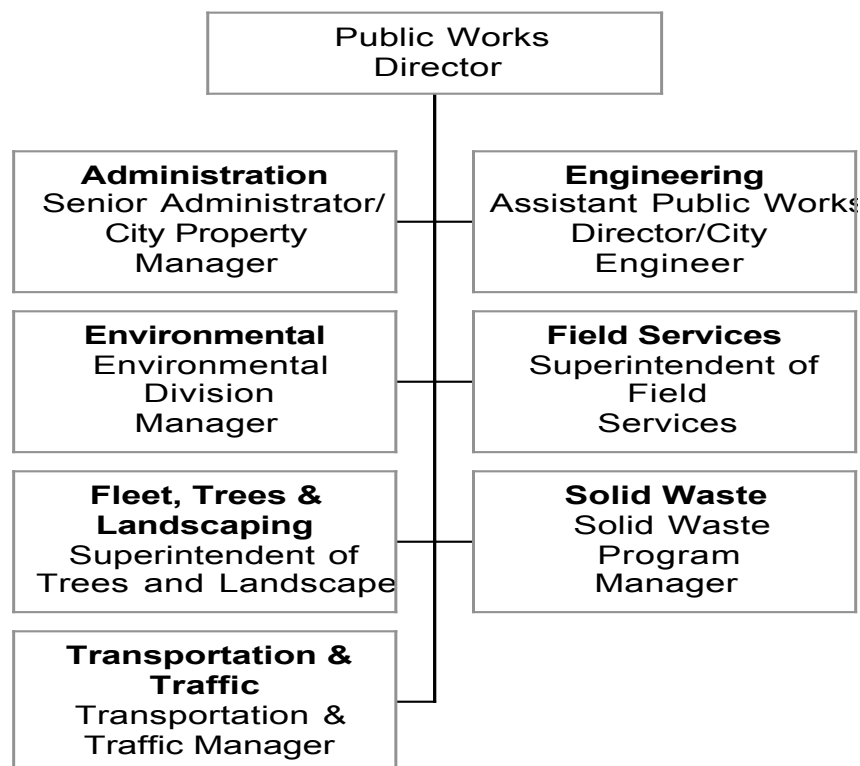
This chapter presents background information regarding the Public Works Department. The chapter includes the following:

- Organizational structures for the divisions within the Public Works Department;
- Workload and staffing trends for divisions within the Department; and
- The role and responsibilities of staff within the Public Works Department.

The chapter opens with an overall description of the Public Works Department.

1. THE PUBLIC WORKS DEPARTMENT IS AUTHORIZED 219 POSITIONS AND ORGANIZED INTO SEVEN DIVISIONS.

The overall administrative plan of organization for the Public Works Department is presented in the chart below.



Important points to note regarding each division are presented in the paragraphs below.

- The Administration Division is responsible for the overall management of the Public Works Department, including property management.
- The Engineering Division manages design and construction of capital improvement projects; plan checks development plans; inspects privately constructed public improvements, such as sidewalks, curbs and gutters; and updates and maintains records of public improvements, such as streets, sewer mains, water mains, etc.
- The Environmental Division operates and maintains the Water Pollution Control Plant. This Division is also responsible for coordination and implementation of the City's NPDES stormwater permit.
- The Field Services Division is responsible for the maintenance, operation, and repair of the water distribution, wastewater collection, and stormwater collection systems, and the maintenance and repair of streets.
- The Fleet, Trees and Landscaping Division is responsible for the maintenance of street trees, sidewalks and boulevard landscaping, and the acquisition, maintenance, and repair of City vehicles.
- The Solid Waste Division is responsible for managing the collection and disposal of solid waste and household hazardous waste, managing the operation of the SMaRT Station, and managing the maintenance of the City's closed landfill.
- The Traffic and Transportation Division is responsible for managing the contract for traffic signal maintenance; intergovernmental coordination, including Federal, State, regional and local coordination and liaison with schools on school traffic issues; enhancing roadway safety; plan checking development plans regarding their transportation impact; support of the Bicycle and Pedestrian Advisory Committee; conducting traffic calming studies; and managing traffic signal operations and infrastructure improvements.

Overall, the Department is authorized 219 positions. A total of 82% of these positions are allocated to three divisions:

- 73 positions or 33% to the Field Services Division;
- 60 positions or 27% to the Environmental Division; and
- 47 positions or 21% to the Fleet, Trees and Landscaping Division.

The remaining four divisions, Administration, Engineering, Solid Waste, and Transportation and Traffic are allocated a total of 39 positions or 18% of the total authorized positions in the Department.

2. THE ADMINISTRATION DIVISION IS AUTHORIZED 8 POSITIONS.

The Administration Division is responsible for the overall management of the Public Works Department, including property management, and is managed by the Senior Administrator/Property Manager. The Senior Administrator/Property Manager is also responsible for the acquisition, lease and sale of City-owned properties. The organization of this Division is presented in the chart below, which also includes the number of authorized positions for each classification:

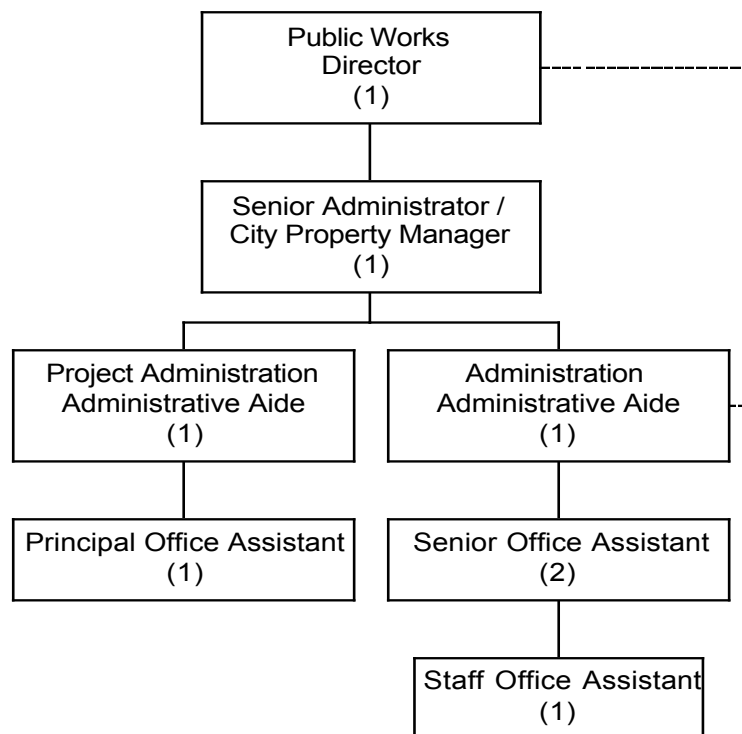


Exhibit 1 at the end of this chapter provides a summary of the key roles and responsibilities for each of the positions in the Administration Division.

3. THE ENGINEERING DIVISION IS AUTHORIZED 15 POSITIONS.

The Engineering Division is managed by the Assistant Director of Public Works / City Engineer. The Division manages design and construction of capital improvement projects, plan checks development plans; inspects privately constructed public improvements such sidewalks, curbs and gutters; and updates and maintains records of public improvements, such as streets, sewer mains, water mains, etc. The organization of this Division is shown in the chart below, which also includes the number of authorized positions for each classification.

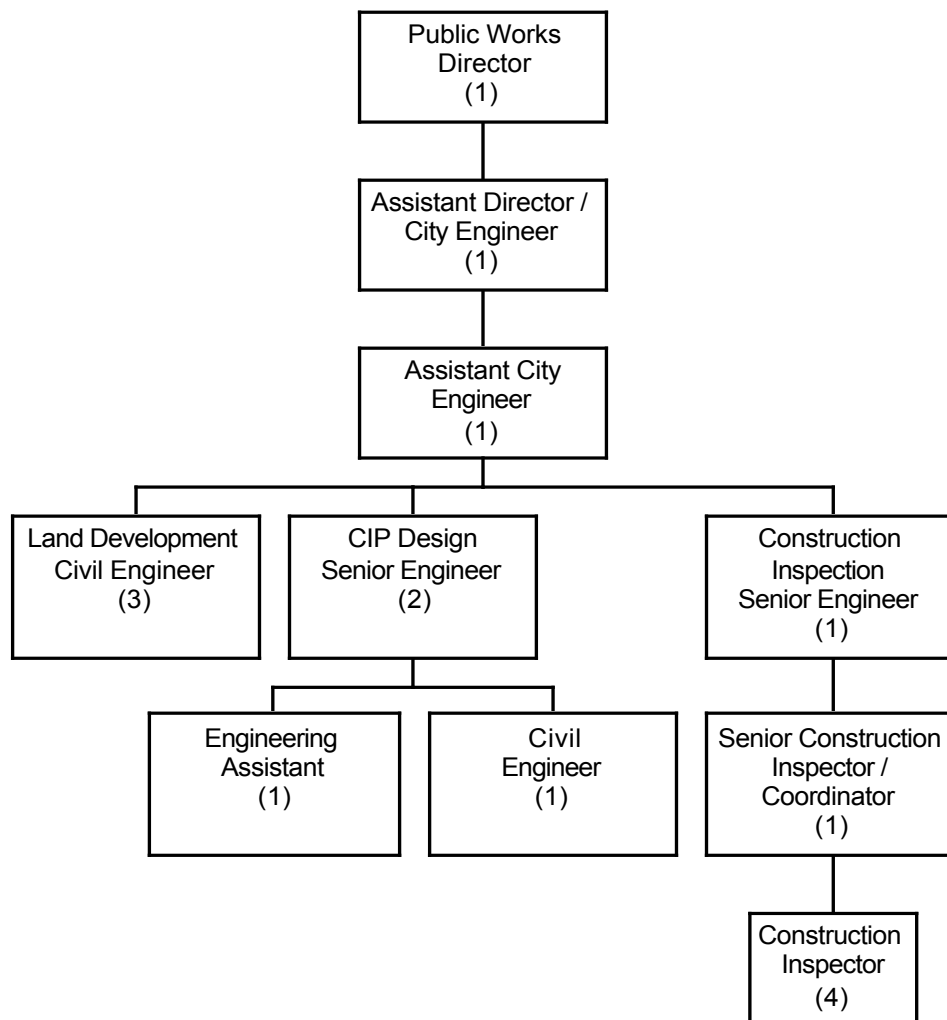


Exhibit 2 at the end of this chapter provides a summary of the key roles and responsibilities for each of the positions in the Engineering Division.

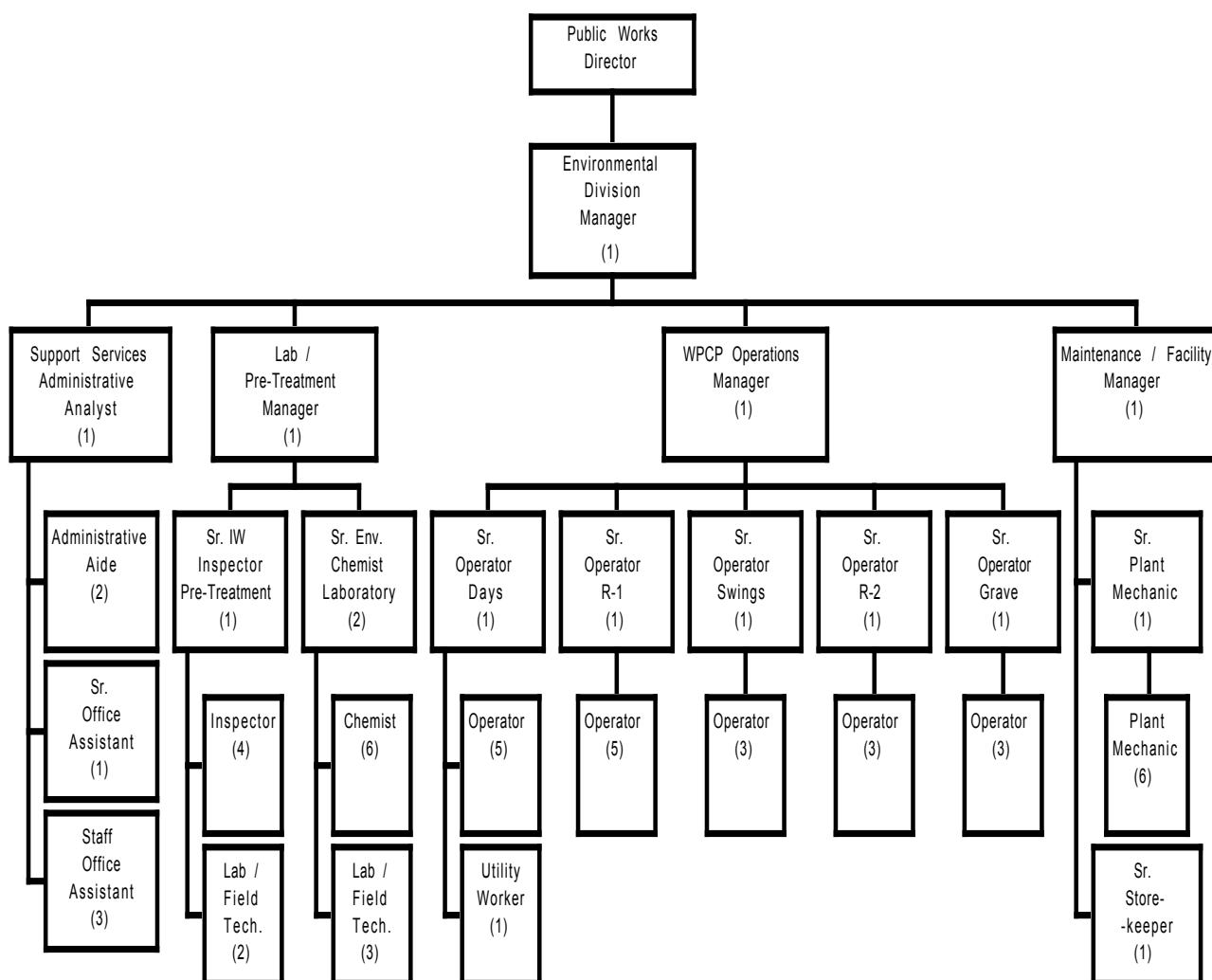
A description of the services provided by each of the programs within the Engineering Division is presented below.

- **Land Development.** It is estimated that land development engineers spend approximately 20% of their time on development project applications, 25% of their time reviewing and processing subdivision maps associated with development projects, and 35% of their time reviewing and issuing encroachment permits. The remaining 20% is spent on the maintenance and updating of records, general services to both internal and external customers, etc. This program is responsible for the following services:
 - Reviews development project applications, including researching and analyzing data, establishing project conditions of approval and reviewing general plan sub-elements, environmental impact reports and specific plans.
 - Reviews and processes subdivision maps associated with development projects, including providing technical review of maps, easement deeds and/or other legal descriptions. Reviews Engineer's estimates, prepares subdivision agreements, calculates and collects development impact fees.
 - Reviews and issues encroachment permits. This involves reviewing any proposed work in the public right-of-way or in a public utility easement.
- **Capital Projects Design.** The staff assigned to Capital Projects Design manages most of the City's capital improvement projects (and the associated processes involving the client, consultants, contractors, and all relative City personnel involved with purchasing, inspections, etc.).
- **Inspections.** The staff assigned to Inspections assures that all contract requirements are met during the construction phase for capital improvement projects, developer-constructed assets, and encroachment permits.

Exhibit 3, presented at the end of this chapter, provides a summary of the services provided by the Division, along with key workload indicators:

4. THE ENVIRONMENTAL DIVISION IS AUTHORIZED 60 POSITIONS.

The Environmental Division Manager manages the Division. This Division operates the City's Water Pollution Control Plant. The Division is responsible for wastewater treatment, including pollution detection and prevention. This Division is also responsible for coordination and implementation of the City's NPDES stormwater permit. The organization of this Division is shown by the following chart, which also includes the number of authorized positions for each classification:



The design capacity of the Water Pollution Control Plant is dry weather flow of 29.5 million gallons a day and a peak wet weather flow of 41.8 million gallons a day.

The facility comprises four distinct process areas operating together as a single treatment plant; the primary treatment plant, the oxidation ponds, the tertiary treatment facilities, and the solids processing facilities.

- **Primary treatment plant.** The primary treatment plant was initially constructed in 1956 to provide influent screening/grinding, raw sewage pumping and metering, pre-aerated grit removal, and primary sedimentation. The facilities have been expanded several times, most recently with the construction of the tenth sedimentation basin, grit handling equipment, and the auxiliary pump station in 1984.
- **Oxidation ponds.** The oxidation ponds were constructed in their present form in 1968. They are technically considered facultative ponds due to their depth and the presence of an anaerobic bottom layer. The ponds were originally designed for high Biological Oxygen Demand (BOD) loadings during the summer canning season, which were accommodated through supplemental surface aeration (2,500 hp total installed capacity). Pond loadings were greatly reduced with the departure of the canneries in 1983.
- **Tertiary treatment plant.** The tertiary facilities were originally constructed in 1973 and expanded in 1984 to provide additional treatment of oxidation pond effluent. Re-circulated flow from the oxidation ponds is pumped to the tertiary plant, which provides nitrification, solids removal, effluent filtering, disinfection, and de-chlorination prior to discharge into the Sunnyvale Slough.
- **Solids handling facilities.** Solids handling is provided by four anaerobic digesters, which process all primary sludge and scum, plus a portion of the secondary solids (referred to as "float") from the air flotation tanks. Currently, the three smaller digesters are operated as primary digesters, with the fourth (larger) digester operated as a secondary digester to concentrate digested sludge prior to dewatering. Solids removed from the bottom of the secondary digester are routed to the dewatering facility, which utilizes 16,200 square feet of slotted drainage tiles to dewater the polymer-conditioned sludge. After this initial dewatering, solids are removed to a paved drying area for additional solar drying. Secondary solids from the air flotation tanks, not processed through the solids handling facilities, are returned to the oxidation ponds.

Exhibit 4 at the end of this chapter provides a summary of the key roles and responsibilities for each of the positions in the Water Pollution Control Plant.

A description of the services provided by each of the programs within the Water Pollution Control Plant is presented below.

- **Maintenance and Facilities.** Section preventively maintains, provides corrective maintenance, performs overhauls/rehabilitations, and modifies and repairs electrical, mechanical and instrumentation equipment used throughout the tertiary wastewater treatment process, power generation facility, recyclable water processing and pump stations. The staff operates during Day Shift and interfaces regularly with plant operations staff.
- **Plant Operations.** Plant operations staff operate the plant 24/7 in five (5) shifts in four assignment areas: Inside Operator Rounds, Outside Operator Rounds, Tertiary Operator Rounds, and Dewatering. These staff monitor and adjust plant processes to ensure that local, State, and Federal regulatory requirements are met. These staff also maintain equipment, including cleaning, oiling and conducting minor maintenance through preventive operating procedures (POPs) to pumps, motors and other plant equipment.
- **Laboratory and Industrial Waste Pre-Treatment.** This Section has two roles: industrial waste pre-treatment and wastewater and water laboratory analysis. The section permits and oversees 45 industries defined as 'Significant Industrial Users' and their pre-treatment facilities. This includes: inspects and samples industrial wastewater, non-point sources, and other discharges and performs field measurements of industrial wastewater flows. The Section also performs commercial inspections, such as restaurants, for compliance with grease trap ordinance, storm water discharge, and other relevant regulations. The Section collects samples from the Water Pollution Control Plant, water distribution system, industrial, commercial, recycled water, and residential dischargers for laboratory analysis in accordance with local, State, and Federal requirements. The section performs various physical, chemical and bacteriological analyses of potable water, wastewater, or industrial waste samples as required by the NPDES permit, pre-treatment program, Water Division, and laboratory certification requirements.

Exhibit 5, presented at the end of this chapter, provides a summary of the services provided by the Water Pollution Control Plant, along with key workload indicators.

5. THE FIELD SERVICES DIVISION IS AUTHORIZED 73 POSITIONS.

A Superintendent manages the Field Services Division. This Division is responsible for the operation and maintenance of the water distribution, wastewater collection, and stormwater collection systems, and the maintenance of the City's streets.

The organization of this Division is presented in the chart below, which also includes the number of authorized positions for each classification.

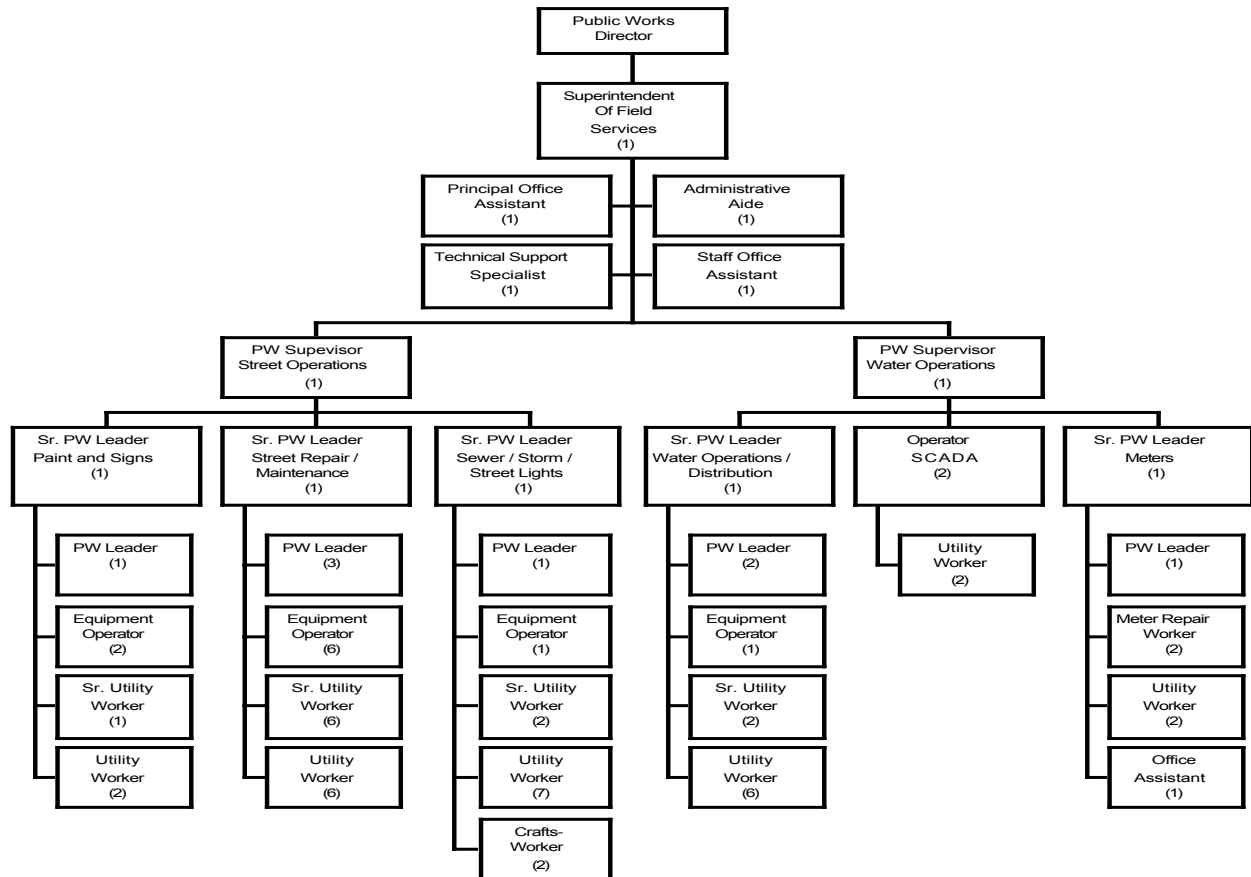


Exhibit 6, at the end of this chapter, provides a summary of the key roles and responsibilities for each of the positions in the Field Services Division.

A description of the services provided by each of the programs within the Field Services Division is presented below.

- **Water Operations and Distribution.** This Section is responsible for the operation and maintenance of the water distribution system to ensure reliable delivery of water that meets all quality and health standards. This system comprises 282.7 miles of water mains. The City obtains approximately potable water from the San Francisco Water Department (Hetch Hetchy), Santa Clara Valley Water District, City wells, and reclaimed wastewater from the Water Pollution Control Plant. The average daily water demand for the City is approximately 22 million gallons per day.

- **Water Meters.** This Section is responsible for testing, repairing and replacing of water meters. There are 27,837 water meters installed in the City (excluding meters on fire lines).
- **Paint and Sign.** This Section maintains street signs, street lines, street legends, and curb painting. The table below highlights the work output of the section.

Work Task	Count Point	Work Output
Sign/pole installation	Number of signs/poles	360
Fabricate sign	Number of signs	1,251
Repair traffic sign/pole	Number of signs/poles	1,411
Replace traffic sign/pole	Number of signs/poles	1,643
Street striping	Lineal feet	856,373
Maintain crosswalks/limit bars	Lineal feet	41,566
Maintain legends	Legends	1,839

- **Street Maintenance.** This Section is responsible for pavement maintenance; providing major and minor corrective repair, such as pavement grinding, patching, and skin coating on streets; repairing hazardous pavement conditions; providing preventive maintenance activities such as chip seal and slurry seal; and patching utility trenches for water and wastewater programs. There are over 300 centerline miles of streets. The table below highlights the work output.

Work Task	Count Point	Work Output
Remove pavement by grinding	Square foot	59,122
Deep lift patching	Square foot	40,250
Crack sealing	Lineal foot	722,000
Permanent patching	Square foot	339,567
Chip sealing	Square foot	1,597,000
Street sweeping	Curb miles swept	9,936

- **Streetlight, Stormwater, and Wastewater Collection System Maintenance.** This Section is responsible for maintenance and repair of the wastewater collection system, the stormwater collection system, the street lighting system, and providing USA locates. There are 282 miles of wastewater mains, 327 miles of stormwater mains, 8,019 City-owned streetlights and 841 Pacific Gas and Electric-owned streetlights. The table below highlights the work output.

Work Task	Count Point	Work Output
Jet flush sewers	Lineal feet	10,001,000
Inspect and clean manholes	Manholes	1,099
CCTV inspection	Linear foot	33,800
Remove lateral plugs	Lateral plugs	1,478
Remove main plugs	Main plugs	140
Jet flush storm drains	Lineal feet	18,586
Clean drain inlets	Number of inlets	3,084
Repair streetlights	Number of streetlights	800
Repair/replace streetlight amps	Number of streetlight lamps repaired/replaced	674

Exhibit 7, presented at the end of this chapter, provides a summary of the services provided by the Field Services Division, along with key workload indicators.

6. THE FLEET, TREES, AND LANDSCAPING DIVISION IS AUTHORIZED 47 POSITIONS.

The Fleet, Trees, and Landscaping Division is managed by the Superintendent. This Division is responsible for the maintenance of street trees, sidewalks and boulevard landscaping, and the acquisition, maintenance, and repair of all City vehicles. The organization of this Division is presented in the chart below, which also includes the number of authorized positions for each classification.

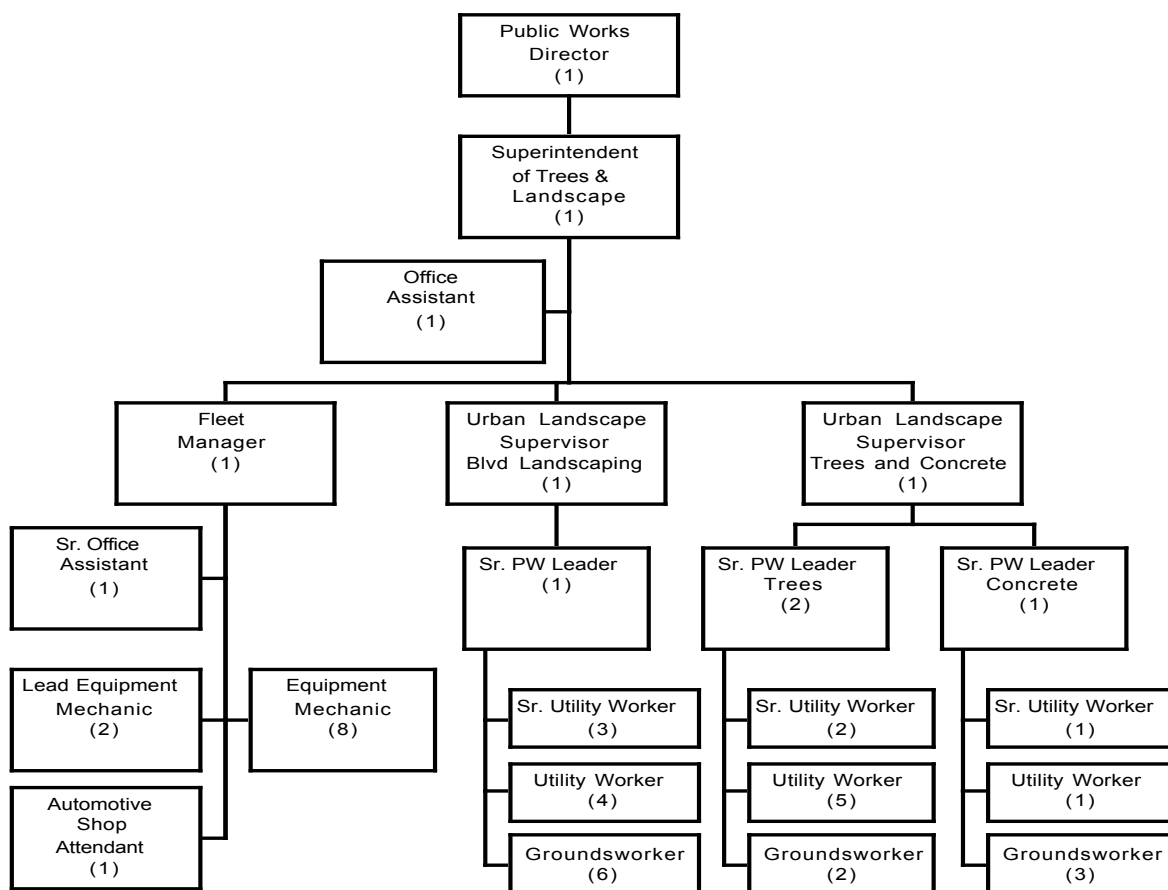


Exhibit 8 at the end of this chapter provides a summary of the key roles and responsibilities for each of the positions in the Fleet, Trees, and Landscaping Division.

A description of the services provided by each of the programs within the Fleet, Trees, and Landscaping Division is presented below.

- **Trees and Concrete.** This Section provides pruning services for street trees, removes trees and plants new trees, and maintains the City's sidewalks. Sidewalk replacement and curb and gutter replacement services are provided by contract at an annual cost of approximately \$467,000. Similarly, replacement tree planting and stump removal are also performed by contract at an annual cost of approximately \$85,000. The table below highlights the work output of the section.

Work Task	Count Point	Work Output
Scheduled tree trimming	Tree	6,046
Service request pruning	Tree	62
Priority pruning	Tree	561
Emergency pruning	Tree	73
Replacement tree planting	Tree	384
New tree planted	Tree	181
Tree removed	Tree	312
Tree stump removed	Tree stump	413
Young tree pruned	Tree	1,440
Temporary A/C Repair to Sidewalks	Lineal foot of sidewalk	4,514
Grind sidewalk displacement	Lineal foot of sidewalk	30,481
Remove parkway concrete	Square foot of concrete removed	13,835
Root prune sidewalks	Lineal foot of sidewalk	8,869

- **Boulevard Landscaping.** This Section maintains City roadside medians (including plant material, irrigation systems, weeds and litter, etc., the landscaping at six (6) City Fire Stations, seventeen (17) City water well facilities, the Water Pollution Control Plant (WPCP), corporation yard, downtown parking district, Multi Modal Train Station and Murphy Street. The total acreage maintained by this section is presented in the table below.

Locations Maintained	Unit of Measure
Parking District Area/Medians	53.9 acres
Water Wells	9.9 acres
Fire Stations	3.3 acres
Water Pollution Control Plant Grounds	1 acre
Sound Walls	5.4 acres

- **Fleet.** The Fleet section is responsible for maintaining the City's fleet, which amounts to 541 pieces of equipment. This equipment is assigned to the following departments (based on the Active Equipment List as of 12/19/05), presented below:

– 12 – Community Development Department

- 151 – Department of Parks and Recreation
- 139 – Department of Public Safety
- 233 – Department of Public Works
- 5 – Finance
- 1 – Information Technology

The table below highlights the work output of the section.

Work Task	Count Point	Work Output
Preventive maintenance	Service/inspections performed	2,233
Repairs performed	Repairs completed	5,174
Acquire vehicles	Number of vehicles acquired	48
Dispose of surplus equipment	Number of vehicles disposed	91

Exhibit 9, presented at the end of this chapter, provides a summary of the services provided by the Fleet, Trees, and Landscaping Division, along with key workload indicators.

7. THE SOLID WASTE DIVISION IS AUTHORIZED 9 POSITIONS.

The Solid Waste Manager manages this Division. The mission of the Solid Waste Program is to reduce the amounts of refuse disposed and to provide reliable, competitively priced, and environmentally sound services for waste reduction, recycling, and solid waste collection and disposal. The Division is responsible for managing the collection and disposal of solid waste and household hazardous waste, operation of the SMaRT Station, and the City's closed landfill. The organization of this Division is presented in the chart below, which also includes the number of authorized positions for each classification.

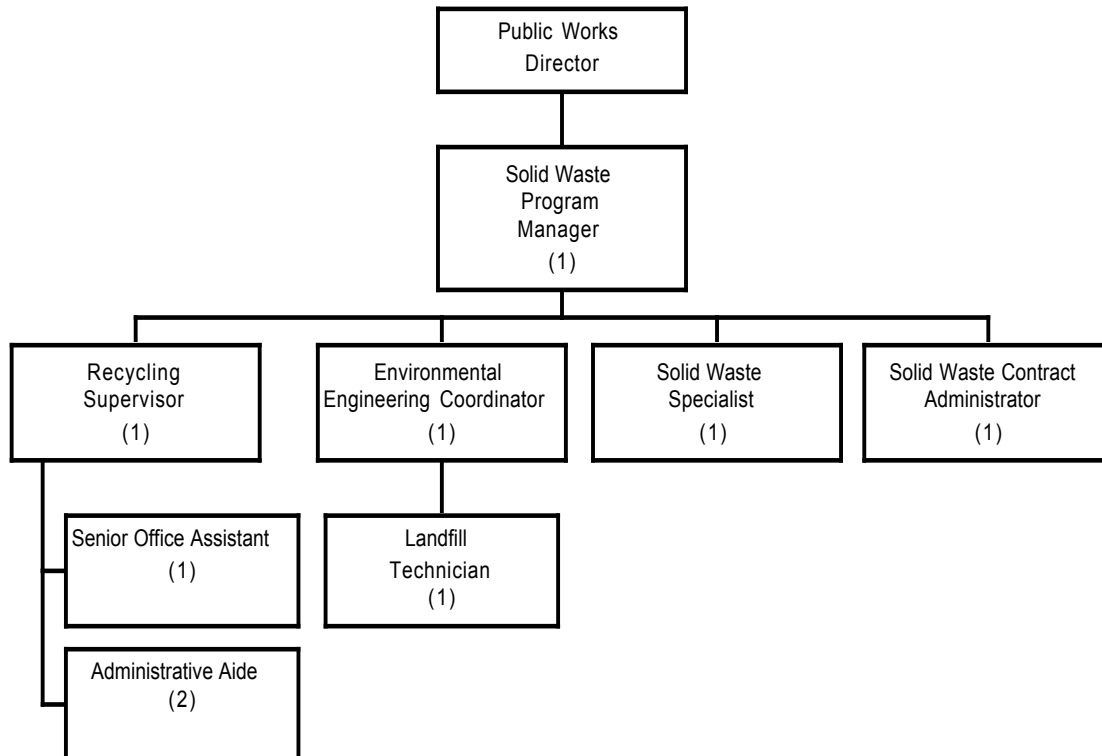


Exhibit 10 at the end of this chapter provides a summary of the key roles and responsibilities for each of the positions in the Solid Waste Division.

A description of the services provided by each of the programs within the Solid Waste Division is presented below.

- **Contract Management.** The Division is responsible for the management of a number of contracts. The most significant contracts managed by the Division include the franchised garbage or refuse collection contract (managed by the Solid Waste Specialist), the GreenTeam/Zanker contract for the SMaRT station (managed by the Solid Waste Contract Administrator), and the Kirby Canyon Landfill (managed by the Solid Waste Contract Administrator).
- **Recycling.** This program promotes source reduction and recycling services and events for single-family and multi-family residents, businesses, institutions, and City facilities; oversees the Household Hazardous Waste Program; interfaces with the refuse collection contractor in regard to recycling program; and prepares annual reports to CIWMB to document City's compliance with AB 939.
- **Environmental Engineering.** This program monitors and manages the City's landfill gas, soil cover/vegetation, wildlife, groundwater, storm water runoff, and landfill post-closure land uses in compliance with regulatory requirements.

Exhibit 11, presented at the end of this chapter, provides a summary of the services provided by the Solid Waste Division, along with key workload indicators.

8. THE TRANSPORTATION AND TRAFFIC DIVISION IS AUTHORIZED 7 POSITIONS.

The Transportation and Traffic Manager manages the Division. The Traffic and Transportation Division is responsible for managing the contract for traffic signal maintenance; intergovernmental coordination, including Federal, State, regional and local coordination and liaison with schools on school traffic issues; enhancing roadway safety; plan checking development plans regarding their transportation impact; support of the Bicycle and Pedestrian Advisory Committee; conducting traffic calming studies; managing traffic signal operations and traffic signal infrastructure improvements, and planning for infrastructure replacement projects related to traffic and transportation. The organization of this Division is presented in the chart below, which also includes the number of authorized positions for each classification.

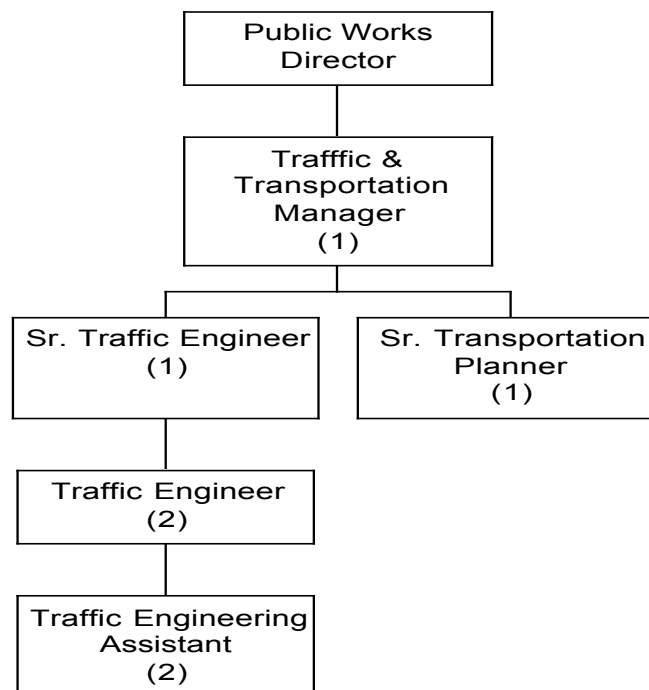


Exhibit 12 at the end of this chapter provides a summary of the key roles and responsibilities for each of the positions in the Traffic and Transportation Division.

A description of the services provided by each of the programs within the Traffic and Transportation Division is presented below.

- **Transportation Planning.** Plans the City's transportation system including responding to citizen service requests (such as requests for stop signs, traffic signals, speed bumps, etc.), completing traffic studies, transportation plans such as the Fair Oaks/Tasman Bicycle and Pedestrian Circulation Plan, traffic calming studies, etc. The responsibilities for transportation planning include the support of the City's Bicycle and Pedestrian Advisory Committee, and coordinating transportation issues on a regional basis through participation in regional planning, operations coordination, congestion management, legislative advocacy, and outside transportation funding.
- **Traffic Signal Maintenance.** Designs, operates, and manages the contract for maintenance, and coordinates traffic signal operations within the City to facilitate the safe and efficient movement of traffic through signalized intersections.
- **Development Review.** Assures that transportation facilities and mitigation measures proposed for development are adequate to meet City transportation plans, design standards, and legal requirements.

Exhibit 13, presented at the end of this chapter, provides a summary of the services provided by the Traffic and Transportation Division, along with key workload indicators.

Exhibit 1(1)

**Roles and Responsibilities of the
Administration Division**

Staffing By Classification		Roles and Responsibilities
Director	1	<ul style="list-style-type: none"> • This position provides the overall executive management and administration of all the divisions within the Public Works Department. • Responsible for developing the overall priorities of the Department, including the development of policies and procedures, performance goals and objectives, monitoring of budget, etc. • Prepares the operating budget and confers with the City Manager on formulating the City's capital improvement program, and meets with Department managers on a regular basis to discuss operations, issues, performance, etc.
Senior Administrator / City Property Manager	1	<p>This position supports the Director and represents the Department in areas such as finance/budget, health and safety, floodplain management, disadvantaged businesses and records management. The position is also responsible for property related duties such as:</p> <ul style="list-style-type: none"> • Negotiating with property owners, real estate professionals, and others having an interest in real estate proposed to be purchased, sold, or leased by the City. • Supervising and reviewing appraisals to establish value for specific City purchases and sales. • Preparing deeds, contracts, easements, escrow instructions and other documents necessary to purchase, lease, or sell real property. • Manages some of the City's rental units, including rent setting, enforcement of terms and conditions of agreement, coordinates property maintenance, etc. • Advises other departments on various types of real estate transactions and issues. • Gathers real property related statistical data and compiles reports, as necessary.

Exhibit 1 (2)

Staffing By Classification		Roles and Responsibilities
Administrative Aide	1	<ul style="list-style-type: none"> • The Administrative Aide provides nearly 100% support to the Engineering Division for capital improvement projects from design to closeout phase. • Supervises a Principal Office Assistant. • Assembles bid packages, including appropriate forms, specifications, qualifications and provisions, and forwards to Purchasing. • Processes Engineering-related paperwork, including project change orders, progress payment submittals, project closeout, project-specific inter-department customer satisfaction surveys, contractor payroll records reviews, and annual warranty report. • Maintains hardcopy Engineering project files and various electronic record-keeping databases (e.g. Closeout Report).
Principal Office Assistant	1	<ul style="list-style-type: none"> • Provides nearly 100% support to Engineering Division for capital improvement projects from design to closeout phase. • Maintains Project Administration Section (PAS) Microsoft Access databases, including project status and tracking logs. • Processes Notice-to-Proceed paperwork and schedules pre-construction meetings. • Maintains encroachment permit files and notifies inspectors of encroachment permit engagements/inspections. • Assists with updating of hardcopy project files. • Communicates regularly with contractors and Engineering Project Managers.
Administrative Aide (Confidential)	1	<ul style="list-style-type: none"> • Executive assistant to the Public Works Director. • Performs wide range of varied and complex staff work. • Tracks and responds to Department inquiries, complaints and requests for services, and assures timely follow-up and response. • Produces correspondence for the Public Works Director. • Works on various special projects in support of the Public Works Director. • Assists with reviewing monthly budget reports. • Acts as Department liaison for Intergovernmental Relations and reports to Council. • Acts as Department Personnel Representative, including maintaining confidential personnel files. • Assists Department management and other City staff with Department-related issues and projects. • Coordinates Department special events. • Supervises 2 Senior Office Assistants and 1 Staff Office Assistant.

Exhibit 1 (3)

Staffing By Classification		Roles and Responsibilities
Senior Office Assistant	1	<ul style="list-style-type: none"> • Serves as primary answer point for Engineering, Traffic and Transportation, and Administration. Back-up answer point for Solid Waste • Receives, sorts, and distributes mail on behalf of Engineering, Traffic and Transportation, and Administration. • Works with contractor and Utilities in handling garbage complaints. Maintains database for complaints. • Processes weekly timecards (four [4] divisions). • Key Operator for copier, printer, and fax machine. • General office support (copies, typing, filing etc.). • Serves as back-up to RTC Liaison. • Mass mailings (Public Notices) for the Transportation and Traffic Division. • Process monthly rent payments for City-owned properties.
Senior Office Assistant	1	<ul style="list-style-type: none"> • Serves as purchasing liaison. Processes Accounts Payable for Administration, Solid Waste, Traffic Engineering, and Engineering (including Receivers, Purchase Orders, Purchase Requisitions, Change Orders, Progress Certificates, Field Orders, etc.). • Monitor Engineering Purchase Orders. • Processes Hydrant Meters for outside contractors including processing water usage paperwork for refunds and/or invoicing to Finance. • Assists with monitoring monthly reports for City properties and budget reports. • Serves as back-up to Department Administrative Aide and as main answer point.
Staff Office Assistant	1	<ul style="list-style-type: none"> • Maintains office files for four (4) divisions (Engineering, Traffic and Transportation, Solid Waste and Administration.). • Maintains digital files of Aerial Maps, project plans, parcel maps, tract maps, utility maps, indexes, and general work forms. • Assists with creating work forms and updates as needed • Maintains legal files. • Digitizes hard copy files. • Performs general clerical support for four (4) divisions.

Exhibit 2 (1)

**Roles and Responsibilities of the
Engineering Division**

Function	Staffing By Classification		Roles and Responsibilities
Administration	Assistant Director of Public Works / City Engineer	1	<ul style="list-style-type: none"> • This position manages the direct supervision of the Assistant City Engineer. • Works with staff to establish criteria for design and construction of projects. • Assists with the development of the capital project budget. • Prepares specifications for construction and maintenance projects. • Coordinates projects with work of other City departments and other private and public agencies. • Works with Division personnel to ensure that budgetary program goals, objectives, and outcomes are being met. • Serves as the Public Works Director when needed.
	Assistant City Engineer	1	<ul style="list-style-type: none"> • This position supervises the staff of the Engineering Division. • Is primarily responsible for the development of the City's capital project budget. • Coordinates projects with other City departments and outside contractors, to ensure work is done within budget, on schedule, and within scope, etc. • Overall, this positions is responsible for assigning and monitoring the workload activities of engineers, consultants, and inspectors.

Exhibit 2 (2)

Function	Staffing By Classification		Roles and Responsibilities
Land Development	Civil Engineer	2	<ul style="list-style-type: none"> Responsible for reviewing development project applications, including researching and analyzing data, establishing project conditions of approval, and reviewing General Plan elements, Environmental Impact Reports, and Specific Plans, etc. Coordinates with other City department/division staff as necessary. Reviews and processes subdivision maps associated with development projects, including providing technical review of maps, easement deeds, etc. Reviews Engineer's estimates, prepares subdivision agreement, calculates and collects development impact fees, etc. Reviews and issues encroachment permits, and coordinates with Public Works inspector and Field Services personnel as needed during construction. Maintains and updates engineering records, official maps, records drawings, maps and easement deeds, provides records to the public, etc. Provides general engineering services to the public at the front-counter, by phone, etc., as well as assists internal customers as appropriate.
	Senior Engineer	2	<ul style="list-style-type: none"> These positions are responsible for managing the design of City's Capital Improvement Projects for all City facilities, including buildings, parks, bridges, etc. Involved in cost estimating and budget development for projects, and ensures that construction meets plans and specifications. Involved with developing requests for proposals for design consultants, including their selection and management. Involved with development requests for proposals for builders, including identification of the scope of work, contract requirements, costs, etc.
	Civil Engineer	2	<ul style="list-style-type: none"> Prepares or assists in the preparation of specifications, plans, estimates and reports pertaining to the construction, maintenance and operation of a capital projects. Assists the Senior Engineers on capital projects as appropriate.
	Engineering Assistant II	1	<ul style="list-style-type: none"> Assists with projects, including simple design work (e.g., fencing projects), working with AutoCAD, some administrative work, checking consulting contracts and invoices, etc.

Exhibit 2 (3)

Function	Staffing By Classification	Roles and Responsibilities
Inspections	Senior Engineer	1 <ul style="list-style-type: none"> • Responsible for Construction Management of City's CIP and inspection of Capital Improvement Projects (for City parks, buildings, roads, bridges, etc.). • Responsible for ensuring projects are being completed per plans and specifications. • Responsible for ensuring that all City CIP projects are completed on schedule and within the allocated budget. • Holds weekly progress meetings with contractors, customers, etc., to discuss progress, technical issues, and complaints. • Responsible for managing and processing all changes to the scope of work and contract (has authority of up to \$1,000 for cost changes). • Reviews and processes requests for information, request for quotations, change orders, etc. This involves negotiation with contractors over issues identified. • Responsible for quality assurance for developer constructed infrastructure and for managing the City's inspections for encroachment permits (within City's right-of-way, including hook-ups for sewer, water, utilities, etc.)
	Senior Construction Inspector / Coordinator	1 <ul style="list-style-type: none"> • Supervises the Construction Inspectors, as well as contract inspectors, when needed. • Assists the Senior Engineer in all phases of construction from pre-construction to project closeout. • Monitors performance of inspectors, regularly meeting with them to discuss project status, issues, and future activities. • Ensures that quality control and quality assurance activities are working effectively (including regularly checking design submittals, construction submittals, testing, training, documentation, etc.)

Exhibit 2 (4)

Function	Staffing By Classification	Roles and Responsibilities	
Inspections (Continued)	Public Works Construction Inspector	4	<ul style="list-style-type: none"> • These personnel provide on-site inspections to ascertain that approved plans and specifications are being followed and that proper materials are being used and installed correctly. • Maintains daily logs, records, and working files, and prepares reports of work performed. • Reviews contractor's requests for payment and prepares payment certificates for review and processing. • Monitors progress of construction contracts and construction work to ensure that the contractor is keeping record documents current. • Personnel are assigned inspections based on a combination of geographic area, workloads, training, specialty, etc.

Exhibit 3 (1)

**Summary of the Services and
Workload of the Engineering Division**

Function	Description of Services	Key Workloads
Land Development	<ul style="list-style-type: none"> Reviews development project applications, including researching and analyzing data, establishing project conditions of approval and reviewing general plan sub-elements, environmental impact reports, and specific plans. Reviews and processes subdivision maps associated with development projects, including providing technical review of maps, easement deeds and / or other legal descriptions. Reviews Engineer's estimates, prepares subdivision agreements, calculates and collects development impact fees. Reviews and issues encroachment permits. This involves reviewing any proposed work in the public right-of-way or in a public utility easement. 	<ul style="list-style-type: none"> It is estimated that land development engineers spend approximately 20% of their time on development project applications, 25% of their time reviewing and processing subdivision maps associated with development projects, and 35% of their time reviewing and issuing encroachment permits. The remaining 20% is spent on the maintenance and updating of records, general services to both internal and external customers, etc. The staff reviews approximately 120 Development Project applications per year. The staff reviews and processes an average 10 to 12 maps per year. The staff issues an average of 269 encroachment permits per year.
Capital Improvement Projects	<ul style="list-style-type: none"> Staff provide management of the City's capital improvement projects (and all associated processes involving the client, consultants, contractors, and all relative City personnel involved with purchasing, inspections, etc.). These capital improvements include such projects as downtown projects, street projects, park projects, general projects, storms and sanitary sewer projects, solid waste projects, water projects, operations projects, etc. Overall, provide functional and cost effective designs that meet approved scope and are within project budget, ensure construction is in accordance with approved plans and specifications, schedule and budget, and meet the needs of the customer by communicating regularly throughout the process, etc. 	<ul style="list-style-type: none"> As of 11/30/05, these personnel were managing the following (projects with charge numbers): <ul style="list-style-type: none"> 3 Downtown projects, total over \$13 Million. 12 Street /Traffic projects, total over \$26 Million. 5 park projects, total over \$600,000. 9 general projects, total budget nearly \$5 Million. 21 storm and sanitary sewer projects, total budget nearly \$11 Million. 1 solid waste project, total budget nearly \$4 Million. 18 water projects, total budget over \$5 Million. 4 operations projects, total budget over \$740,000 The grand total for capital projects was \$65,662,197 (as of 11/30/05).

Exhibit 3 (2)

Function	Description of Services	Key Workloads
Inspections	<ul style="list-style-type: none"> Inspectors work to ensure that all contract requirements are met during the construction phase for capital improvement projects (and encroachment permits). Personnel inspect all on-going projects, scheduling and attending meetings, perform constructability review of plans and specifications (projects in design), etc. Review submittals (construction schedules, schedule of values, storm water pollution prevention plan, traffic control plan, construction sequencing plan, warranties, material submittals, test reports, record drawings / documents, closeout documents, etc.). Staff respond to contractor's requests for information, and provide information on the preparation of request for quotations. Inspectors make written and oral process reports on inspections, work performed and progress of projects, and approve and recommend progress payments to contractors. Schedule and conduct pre-final and final inspection with customer, contractor, and project team members at the completion of all projects. Ensure that all project closeout documents are submitted by the contractor and approved by the City before processing of the final invoice. 	<ul style="list-style-type: none"> Based on program active project lists, the total number of capital improvement projects that inspectors were responsible for was 73, as of 11/30/05 (total of \$65.6 Million). Inspectors were responsible for \$95,000 in value of developer constructed assets in 2004-05. Issues 265 encroachment permits during FY 2004-05. <p>Note: Of the encroachment permits issued, approximately 10% were major permits associated with significant infrastructure improvements.</p>

Exhibit 4 (1)

**Roles and Responsibilities of the
Staff of the Water Pollution Control Plant**

Function	Staffing By Classification		Roles and Responsibilities
Administration	Manager	1	<ul style="list-style-type: none"> • Responsible for reviewing and evaluating all programs and operations of the Division, including operation of the Treatment Plant, the maintenance and repair of WPCP assets, laboratory, and the pre-treatment programs. • Coordinates the development of the budget, including performance goals, objectives, and priorities. • Maintains budgetary controls for the Division budget and approved expenditures. • Provides various administrative duties, including coordination with the Director, City management, City Council, etc.
Support Services	Administrative Analyst	1	<ul style="list-style-type: none"> • Recommends procedures and processes for, and oversees implementation of, the stormwater permit citywide. • Performs WPCP and stormwater regulatory reporting and documentation to various entities, including Regional Board, State, etc. • Attends relevant environmental intergovernmental group meetings, as required. • Compiles Plant Plans, as requested.

Exhibit 4 (2)

Function	Staffing By Classification		Roles and Responsibilities
Support Services (Continued)	Administrative Aide	2	<ul style="list-style-type: none"> Position performing as Office Manager supervises one (1) Sr. Office Assistant and three (3) Staff Office Assistants and conducts other duties such as: <ul style="list-style-type: none"> Budget analysis and reporting of information to Division's managers. Maintains Sewer Replacement Schedule "Rental Rates" and collects data for annual Sewer Rate submittals. Audits cell phone and Division phone monthly bills. Schedules and coordinates various meetings including ad-hoc, safety, Capital Improvement Program, etc, and frequently acts as Division representative on inter-department committees. Manages various projects specific to the WPCP, such as Office Remodels, File Management System creation, IT Upgrades, coordinates ergonomic evaluations, prepares CCI (Community Condition Indicator measures / statistics). Position performing as Environmental Outreach Coordinator performs: <ul style="list-style-type: none"> Water Conservation and pollution prevention outreach to community, including schools, businesses, hotels as required by two NPDES permits. Development and administration of utility bill inserts.
	Sr. Office Assistant	1	<ul style="list-style-type: none"> Operates at WPCP front desk and assists with receptionist duties, including greeting visitors, answering phones, operating radio and paging systems. Schedules training and conference rooms. Handles personnel-related functions and serves as Personnel Representative for the WPCP to include processing all personnel related documents such as PAF's, accident reports, workers comp claims, separation & retirement forms, address changes, WPCP key issuance and out-of-class forms, as well as maintaining the WPCP Operator certificates and Personnel files. Handles all payroll-related operations to include documents such as timecard collection and QA/QC, special schedules, jury duty notices, special awards and leave requests. Responsible for two monthly reports: State Monthly Report and Water Division report, including associated Water Division data entry.

Exhibit 4 (3)

Function	Staffing By Classification	Roles and Responsibilities
Support Services (Continued)	Staff Office Assistant	<div>3</div> <ul style="list-style-type: none"> • Office Assistants assigned to WPCP are cross-trained, but generally perform specific roles. • One (1) Assistant primarily acts in the capacity of front desk receptionist: <ul style="list-style-type: none"> - Answers phones, dispatches radio calls, routes mail and serves front desk customers. - Conducts data entry such as daily nitrification reports, daily operation data sheets, and POPs and Maintenance PMs into MAXIMO software, as needed. - Orders office supplies, as requested. • One (1) Assistant primarily acts in the capacity of purchasing specialist: <ul style="list-style-type: none"> - Prepares purchase requisitions for WPCP purchases; handles and tracks blanket and one-time purchase orders and field purchase orders; reconciles individual purchasing card statements; prepares receiving reports to release payment, and conducts follow-up on invoice discrepancies / problems. - Maintains petty cash and reconciles account each period. - Processes membership renewals and training class registrations and maintains database for WPCP; prepares check requisitions for training, publications, certificates, etc., and coordinates travel requests and reconciles travel expense reports. • One (1) Assistant primarily acts in the capacity of Lab & Pre-treatment Section Support: <ul style="list-style-type: none"> - Acts as Industrial Waste answer point for incoming calls, responds to questions and routes appropriately. - Maintains and updates Industrial Waste and Lab computer database files, including lab results data, Ph tapes, etc. - Assists with correspondence, report generation, permit packages, and maintains lab and pre-treatment files to ensure compliance with relevant rules and regulations.

Exhibit 4 (4)

Function	Staffing By Classification		Roles and Responsibilities
Maintenance and Facilities	Manager	1	<ul style="list-style-type: none"> • This position is responsible for managing the maintenance, repair, and replacement of all process related equipment to maintain compliance with National Pollutant Discharge Elimination System permit. Directly supervises one (1) Senior Mechanic. • Manages the maintenance for all plant infrastructure, facilities, grounds, roads and mechanical systems at the Water Pollution Control Plant. • Establishes organizational controls to measure performance, manages the Mechanical Section's budget, prepares reports to regulatory agencies, implements safety rules and regulations, etc. • Prepares the Capital Improvement Program budget and performs overall project administration for CIP-related programs.
	Sr. Plant Mechanic	1	<ul style="list-style-type: none"> • Acts in field supervisor capacity overseeing six (6) mechanic positions and providing functional supervision of Senior Storekeeper. • Assigns weekly and daily preventive, corrective, and rehabilitative maintenance work orders to staff with relevant expertise. • Directs and oversees the maintenance, overhaul, modification and repair of mechanical, electrical, instrumentation equipment used in the wastewater treatment, power generation, recyclable water processing and pumping stations. • Assures proper prioritization of mechanical workload to provide plant reliability, economy and safety. • Provides training and mentorship of subordinate staff including completion of performance reviews. • Supports manager through completion of various administrative duties including meeting attendance, report generation, etc.
	Plant Mechanic	6	<ul style="list-style-type: none"> • Mechanics preventively maintain, provide corrective maintenance, perform overhauls/rehabilitations, and modify and repair electrical, mechanical and instrumentation equipment used in the wastewater treatment process, power generation, recyclable water processing and pump stations. • Determines and documents proper procedures for maintenance and repair of electrical, mechanical, and instrumentation equipment. • Assures that plant electrical, mechanical and instrumentation equipment is repaired and operating to provide plant reliability, economy and safety. • Utilizes MAXIMO maintenance management system to help capture SOPs, maintenance workload, and historical asset maintenance data.

Exhibit 4 (5)

Function	Staffing By Classification		Roles and Responsibilities
Maintenance and Facilities (Continued)	Sr. Storekeeper	1	<ul style="list-style-type: none"> • Orders and receives parts and supplies for preventive, corrective, and rehabilitative maintenance programs and maintains inventory of frequently-used materials and other parts. • Utilizes P-card (purchase card) for the majority of transactions. • Updating MAXIMO database system with relevant parts history and transaction information, Job Plans, as well as populating the inventory database. • Acts as MAXIMO resident expert and prints out weekly POPs and PMs for distribution to Senior staff. • Loosely maintains inventory control through paper-intensive system.
WPCP Operations	Manager	1	<ul style="list-style-type: none"> • Manages all functions associated with operation and process control of the WPCP. • Establishes organizational controls to measure performance against approved performance objectives, ensures implementation of these objectives, etc. • Prepares and administers the operational budget and supervises expenditures from that budget. • Manages and directs the activities of WPCP operators and other subordinate staff, including personnel scheduling, performance reviews, safety training, etc.
	Sr. Operator	5	<ul style="list-style-type: none"> • Acts in field supervisor capacity overseeing Operators assigned to Senior Operator's shift. • Cross-checks Operator readings during rounds and confirms operating adjustments, as needed. • Backs-up operator rounds, as necessary, due to operator absence or assignment to other responsibility. • Performs review of contractor upgrade/rehabilitation, specs, diagrams and plans. • Provides training and mentorship of subordinate staff, including field support, safety training, tailgate sessions, etc. • Directly involved in seasonal production of Title 22 Unrestricted Recycled Water. • Performs administrative duties, as required, such as work order approval, development of training sessions, meeting attendance, development of revised operational procedures, etc.

Exhibit 4 (6)

Function	Staffing By Classification		Roles and Responsibilities
WPCP Operations (Continued)	Operator	19	<ul style="list-style-type: none"> Monitors and adjusts plant processes through inspection (or rounds) of the plant to ensure that local, State, and Federal regulatory requirements are met while maintaining plant operational efficiency and effectiveness. Cleans, oils and conducts minor maintenance through Preventive Operating Procedures (POPs) to pumps, motors and other plant equipment. Operates engines, pumps, sedimentation basins, chlorinators, de-chlorinators, contact channels, power generators, digesters, SCADA instrumentation panels, man-machine interfaces (MMIs) and other complex apparatus. Regulates removal of sludge, skimming and screenings. Maintains buildings and grounds. Performs plant "housekeeping" duties. Prepares MAXIMO Work Orders for Maintenance dependent upon round/inspection results.
	Utility Worker	1	<ul style="list-style-type: none"> Assigned to Dewatering facility with one certified Operator. Scrapes dewatered sludge from beds and cleans facility. Pours sludge into beds for dewatering. Transports sludge to asphalt or storage for subsequent and further drying.
Lab and Pretreatment	Manager	1	<ul style="list-style-type: none"> This position is responsible for managing the industrial waste program, which involves the inspection and monitoring of industrial, commercial, and residential discharges to the sewage and storm drain system. This position is responsible for managing the environmental lab activities, whose personnel perform chemical, physical, and bacteriological analyses of potable water, sewage and industrial wastes, influents and effluents, and processes control samples at the plant laboratory. Overall responsibility for budget management and meeting performance objectives, including all local, State, and Federal regulations relating to the quality of the water system.

Exhibit 4 (7)

Function	Staffing By Classification		Roles and Responsibilities
Lab and Pretreatment (Continued)	Sr. Industrial Waste Inspector	1	<ul style="list-style-type: none"> • Acts in supervisory capacity overseeing four (4) IW Inspectors and two (2) Lab/Field Technicians. • Oversees one complex 'Significant Industrial User.' • Attends stakeholder and regional environmental meetings, as required. • Provides training and mentorship of subordinate staff including completion of performance reviews. • Prepares requisite environmental, administrative and regulatory reports, as necessary. Performs other administrative duties, such as budget preparation assistance and monitoring, as required.
	Industrial Waste Inspector	4	<ul style="list-style-type: none"> • Oversees specifically assigned industries defined as 'Significant Industrial Users' (SIUs) and their pre-treatment facilities. • Reviews, evaluates and approves various technical reports submitted by industrial facilities. • Inspects and samples industrial wastewater, non-point sources, and other discharges. • Performs field measurements of industrial wastewater flows. • Performs commercial inspections, such as restaurants, for compliance with grease trap ordinance, storm water discharge, and other relevant regulations. • Reviews building plans, including wastewater systems and plumbing for new facilities and facility modifications. • Issues correction orders and enforcement orders to enforce the provisions of industrial waste permits, ordinances, and applicable rules and regulations. • Other duties such as reviewing applications for discharge permits, evaluating reports, resolving issues with industries, compiling/evaluating data, etc.
	Sr. Environmental Chemist	2	<ul style="list-style-type: none"> • Acts in supervisory capacity overseeing chemists and technicians assigned to laboratory. Each Sr. Environmental Chemist supervises based on specific technical areas. • Assigns monthly Plant and Water Division testing schedules, reviews lab results and performs QA/QC on laboratory functions. • Generates monthly NPDES and water reports. Generates WS/WP/DMR performance reports. Generates annual consumer confidence report. • Procures laboratory equipment and orders supplies and reagents for laboratory. • Performs administrative duties, as required, such as development of training sessions, meeting attendance, development of revised operational procedures, annual performance reviews, etc.

Exhibit 4 (8)

Function	Staffing By Classification		Roles and Responsibilities
Lab and Pretreatment (Continued)	Environmental Chemist	6	<ul style="list-style-type: none"> Collects and analyzes samples from municipal water and water pollution control systems for laboratory analyses and process control in accordance with State and Federal permit requirements. Performs physical, bacteriological and advanced chemical analyses of potable water samples, wastewater and related byproducts to monitor treatment plant operations and industrial discharges. Operates advanced instrumentation in performing tests and analyses, including spectrophotometer, atomic absorption spectrophotometer, gas chromatograph, gas chromatograph / mass spectrometer, ion chromatograph, etc. Performs preventive maintenance on these instruments. Records test results and compiles laboratory data using manual and computer based data management systems. Other duties such as physical and advanced chemical analyses for the industrial pretreatment monitoring program, assists with special and routine reports for management, etc.
	Lab / Field Technician	5	<ul style="list-style-type: none"> Collects samples from industrial, commercial, recycled water, and residential dischargers for laboratory analysis in accordance with local, State, and Federal requirements. Collects samples from locations within the WPCP for operational decisions regarding treatment or process in control. Collects samples from drinking water sources within the distribution system for laboratory analysis. Performs various physical, chemical and bacteriological analyses of potable water, wastewater, or industrial waste samples. Keeps records of tests, field activities, and observations. Other duties as requires and requested.

Exhibit 5 (1)

**Summary of the Services and
Workload of the Water Pollution
Control Plant**

Function	Description of Services	Key Workloads
Maintenance and Facilities	<ul style="list-style-type: none"> • Section preventively maintains, provides corrective maintenance, performs overhauls/rehabilitations, and modifies and repairs electrical, mechanical and instrumentation equipment used throughout the tertiary wastewater treatment process, power generation facility, recyclable water processing and pump stations. • Operates during Day Shift and interfaces regularly with WPCP Operations staff. • Assures that plant electrical, mechanical and instrumentation equipment is repaired and operating to provide plant reliability, economy and safety, and to maintain compliance with National Pollutant Discharge Elimination System permit. • Orders and receives parts and supplies for preventive, corrective, and rehabilitative maintenance programs and maintains inventory of frequently-used materials and other parts. • Utilizes MAXIMO maintenance management system to help capture SOPs, maintenance workload, and historical asset maintenance data. 	<ul style="list-style-type: none"> • For the FY 2004-05, the following summarizes the number of products completed for various activities: <ul style="list-style-type: none"> - 1,368 preventive maintenance work orders - 27 major maintenance work orders - 56 modification maintenance work orders - 397 corrective maintenance work orders

Exhibit 5 (2)

Function	Description of Services	Key Workloads
WPCP Operations	<ul style="list-style-type: none"> • Section performs 24/7 operator rounds in five (5) coverage shifts in four assignment areas: Inside Operator Rounds, Outside Operator Rounds, Tertiary Operator Rounds, and Dewatering. • Monitors and adjusts plant processes to ensure that local, State, and Federal regulatory requirements are met while maintaining plant operational efficiency and effectiveness. • Cleans, oils and conducts minor maintenance through Preventive Operating Procedures (POPs) to pumps, motors and other plant equipment. • Operates engines, pumps, sedimentation basins, chlorinators, de-chlorinators, contact channels, power generators, digesters, dewatering facilities, SCADA instrumentation panels, man-machine interfaces (MMIs) and other complex apparatus. • Maintains buildings and grounds. Performs plant “housekeeping” duties. 	<ul style="list-style-type: none"> • For the FY 2004-05, the following summarizes the number of products for this operation: <ul style="list-style-type: none"> - 3,524,000 pounds of solids removed from process and delivered to digesters. - 5,579 products (a million gallons influent to plant). - 16,113 completed work orders for preventative operational procedures.

Exhibit 5 (3)

Function	Description of Services	Key Workloads
Lab and Pretreatment	<ul style="list-style-type: none"> • Section permits and oversees ~45 industries defined as 'Significant Industrial Users' and their pre-treatment facilities. • Inspects and samples industrial wastewater, non-point sources, and other discharges and performs field measurements of industrial wastewater flows. • Performs commercial inspections, such as restaurants, for compliance with grease trap ordinance, storm water discharge, and other relevant regulations. • Issues correction orders and enforcement orders to enforce the provisions of industrial waste permits, ordinances, and applicable rules and regulations. • Collects samples from the WPCP, drinking water sources, industrial, commercial, recycled water, and residential dischargers for laboratory analysis in accordance with local, State, and Federal requirements. • Performs various physical, chemical and bacteriological analyses of potable water, wastewater, or industrial waste samples as required by the NPDES permit, pre-treatment program, Water Division, and laboratory certification requirements. • Keeps records of tests, field activities, and observations. 	<ul style="list-style-type: none"> • For the FY 2004-05, the following summarizes the number of tests completed: <ul style="list-style-type: none"> - 1,048 for plant process parameters - 777 for spectrophotometer analysis - 2,585 for colorimetric analysis - 5,068 for solids - 5,899 selective ion electrode methods - 1,784 titrations - 5,276 metals by atomic absorption - 691 specialty metals - 218 metals cold vapor - 66 for botulism control - 20 acute toxicity testing - 328 organic compounds gas chromatography - 465 total organic carbon - 396 ion chromatography - 457 microbiological testing (wastewater) - 4,470 (wastewater samples collected)

Exhibit 6 (1)

**Roles and Responsibilities of the
Staff of the Field Services Division**

Function	Staffing By Classification		Roles and Responsibilities
Administration	Superintendent	1	<ul style="list-style-type: none"> • This is the top management position which provides administrative direction, coordination, review and control for the water supply (purchase) operations and distribution system, street repair and maintenance, sewer, storm, and street lighting. • Responsible for the planning, scheduling, controlling and determining the cost of operations. • Ensures the Division is meeting all budgetary and program goals and objectives, including for performance outcomes, etc.
	Principal Office Assistant	1	<ul style="list-style-type: none"> • Handles personnel-related functions and serves as Personnel Representative for the Division to include processing all personnel related documents such as PAF's, Accident Reports, Workers Comp Claims, separation & retirement forms, address changes, travel and expense reports, training requests and maintenance of Personnel files. • Handles payroll and fiscal related operations to include documents such as timecard collection and QA/QC, petty cash distribution and reconciliation, and payment of water bills to two water agencies. • Orders office supplies and is responsible for office equipment maintenance. • Performs special duties such as water consumption reports, monitoring the shopping cart and graffiti hotline, and handles the PG&E streetlights inventory. • Conducts other administrative duties such as meeting scheduling, agenda preparation, weather monitoring, and back-up for 'front-desk' duties.
	Administrative Aide	1	<ul style="list-style-type: none"> • Handles various budget-related responsibilities, including accounting corrections, cell phone bills, and problematic invoices. • Provides water conservation and rebate information. • Maintains tracking records for various apparatus, including radios, vehicular units, and other equipment. • Performs special projects and conducts research, as requested.
	Office Assistant	1	<ul style="list-style-type: none"> • Primarily acts in the capacity of front desk receptionist. • Answers phones, dispatches radio calls, routes mail and serves front desk customers, acting as 'Main Answer Point' for the Division. • Handles purchase orders, credit card statements, check requisitions, and invoice requisitions.

Exhibit 6 (2)

Function	Staffing By Classification		Roles and Responsibilities
Administration (Cont'd)	Technical Support Specialist	1	<ul style="list-style-type: none"> Oversees and is responsible for update and maintenance of Pavement Management System. Responsible for update and maintenance of the Service Report (complaint) System. Updates water sections maintenance Excel database and provides backup to water operators in regard to SCADA operations. Acts as Division liaison to Information Technology and provides technical/computer support to staff in Corp Yard, as requested. Schedules slurry and chip seal applications and street sweeping route dates. Updates various web pages with relevant Division operational data.
Water Operations	Supervisor	1	<ul style="list-style-type: none"> Manages the operation of the water operations and distribution system, including supervising employees engaged in day-to-day operations. Monitors and implements State and Federal regulations. Prepares the annual operating budget for the assigned programs. Assists in the preparation of capital improvement projects. Assesses the condition of program assets and makes recommendations for maintenance and repair improvements or changes.
Water Operations and Distribution	Sr. Public Works Leader	1	<ul style="list-style-type: none"> This position is responsible for the operations of various crews and programs, including water construction, auto valve maintenance and repair, gate valve maintenance, water on-call / blow-off flushing, map room, fire hydrant maintenance, etc. Oversees Water Distribution Stand-by Prepares daily, weekly, and monthly crew schedules. Maintains records for time, material, costs, and work performed. Trains and instructs subordinates. Interprets maps and plans. Analyzes maintenance operations and suggests improvements. Provides information to management regarding program and performance. Responds to citizen complaints, responds to requests for service, etc.

Exhibit 6 (3)

Function	Staffing By Classification		Roles and Responsibilities
Water Operations and Distribution (Continued)	Public Works Leader	2	<ul style="list-style-type: none"> • These positions provide the lead for 2 separate crews, primarily for water construction and for auto valve maintenance and repair. • These positions receive assignments from the Sr. PW Leader.
	Equipment Operator	1	<ul style="list-style-type: none"> • This position may operate all types of equipment in the maintenance of the water system. • Services and makes minor repairs to the equipment, reports the need for maintenance or repairs, and performs duties of other classifications, including utility worker.
	Sr. Utility Worker	2	<ul style="list-style-type: none"> • Under general directions, these positions perform skilled manual tasks in the maintenance of the water lines, sewer, etc. • These positions operate motorized equipment, lead small field crews, and other work as required.
	Utility Worker	6	<ul style="list-style-type: none"> • Services and makes running adjustments to equipment used in the performance of the assigned crew. • Operates equipment associated with water construction, auto valve maintenance, gate valve maintenance, fire hydrant maintenance, performs flow tests, etc.
SCADA	Water System Operator	2	<ul style="list-style-type: none"> • These positions maintain, repair, operate and adjust the SCADA system (Supervisory Control and Data Acquisition). • Maintains, repairs, and operates pumping station equipment including wells, pumps, automatic valves, piping, and electrical components, and storage tanks for the City's water supply and distribution system. • Monitors the operation of storm and sewer pumping stations. • Oversees Operations stand-by. • Recycled Water Representative - Water Conservation Program. • Responds to requests for service, etc.
	Utility Worker	2	<ul style="list-style-type: none"> • Under the direction of the Water System Operator, these positions assist with the maintenance, repair, operations and adjustments to the SCADA system.

Exhibit 6 (4)

Function	Staffing By Classification		Roles and Responsibilities
Meters	Sr. Public Works Leader	1	<ul style="list-style-type: none"> • This position is responsible for the operations of water meter maintenance, repair, and replacement. • This involves the testing and repairing of large meters, new-meter installation, and ensuring that all meters are running efficiently and effectively. • Prepares daily, weekly, and monthly crew schedules. • Maintains records for time, material, costs, and work performed. • Trains and instructs subordinates. • Interprets maps and plans. • Analyzes maintenance operations and suggests improvements. • Provides information to management regarding program and performance. • Responds to citizen complaints, responds to requests for service, etc.
	Public Works Leader	1	<ul style="list-style-type: none"> • Provides lead work for the repair and maintenance of water meters. • Leads and assigns meter repair tasks when necessary, monitors the work of employees, assists with the scheduling of work, maintains records, performs testing, etc.
	Water Meter Repair Worker	2	<ul style="list-style-type: none"> • These positions work in the testing, repairing, replacement and adjustment of water meters and backflow prevention devices. • Duties include disassembling, inspecting, cleaning, repairing and replacing worn or defective parts and assembling several sizes and types of water meters and backflow prevention devices, adjusting meters, testing meters at different flow rates, cleaning and maintaining shop equipment, replacing meters in the field, tracking daily tasks and keeping records, etc.
	Utility Worker	2	<ul style="list-style-type: none"> • These positions are paired with the Water Meter Repair Workers and provide assistance to them as needed.
	Office Assistant	1	<ul style="list-style-type: none"> • Involved in record keeping, report producing, sending letters for testing, data entry into the database, etc.

Exhibit 6 (5)

Function	Staffing By Classification		Roles and Responsibilities
Streets	Supervisor	1	<ul style="list-style-type: none"> • Manages the operation of the paint and sign program, street repair and maintenance, and sewer / storm / street lighting, including supervising employees engaged in day-to-day operations. • Monitors and implements State and Federal regulations. • Prepares the annual operating budget for the assigned programs. • Assists in the preparation of capital improvement projects. • Assesses the condition of program assets and makes recommendations for maintenance and repair improvements or changes.
Paint and Sign	Sr. Public Works Leader	1	<ul style="list-style-type: none"> • Acts in field supervisor capacity overseeing six (6) staff positions. • Assigns workload and schedules maintenance staff for weekly assignments based on need, complaints, etc. • Reviews performance of staff based on completed assignment logs and time card information. • Provides training and mentorship of subordinate staff, including completion of performance reviews. • Supports manager through completion of various administrative duties, including meeting attendance, report generation, etc.
	Public Works Leader	1	<ul style="list-style-type: none"> • This position receives assignments from the Sr. Public Works Leader and acts in supervisory capacity in her absence. Provides training to junior staff. • Fully cross-trained position responsible for tasks in the paint and sign crew, including the maintenance, repair, fabrication, and replacement of traffic signs, traffic markings, etc. • Operates heavy equipment associated with the paint and sign crew (e.g. stripers).
	Equipment Operator	2	<ul style="list-style-type: none"> • Under general supervision, operates equipment associated with the paint and sign functions (e.g., paint stripers, etc.). • Fully cross-trained position responsible for tasks in the paint and sign crew, including the maintenance, repair, fabrication, and replacement of traffic signs, traffic markings, etc. • Provides back-up to street sweeper operator, as necessary.

Exhibit 6 (6)

Function	Staffing By Classification		Roles and Responsibilities
Paint and Sign (Continued)	Sr. Utility Worker	1	<ul style="list-style-type: none"> • Performs the field functions associated with the paint and sign crew. • Provides scheduled maintenance services through painting or thermo-plastic application to street lines, street legends, and curbs. • Conducts signage maintenance in assigned community areas such as cleaning, repair, replacement, fabrication, and foliage removal. • Conducts arterial checks and median checks annually. • Installs traffic reflectors, delineators, and other street-related traffic control accoutrements.
	Utility Worker	2	<ul style="list-style-type: none"> • Performs the field functions associated with the paint and sign crew. • Provides scheduled maintenance services through painting or thermo-plastic application to street lines, street legends, and curbs. • Conducts signage maintenance in assigned community areas such as cleaning, repair, replacement, fabrication, and foliage removal. • Conducts arterial checks and median checks annually. • Installs traffic reflectors, delineators, and other street-related traffic control accoutrements.
Street Repair and Maintenance	Sr. Public Works Leader	1	<ul style="list-style-type: none"> • This position is responsible for supervising the operations of the street repair and maintenance personnel. • Crews under supervision include patch, crack-seal, chip seal, sweeping, sawing, and miscellaneous. • Prepares daily, weekly, and monthly crew schedules. • Maintains records for time, material, costs, and work performed. • Trains and instructs subordinates. • Interprets maps and plans. • Analyzes maintenance operations and suggests improvements. • Provides information to management regarding program and performance. • Responds to citizen complaints, responds to requests for service, etc.

Exhibit 6 (7)

Function	Staffing By Classification		Roles and Responsibilities
Street Repair and Maintenance (Continued)	Public Works Leader	3	<ul style="list-style-type: none"> • These positions lead field crews and individuals in the maintenance and repair of City streets. • Operates equipment used in the type of work being performed. • Interprets maps and plans. • Aids in training crew members in use and care of equipment and tools used in street repair and maintenance. • Maintains time and materials records.
	Equipment Operator	6	<ul style="list-style-type: none"> • Operates all types of equipment in the maintenance and repair of streets, including street sweepers, backhoes, oil distributors, paving boxes, rollers, and loaders.
	Sr. Utility Worker	6	<ul style="list-style-type: none"> • Performs essential functions relating to their assigned crew (e.g., patching, crack-seal, sweeping, sawing, etc.).
	Utility Worker	6	<ul style="list-style-type: none"> • Performs essential functions relating to their assigned crew (e.g., patching, crack-seal, sweeping, sawing, etc.).
Sewer / Storm / Street Lighting	Sr. Public Works Leader	1	<ul style="list-style-type: none"> • This position is responsible for supervising the operations of the construction crew, hydro flush, locates, maintenance crew, streetlights, and fabrication truck. • Prepares daily, weekly, and monthly crew schedules. • Maintains records for time, material, costs, and work performed. • Trains and instructs subordinates. • Oversees Sewer Stand-by. • Interprets maps and plans. • Analyzes maintenance operations and suggests improvements. • Provides information to management regarding program and performance. • Responds to citizen complaints, responds to requests for service, etc.
	PW Leader	1	<ul style="list-style-type: none"> • This position is assigned to the construction crew, and is responsible for its coordination and supervision. • Operates equipment used for the construction crew, assists with training, safety implementation, maintaining accurate records of activities, etc.
	Equipment Operator	1	<ul style="list-style-type: none"> • This position is assigned to the maintenance crew, and is involved with minor construction and repair (including sewer laterals, lift stations, manholes), and responds to customer complaints.

Exhibit 6 (8)

Function	Staffing By Classification		Roles and Responsibilities
Sewer / Storm / Street Lighting (Continued)	Sr. Utility Worker	2	<ul style="list-style-type: none"> • These positions perform skilled manual tasks in the maintenance and repair of sewer, storm, and street lighting assets. • Responsible for leading crews on assignments, operating motorized equipment, etc.
	Utility Worker	7	<ul style="list-style-type: none"> • These positions are assigned to one of several crews, including construction, on-call truck, hydro flushing, locates, maintenance, streetlights, etc. • Provide the basic functions associated with sewer, storm, and street lighting responsibilities. • Performs Utility locates for USA
	Maintenance Crafts-worker	2	<ul style="list-style-type: none"> • These positions are divided into one fabricator and one electrician, providing general and specialized support. • The electrician is involved in the installation, maintenance, repair and extension of electrically controlled and/or operated equipment, etc., primarily for streetlight program • The fabricator is involved with the construction, maintenance, and repair of all types of water mains, laterals, services, and other mechanical devices.

Exhibit 7 (1)

**Summary of the Services and
Workload of the Field Services Division**

Function	Description of Services	Key Workloads																																													
Water Operations and Distribution	<ul style="list-style-type: none"> Manage the construction, operation and maintenance of the distribution system to ensure reliable delivery of water that meets all quality and health standards. Responding to water system emergencies in a timely manner. Performing water supply quality through cross connection control. Monitoring water quality. Maintains fire hydrants. 	<ul style="list-style-type: none"> For the FY 2004-05, the following summarizes the number of products: <table> <tr> <td>Preventive Maint.</td><td>03-04</td><td>04-05</td></tr> <tr> <td>Hydrants</td><td>1,760</td><td>1,526</td></tr> <tr> <td>Valves</td><td>2,909</td><td>3,398</td></tr> <tr> <td>Pumps, Tanks, Wells</td><td>1,181</td><td>2,378</td></tr> <tr> <td>Blow-offs</td><td>292</td><td>393</td></tr> <tr> <td>Facilities & Grounds</td><td>1,565</td><td>1,683</td></tr> <tr> <td>Corrective Repairs</td><td>03-04</td><td>04-05</td></tr> <tr> <td>Mains (breaks)</td><td>13</td><td>25</td></tr> <tr> <td>Hydrants</td><td>54</td><td>142</td></tr> <tr> <td>Valves</td><td>248</td><td>120</td></tr> <tr> <td>Services</td><td>3,608</td><td>5,452</td></tr> <tr> <td>Pump</td><td></td><td></td></tr> <tr> <td>Stations</td><td>68</td><td>58</td></tr> <tr> <td>Blow-offs</td><td>14</td><td>20</td></tr> <tr> <td>New Service Installs</td><td>320</td><td>214</td></tr> </table> In the City there are: <ul style="list-style-type: none"> 282.7 miles of water mains 3,385 fire hydrants 10,554 gate valves 87 auto valves (PRV's) 96 air relief valves 498 blow-offs 278 backflow devices 17 water plants 10 reservoirs (27.5 MG total) 9 wells (7 active, 2 emergency) 16 interties 	Preventive Maint.	03-04	04-05	Hydrants	1,760	1,526	Valves	2,909	3,398	Pumps, Tanks, Wells	1,181	2,378	Blow-offs	292	393	Facilities & Grounds	1,565	1,683	Corrective Repairs	03-04	04-05	Mains (breaks)	13	25	Hydrants	54	142	Valves	248	120	Services	3,608	5,452	Pump			Stations	68	58	Blow-offs	14	20	New Service Installs	320	214
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Meters	<ul style="list-style-type: none"> Annual testing, repairing and replacing water meters. Responsible for both residential and commercial water meters. 	<ul style="list-style-type: none"> The number of water meters was 27,837 in July 2006 Replacement schedule of 10-15 years. 																																													

Exhibit 7 (2)

Function	Description of Services	Key Workloads																								
Paint and Sign	<ul style="list-style-type: none"> Section performs the various duties and responsibilities associated with the maintenance of street signs, street lines, street legends, and curb painting. Provides scheduled maintenance services through painting or thermo-plastic application to street lines and street legends on an annual basis for arterials and a bi-annual basis for residential streets. Conducts arterial checks and median checks annually. Performs curb painting as needed and as funds available. Conducts signage maintenance three times per annum in assigned community areas such as cleaning, repair, replacement, fabrication, and foliage removal. Installs traffic reflectors, delineators, and other street-related traffic control accoutrements. 	<ul style="list-style-type: none"> Section maintains 300 centerline miles of community street lines and legends as well as signage on these roadways. Section does not presently have an automated inventory of lines, legends or signs, complicating evaluation of resource requirements based on planned maintenance schedules and inventory. <p>During FY 03-04 and FY 04-05, staff generated the following output (partial list):</p> <table> <tr> <td>Signs Fab</td><td>1,087</td><td>1,723</td></tr> <tr> <td>Signs/Poles Installed</td><td>758</td><td>360</td></tr> <tr> <td>Signs/Poles – Remove/Repair/Replace</td><td>2,980</td><td>3,115</td></tr> <tr> <td>Striping (LF)</td><td>748,159</td><td>856,373</td></tr> <tr> <td>Paint X-walks (LF)</td><td>29,710</td><td>41,566</td></tr> <tr> <td>Maintain Legends</td><td>1,298</td><td>2,039</td></tr> <tr> <td>Remove Markings (LF)</td><td>22,635</td><td>39,473</td></tr> <tr> <td>Curbs Painted (LF)</td><td>5,266</td><td>6,125</td></tr> </table>	Signs Fab	1,087	1,723	Signs/Poles Installed	758	360	Signs/Poles – Remove/Repair/Replace	2,980	3,115	Striping (LF)	748,159	856,373	Paint X-walks (LF)	29,710	41,566	Maintain Legends	1,298	2,039	Remove Markings (LF)	22,635	39,473	Curbs Painted (LF)	5,266	6,125
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Exhibit 7 (3)

Function	Description of Services	Key Workloads
Street Maintenance and Repair	<ul style="list-style-type: none">Planning and implementing pavement construction and maintenance in accordance with City budgets, schedules and standard specifications.Providing major corrective repair (including reconstructing pavements that have deteriorated below a PCI rating of 59, performing asphalt overlay on streets that have a PCI rating between 60-69, etc.).Providing minor pavement corrective repairs (performing pavement grinding, patching, and skin coating on streets, repairing hazardous pavement conditions in a timely manner, etc.)Providing preventive maintenance activities (performing chip seal and slurry seal, etc.) – typically for streets with a PCI between 70 to 90.Patch utility trenches for Water and Sewer programs. Charged to those programs.	<ul style="list-style-type: none">There are 665 curb miles of streets (for over 300 miles of City-owned streets).During FY 03-04 and 04-05, the personnel provided the following products for minor pavement corrective repairs:<ul style="list-style-type: none">4,359 square feet of temporary patch59,122 square feet of grinding40,250 square feet of deep lift patchingBased on the FY 2005-06 schedule for petromat and chip sealing, there were 1,089,743 square feet of streets scheduled.Based on the FY 2005-06 schedule for slurry sealing, there were 3,393,367 square feet of streets scheduled.
		During FY 03-04 and FY 04-05, the staff provided the following output for pavement maintenance and repair:

Exhibit 7 (4)

Function	Description of Services	Key Workloads																																													
Sewer / Storm / Street Lighting	<ul style="list-style-type: none">Collects and conveys sewage to the treatment facility.Collects and conveys storm water including pumping at two locations to prevent flooding.Provides the maintenance and management of the City's sanitary sewer collection system in a cost effective, safe, reliable and timely manner.Responding to emergency events and assisting residents and businesses during these events.Provides USA locates.Inspection on a monthly basis for parking lot streetlights, bi-monthly basis for regular streetlights, and quarterly for industrial streetlights.	<ul style="list-style-type: none">There are 283.23 miles of sanitary sewer mains, 27,628 sewer connections, 4 sewer lift stations, 5,783 sanitary manholes, 9 siphons.There are 327 miles of storm water mains, 4,281 drop inlets, 2 storm pump stations, 3,195 storm manholes, and 12 storm drain culverts.																																													
		During FY 03-04 and 04-05, the key section output was as follows:																																													
		<table><tr><td>Fiscal Year</td><td>03-04</td><td>04-05</td></tr><tr><td>Total Service Reports</td><td>3,538</td><td>3,811</td></tr><tr><td>Hydroflushing (LF)</td><td>460,300</td><td>368,703</td></tr><tr><td>Remove Mainline Plugs</td><td>142</td><td>113</td></tr><tr><td>Remove Lateral Plugs</td><td>1,084</td><td>1,478</td></tr><tr><td>Cleanouts Installed</td><td>68</td><td>131</td></tr><tr><td>Standby Callouts</td><td>974</td><td>1,036</td></tr><tr><td>Manhole Inspect/ Clean/ Repair</td><td>8,153</td><td>1,175</td></tr><tr><td>CCTV Inspection (LF)</td><td>25,535</td><td>33,850</td></tr><tr><td>Hazardous Debris Remove</td><td>36</td><td>77</td></tr><tr><td>Non-hazardous Debris Remove</td><td>189</td><td>130</td></tr><tr><td>Utility Locates</td><td>789</td><td>1,318</td></tr><tr><td>Inspect/Clean DI's</td><td>187</td><td>3,084</td></tr><tr><td>Storm Patrol/ Response (hrs.)</td><td>974</td><td>812</td></tr><tr><td>Jet Flush Storm lines (LF)</td><td>7,601</td><td>18,586</td></tr></table>	Fiscal Year	03-04	04-05	Total Service Reports	3,538	3,811	Hydroflushing (LF)	460,300	368,703	Remove Mainline Plugs	142	113	Remove Lateral Plugs	1,084	1,478	Cleanouts Installed	68	131	Standby Callouts	974	1,036	Manhole Inspect/ Clean/ Repair	8,153	1,175	CCTV Inspection (LF)	25,535	33,850	Hazardous Debris Remove	36	77	Non-hazardous Debris Remove	189	130	Utility Locates	789	1,318	Inspect/Clean DI's	187	3,084	Storm Patrol/ Response (hrs.)	974	812	Jet Flush Storm lines (LF)	7,601	18,586
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<ul style="list-style-type: none">For street lighting, there are 8,909 streetlights. Workload indicators for FY 2004-05 include:																																															
<table><tr><td>Fiscal Year</td><td>03-04</td><td>04-05</td></tr><tr><td>Streetlamps Repaired/Replaced</td><td>752</td><td>674</td></tr><tr><td>Knockdown Repairs</td><td>16</td><td>28</td></tr><tr><td>Electrical Repairs to Streetlights</td><td>757</td><td>800</td></tr></table>	Fiscal Year	03-04	04-05	Streetlamps Repaired/Replaced	752	674	Knockdown Repairs	16	28	Electrical Repairs to Streetlights	757	800																																			
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<ul style="list-style-type: none">Provided 1,318 utility locations (USA).																																															

Exhibit 8 (1)

**Roles and Responsibilities of the
Staff of the Fleet, Trees and Landscaping Division**

Function	Staffing By Classification		Roles and Responsibilities
Administration	Superintendent	1	<ul style="list-style-type: none"> This is the top management position of the Division, providing the administrative direction, coordination, review and control of the Division operations, including street trees, street landscaping, sidewalk operations, landscaped facilities, and fleet operations. Coordinates with all program managers in evaluating the effectiveness of the program, developing annual budgets, performance goals and objectives, etc.
	Sr. Office Assistant	1	<ul style="list-style-type: none"> Responsible for trees, landscaping, and concrete calls. All purchasing, safety issues, Radio dispatching, customer calls, resident complaints. General clerical duties – phone and dispatch for tree program and concrete (majority of issues that come in). All general record keeping, file maintenance, routing phone calls, etc. General administrative support for all programs (except fleet).
Trees and Concrete	Supervisor	1	<ul style="list-style-type: none"> Under general direction of the Superintendent of Trees and Landscaping, the Urban Landscape Supervisor oversees, plans, supervises and coordinates activities of personnel in the Division within the area of street trees maintenance and sidewalk, curb/gutter replacement and maintenance. This position provides the supervision of three (3) Sr. Public Works Leader positions (who are responsible for the day-to-day operations of the tree and concrete crews). This position is responsible for preparing the annual operating budget for the programs, assists in the preparation of capital improvement projects, assesses the condition of all assets, and ensures that all program, performance and budgetary goals and objectives are being met by personnel. Involved with the Planning Review Committee to provide input on development which could impact operations.

Exhibit 8 (2)

Function	Staffing By Classification		Roles and Responsibilities
Trees and Concrete (Continued)	Sr. Public Works Leader	3	<ul style="list-style-type: none"> Each of these positions is responsible for leading 2 tree crews and 1 concrete crew, including the preparation of daily, weekly, and monthly crew schedules, providing statistical data to managers regarding program measures and activities, performance, etc. Tree crews are responsible for street trees, including their pruning, removal, planting, responding to emergency calls for service, handling service requests, etc. Concrete crew is responsible for the maintenance and repair of all City sidewalks (including their grinding and ramping to limit liability), handicap areas, root pruning, etc. Personnel provide input for plan reviews, new project development, etc.
	Sr. Utility Worker	3	<ul style="list-style-type: none"> Two (2) of these positions lead the activities of one of the tree maintenance crews, particularly those activities associated with routine pruning. One (1) of these positions leads the activities of the concrete maintenance crews. Each of these positions leads the activities of their assigned crews and is responsible for, responding to public and other service requests associated with their assigned program.
	Utility Worker	6	<ul style="list-style-type: none"> These positions serve on either the tree or concrete crew. Climbs and trims trees using rope and saddle and/or aerial lift equipment, removes brush, and uses brush clippers. Removes dead or damaged trees. Uses root cutter machine in cutting roots that are damaging sidewalks. Operates motor vehicles such as truck aerial lifts, water tanker truck, tractors with auger and other attachments, small power landscaping equipment such as chippers, root pruners, tree stumper, chain and concrete saws, air compressors, and jack hammers. Prunes, feeds, fertilizes, stakes, waters and otherwise cares for trees. Maintains chainsaws, pole saws, pole pruners, and small power tools.

Exhibit 8 (3)

Function	Staffing By Classification		Roles and Responsibilities
Trees and Concrete Continued (Continued)	Groundsworker	5	<ul style="list-style-type: none"> • Water, mow, trim, edge, and maintain lawns, trees, etc. • Assists in the application of pesticides. • Assists in planting and maintaining shrubs and trees. • Cleans and clears assigned areas. • Cleans drainage ditches and culverts. • Performs maintenance and janitorial tasks.
Boulevard Landscaping	Supervisor	1	<ul style="list-style-type: none"> • Under general direction of the Superintendent of Trees and Landscaping, the Urban Landscape Supervisor oversees, plans, supervises and coordinates activities of personnel in the Division in the area of boulevard landscaping, parking district landscaping, Murphy Street landscape and various city facility landscape maintenance. • This position provides the supervision of the Sr. PW Leader position (who is responsible for the day-to-day operations of the crews). • This position is responsible for preparing the annual operating budget for the program, assists in the preparation of capital improvement projects, assesses the condition of all assets, and ensures that all program, performance and budgetary goals and objectives are being met by personnel. • This position is responsible for overseeing the Pesticide program for the Public Works Department at the Corp Yard.
	Sr. Public Works Leader	1	<ul style="list-style-type: none"> • Provides first line supervision over the 3 routes of the boulevard landscaping crews (facilities, north, and south). • Coordinates the daily and weekly schedules (overall, Monday is for WPCP, Tuesday for water wells, Wednesday for mowing, Thursday for part of the WPCP and fire stations, and Friday for routes). • This position reports directly to the supervisor.
	Sr. Utility Worker	3	<ul style="list-style-type: none"> • Each of these positions leads a crew for boulevard landscaping, which are divided into 3 route areas, including facilities, southern part of the City, and the northern part of the City. • Overall, these positions are responsible for the upkeep of all urban landscaping and irrigation systems as appropriate, including road medians, sound walls, bike lanes, downtown parking structures, fire stations, WPCP, water wells, corporation yard, etc.

Exhibit 8 (4)

Function	Staffing By Classification		Roles and Responsibilities
Boulevard Landscaping (Continued)	Utility Worker	4	<ul style="list-style-type: none"> Operates various equipment involved in the maintenance of median, island, and boulevard landscape areas, including light tractors, saws, mowers, edgers, power hedge shears, etc. Operates heavy equipment such as dump truck, front-end loader, arrow board trucks, and spray rigs. Prunes, edges, and maintains landscaped areas, repairs and maintains irrigation, and performs landscape construction duties.
	Groundswoker	6	<ul style="list-style-type: none"> Water, mow, trim, edge, and maintains lawns, trees, street medians, etc. Assists in the application of pesticides. Assists in planting and maintaining shrubs and trees. Cleans and clears assigned areas. Cleans drainage ditches and culverts. Performs basic maintenance and janitorial tasks, as assigned.
Fleet	Manager	1	<ul style="list-style-type: none"> Under general direction of the Superintendent of Trees and Landscaping, the Fleet Manager oversees, plans, supervises and coordinates activities of personnel in the Division within the area of the fleet program operations. This position is responsible for the management of fleet operations, including its staff of mechanic personnel and office staff. Provides technical direction to personnel engaged in the maintenance and repair of automotive and heavy equipment. Reviews, develops, establishes, implements and monitors system procedures and practices. Other administrative duties including the development and implementation of fleet goals, objectives, policies and priorities, development of program budget and performance, development of the fleet replacement program, etc.
	Sr. Office Assistant	1	<ul style="list-style-type: none"> This position processes all work orders, processes all "Fleet Focus" information, pays bills, and all the office-related activities associated with fleet, including DMV-related activities, etc. All general record keeping, filing maintenance, routing phone calls, etc. Provides support for all fleet personnel as needed.

Exhibit 8 (5)

Function	Staffing By Classification		Roles and Responsibilities
Fleet (Continued)	Lead Mechanic	2	<ul style="list-style-type: none"> • Provide lead work for the maintenance and repair of heavy and light duty equipment. • 1 position is primarily associated with heavy-duty equipment, serving as the supervisor and performing some preventive maintenance activities. • 1 position is primarily associated with light-duty equipment, serving as the supervisor associated with work on cars and light-trucks.
	Equipment Mechanic	8	<ul style="list-style-type: none"> • These positions provide the maintenance and repair of all City vehicles and appropriate equipment, and are generally assigned as follows: <ul style="list-style-type: none"> - 3 positions for light-duty vehicles and equipment, including preventive maintenance for cars and light trucks, emissions related issues, the repair of turf and lawn equipment, small engines, etc. - 1 position primarily works with the outfitting of law enforcement vehicles. - 1 position is primarily assigned the heavy-duty equipment, including the repair and maintenance of large trucks. - 1 position is primarily assigned to fire trucks (and has an FM 3 certification). - 1 position is primarily assigned to emergency generators, street sweepers, etc. - 1 swing position who works on both small and large equipment.
	Equipment Mechanic Assistant	1	<ul style="list-style-type: none"> • This position serves as the shop attendant, engaging in activities such as overall shop support, sweeping floors, moving cars, clean-up, etc.

Exhibit 9 (1)

**Summary of the Services and Workload of the
Fleet, Trees and Landscaping Division**

Function	Description of Services	Key Workloads
Trees and Concrete	<ul style="list-style-type: none"> Provides pruning and inspections for all inventoried street trees (approximately 18.18% of the inventory should be pruned each year). Preserves and sustains the roadway tree population by new planting and replacement tree planting. Responds to citizen requests for service. Provides advisement in arborist areas. Concrete crew provides temporary patching of displaced sidewalks and sidewalks schedule for repair with asphalt concrete. Grinding concrete sidewalks where displacements are one inch or less. Removes parkway concrete that is raised above the right-of-way sidewalk and is a tripping hazard. Surveys City sidewalks for defects requiring repair. Installs root control materials at sidewalks, curbs and gutters displaced by tree roots. Installs special sidewalk paving materials as an alternative to concrete when beneficial to trees. Adjusts sidewalks and curb and gutter alignments to allow for tree trunk and root growth. Replaces concrete sidewalk that is defective or hazardous. Replaces concrete curb and gutter that is defective or hazardous. Responds to public requests for service. 	<ul style="list-style-type: none"> For the FY 2004-05, the following summarize key product workload data relating to the crews: <ul style="list-style-type: none"> - 6,046 trees pruned for scheduled structural pruning. - 62 trees pruned per request - 561 trees pruned per emergency (on hours). - 73 trees pruned per emergency (off hours). - 181 new trees planted - 312 trees removed - 4,650 trees watered - 1,440 young trees trained - 1,309 work requests completed For the FY 2004-05, the following summarizes key product workload relating to the concrete crew: <ul style="list-style-type: none"> - 4,514 feet of temporary sidewalk repair - 30,841 feet of sidewalk grinded - 13,835 square feet of concrete removed - 8,869 feet of sidewalk root pruned - 5,051 feet of sidewalk barrier installed - 3,558 feet of curb and gutter root pruned - 3,303 feet of curb and gutter barrier installed - 301 square feet of alternative sidewalk installed - 30,515 square feet of sidewalk replaced - 1,029 requests for service answered

Exhibit 9 (2)

Function	Description of Services	Key Workloads
Boulevard Landscaping	<ul style="list-style-type: none"> • Maintains City roadside medians (including plant material, irrigation systems, weeds and litter, etc.). • Maintains the landscaping at six (6) City Fire Stations, seventeen (17) City water well facilities, the Water Pollution Control Plant (WPCP), corporation yard, downtown parking district, Multi Modal Train Station and Murphy Street. • Oversees the contract maintenance for the Multi Modal Train Station Parking Structure. 	<ul style="list-style-type: none"> • The northern part of the City includes: <ul style="list-style-type: none"> - 140,588 of area square yards - 52,940 square yards of ground cover - 2,063 plants - 10,634 shrubs • The southern part of the City includes: <ul style="list-style-type: none"> - 90,774 of area square yards - 56,899 square yards of ground cover - 1,973 plants - 12,421 shrubs • The fire stations include: <ul style="list-style-type: none"> - 24,985 of area square yards - 21,023 square yards of ground cover - 512 plants - 1,205 shrubs • There are 71 miles of bike lanes and routes.

Exhibit 9 (3)

Function	Description of Services	Key Workloads
Fleet	<ul style="list-style-type: none"> • Performs preventive maintenance to City vehicles and motorized equipment. • Corrects mechanical deficiencies and complete necessary modifications to City vehicles and motorized equipment. • Provides and acquires the appropriate vehicles and motorized equipment for all City services. 	<ul style="list-style-type: none"> • The following summarizes the total number of active equipment (including vehicles) for the City (based on the Active Equipment List as of 12/19/05): <ul style="list-style-type: none"> - 12 – Community Development Department - 151 – Department of Parks and Recreation - 139 – Department of Public Safety - 233 – Department of Public Works - 5 – Finance - 1 – Information Technology <p>Total of 541 pieces of equipment.</p> • The Fleet Division processed the following number (and types) of work orders for 2005: <ul style="list-style-type: none"> - 1,651 preventive maintenance - 744 scheduled repairs - 5 non-scheduled preventive maintenance - 1,086 non-scheduled repairs - 1 road calls for preventive maintenance road call - 150 road calls for repair <p>Total of 3,637 work orders handled.</p>

Exhibit 10 (1)

**Roles and Responsibilities of the
Staff of the Solid Waste Division**

Function	Staffing By Classification		Roles and Responsibilities
Administration	Manager	1	<ul style="list-style-type: none"> • This position is responsible for the administration of the Division programs and personnel. • Coordinates with personnel for budget development, coordination, and compliance. • Coordinates with other departments and divisions to meet objectives and complete projects. • Works with personnel to ensure contractors are in compliance with their roles and responsibilities, including their performance. • Responds to City Council, City Manager, and community inquiries about solid waste issues, services, complaints. • Serves as City representative in SMaRT Station issues (customer role). • Represents City in inter-agency forums at county, state, national level. • Researches, responds to laws, regulations, business trends, markets, policy issues; provides Council IGR support. • Represents City to permitting/regulatory agencies (e.g. BAAQMD, CIWMB, RWQCB) on landfill and other solid waste matters.
Recycling	Supervisor	1	<ul style="list-style-type: none"> • Supervises staff located at SMaRT Station landfill facility. • Oversees 3-City Memorandum of Understanding, transfer station operating contract with GreenTeam/Zanker Company and landfill disposal contract with Kirby Canyon Landfill. Conducts regular inspections of contractor documents and transfer facility operations to ensure contract compliance. • Plans and executes SMaRT Station equipment replacement projects. • Manages RFP processes for SMaRT Station operations contracts and equipment replacement design projects. • Oversees Household Hazardous Waste Program and provides hazardous waste regulatory compliance advice to staff. • Determines content, schedule, format of public outreach and education materials and programs. • Interfaces with refuse collection contractor in regard to recycling program. • Provides training and mentorship of subordinate staff including completion of performance reviews. • Supports manager through completion of various administrative duties, including meeting attendance, financial analysis, report generation, and the like.

Exhibit 10 (2)

Function	Staffing By Classification	Roles and Responsibilities
Recycling (Cont'd)	Solid Waste Contract Administrator	<ul style="list-style-type: none"> • Directly administers transfer station operating contract with GreenTeam/Zanker Company and the contracts with Waste Management, Inc. • Prepares budget for SMaRT station and year-end financial reconciliations; facilitates outside audits. • Conducts regular inspections of contractor documents and transfer facility operations to ensure contract compliance and confirm incentive-based terms and conditions of contract. • Interfaces regularly with, and provides financial and operational data and analysis to, Cities of Mountain View and Palo Alto regarding transfer of their waste-stream to SMaRT transfer station (service provider role).
	Sr. Office Assistant	<ul style="list-style-type: none"> • Acts as Main Answer Point for SMaRT, answering phones and responding to public inquires about recycling, the SMaRT Station and hazardous waste. • Acts as SMaRT Station Personnel Rep, handling time cards, leave requests, etc. • Handles purchase-related functions, including purchase orders and payment tracking. • Audits Waste Management bills and receives payments for cardboard sales and other revenues. • Handles scheduling and agenda preparation for divisional meetings and for City meetings and tours at SMaRT Station.

Exhibit 10 (3)

Function	Staffing By Classification		Roles and Responsibilities
Recycling (Continued)	Administrative Aide	2	<ul style="list-style-type: none"> One position performs as a public education specialist conducting duties such as: <ul style="list-style-type: none"> Creation of recycling and solid waste program flyers, mass mailings, website content and other publications for distribution to general public. Promotion and presentation of home compost program classes. Coordination of involvement in special events such as Earth Day. Coordination with City's refuse collection contractor on development and execution of annual publications plan. Coordination with County and regional joint outreach programs regarding messages, media, etc. The other position performs as commercial recycling specialist conducting such duties as: <ul style="list-style-type: none"> Planning, troubleshooting and promoting recycling services provided at City facilities, schools, and institutions. Outreach to commercial and industrial business customers to increase their diversion of waste through source reduction and recycling, and to increase their use of recycled products. Through Special Event Permit process, coordinates recycling and solid waste services provided to events. Oversees operations of cardboard collection service provided by Specialty (hauling contractor). Interfaces with the County Green Business Program. Conducts special studies (e.g. CO2 Emissions Reduction Study Issue).
Post-closure Maintenance/Regulatory Compliance	Environmental Engineering Coordinator	1	<ul style="list-style-type: none"> This position is responsible for managing the City's closed landfill, including coordinating the various contractors involved in the process. Plans and executes strategies and projects aimed at achieving, maintaining and demonstrating the landfill's compliance with environmental regulatory requirements related to air quality, surface and ground water quality, wildlife, storm water runoff, and integrity of the landfill cap. Overall, this positions works with contractors on a daily basis, works on meeting all regulatory requirements, developing all required reports, and other special projects. Provides field supervision and logistical assistance to the Landfill Technician.

Exhibit 10 (4)

Function	Staffing By Classification		Roles and Responsibilities
Post-closure Maintenance / Regulatory Compliance (Cont'd)	Landfill Technician	1	<ul style="list-style-type: none"> • Inspects and maintains environmental systems components to ensure compliance with various regulations regarding the City's closed landfill. • Performs inspections and testing related to gas emissions, gas migration, landfill settlement, vegetation control, wildlife habitat, leeching, and storm water discharge. • Conducts scheduled monthly well monitoring via sampling at 78 gas well sites and makes relevant adjustments to ensure methane gas quality. Performs additional ad-hoc inspections, as time available. • Conducts mandatory monthly site visitations and walks landfill footprint to view potential settlement, leaching, vegetation coverage, and wildlife presence. • Audits consultants' quarterly emissions testing via own sampling to ensure compliance. • Completes data analysis on all compliance testing results to look for patterns and trends in results and identifies potential problems. • Conducts necessary field repairs, with assistance of Environmental Engineering Coordinator and contractors. • Completes various administrative duties such as annual report generation, Green-Tickets invoice preparation, equipment database maintenance, etc.
Solid Waste	Solid Waste Specialist	1	<ul style="list-style-type: none"> • This position administers the refuse collection contract with Specialty Solid Waste and Recycling, which is the company providing daily garbage pick-up and recycling compliance. • This involves monitoring the company for contract compliance, receiving, investigating and responding to complaints from the public, developing monthly reports, coordinating meetings, financial tasks, working with utilities to keep database on customer accounts accurate, etc. • Coordinates solid waste services provided to other divisions and departments (e.g. neighborhood association cleanup events). • Coordinates with Revenue Division to assure coverage of customer service orders. • Works with City planning and building personnel to review and comment on plans for new development to ensure the feasibility of services (i.e., appropriate location and design of container enclosures and site layouts that allow service trucks to access various locations efficiently and effectively).

Exhibit 11 (1)

**Summary of the Services and
Workload of the Solid Waste Division**

Function	Description of Services	Key Workloads
Recycling	<ul style="list-style-type: none"> Section oversees transfer station operating contract with GreenTeam/Zanker. Conducts regular inspections of contractor documents and transfer facility operations to ensure contract compliance and confirm incentive-based terms and conditions of contract. Plans and promotes source reduction and recycling services and events provided to single-family and multi-family residents, businesses, institutions, and City facilities. Oversees Household Hazardous Waste Program. Interfaces with refuse collection contractor in regard to recycling program. Prepares annual reports to CIWMB to document City's compliance with state 50% diversion requirements. Creates flyers and publications to promote recycling and customer use of desired waste collection practices and conducts community outreach to businesses to improve recycling and yard trimmings diversion. 	<ul style="list-style-type: none"> In FY 2004-05, received 258,318 total tons, 176,097 tons land-filled for refuse disposal.
Environmental Engineering	<ul style="list-style-type: none"> Monitoring and managing the City's landfill gas, soil cover/vegetation, wildlife, groundwater, storm water runoff, and post-closure land uses in compliance with regulatory requirements. Delivery of landfill gas fuel to the Power Generation Facility located at the Water Pollution Control Plant. 	<ul style="list-style-type: none"> Closed landfill is over 93 acres, holds 2.5 million tons of garbage and contains approximately 79 gas wells, 13 groundwater monitoring wells, 8 leachate risers, and 4 extensometers (to measure vertical and lateral deformation).

Exhibit 11 (2)

Function	Description of Services	Key Workloads
Solid Waste Collection	<ul style="list-style-type: none"> Collecting and disposing of discarded materials in a dependable environmentally sound and cost effective manner. Approximately 40 trucks per day provide the following types of services: <ul style="list-style-type: none"> Commercial (front-loading, card-board recycling, etc.) Debris boxes and compactors Residential (garbage, yard waste, etc.) Recycling at schools, City offices, etc. Reviewing development projects for safe, efficient design of refuse container enclosures and collection truck access 	<ul style="list-style-type: none"> Collection of materials for approximately 55,111 housing dwelling units, including the following: <ul style="list-style-type: none"> 20,671 single-family detached 5,271 single-family attached (condos and town-homes) 3,551 mobile homes 794 duplexes 23,968 units (triplexes and apartments). Approximately 3,000 business accounts

Exhibit 12 (1)

**Roles and Responsibilities of the
Staff of the Traffic and Transportation Division**

Function	Staffing By Classification		Roles and Responsibilities
Administration	Manager	1	<ul style="list-style-type: none"> • This position serves as the City's primary advocate and contact for regional transportation, including transportation funding, congestion management, alternative modes, interagency coordination and negotiation, etc. • Primary liaison to City management and City Council on transportation issues. • Plans and designs the City's transportation system, including transportation capacity, alternative transportation, transportation and land use interrelation, traffic control, signaling, signage and streetlights. • Maintains, operates, designs, and constructs the City's traffic signal system. • Reviews development and redevelopment proposals, including reviewing development applications in coordination with the City's planning, building, engineering and other staff. • Other duties including developing and implementing transportation programs and projects, developing the Division budget, ensuring goals and objectives are met, etc.
Traffic Engineering	Senior Traffic Engineer	1	<ul style="list-style-type: none"> • Directs and prepares specifications, plans, estimates and reports pertaining to the construction, maintenance, and operation of traffic engineering facilities and street lighting systems. • Responsible for operation and maintenance of the City traffic signal system. • Project management, budget oversight of capital projects. • Directs and coordinates the repair and maintenance of traffic control devices. • Conducts and supervises field traffic engineering studies, including collecting traffic and speed data, traffic control studies, etc. • Conducts ongoing monitoring of traffic flow throughout the City, responds to problems identified by the public and / or other City personnel, works with neighborhood organizations regarding traffic mitigation strategies, monitors various intersections, etc.

Exhibit 12 (2)

Function	Staffing By Classification		Roles and Responsibilities
Traffic Engineering (Cont'd)	Traffic Engineer	2	<ul style="list-style-type: none"> • These positions are involved with traffic safety issues, including working with the schools and Public Safety Department, downtown associations, Bicycle and Pedestrian Advisory Committee, etc. • Responds to neighborhood requests for services, reviews traffic control plans, and is the main contact with Field Services Division for updating striping, sign replacement, trimming trees, etc. • Also involved with engineering issues, including design for traffic signals, going to committee meetings, supervising assistants with traffic counts, participating in land development review process, and scheduling studies for neighborhood complaints. • Preparation of RFP's and reports to Council • Assist with program and project budgeting, and grants administration. • Traffic calming studies and design. • Design of roadway improvements, signals, and striping. • Establishment and implementation of signal timing, oversight of signal maintenance and repair. • Review of collision reports.
	Traffic Engineering Assistant	2	<ul style="list-style-type: none"> • These positions provide field data collection services for traffic impact and mitigation studies, including inputting the data into traffic system models. • Assist with traffic signal maintenance and repair. • Conduct speed studies. • Conduct transportation permit program. • Supports design and construction activities.
Transportation Planning	Senior Transportation Planner	1	<ul style="list-style-type: none"> • Formulation and development of comprehensive City transportation plans and policy. • Intergovernmental coordination, including grant writing, liaison with Federal, State, regional and local entities, review of regional planning documents and projects, etc. • Participates in budget development and capital project planning, coordination and management. • Primary staff support for the City Bicycle and Pedestrian Advisory Committee. • Participates/leads environmental review processes. • Involved with the private development review for land use and building permitting. • Prepares and oversees planning, studies involving transportation capacity, transportation and land use coordination, pedestrians and bicycle planning. • Primary oversight for traffic calming programs.

Exhibit 13 (1)

**Summary of the Services and Workload of the
Traffic and Transportation Division**

Function	Description of Services	Key Workloads
Traffic Engineering and Planning	<p>Plan the City's transportation system to meet the community's current and future access needs by:</p> <ul style="list-style-type: none"> • Designing optimal street layout as it applies to traffic control, signaling, signage and streetlights, including: designing roadway modifications, signage, bikeways, and lighting. • Working with the Department of Finance and the Public Works Engineering Services Division to update 20-year capital improvement plan and establish schedules for projects to be initiated in the first two years of the plan. • Providing functional and cost effective designs that meet design standards and/or address identified deficiencies. • Completing traffic studies and analyses, including speed, volume, parking, traffic control warrant, traffic calming, long range planning, and school traffic studies. • Analyzing and archiving collision reports. • Providing transportation facility design and traffic engineering information to customers and the City staff. • Responding to citizen issues. • Performing transportation planning and traffic studies to address legal, environmental, congestion management, general plan, Council-directed, citizen, business and other requirements and issues. • Develop transportation plans such as the Fair Oaks/Tasman Bicycle and Pedestrian Circulation Plan. The Plan was approved by Council and used to secure \$75,000 in grant funding and \$50,000 in developer contributions for design and construction activities. 	<ul style="list-style-type: none"> • Workload indicators in FY 2004-05 for traffic design operations include: <ul style="list-style-type: none"> - 382 service requests completed - 2 warrant studies completed - 1,525 actions completed for data preparation and analysis - 347 actions completed for permits and internal requests - 22 planning studies completed - 42 web citizen inquiries answered • The City's bicycle and pedestrian facilities continued to expand with the completion of several bicycle and pedestrian improvements. Significant neighborhood studies included parking surveys of El Camino Real and north and west downtown neighborhoods, and speed attenuation on Nisqually Drive. • The Division completed a conceptual feasibility study for a bicycle / pedestrian undercrossing of the Caltrain tracks at Bernardo Avenue. • The Division completed a conceptual engineering and public outreach effort to construct a bicycle facility on Wolfe Road between Homestead Road and Fremont Avenue. • Traffic calming studies or investigations were completed or initiated for a number of locations. • The Division coordinated or managed capital projects, and advised other City staff or contractors on traffic issues for a number of additional projects. • The Division continued support of the City's Bicycle and Pedestrian Advisory Committee.

Exhibit 13 (2)

Function	Description of Services	Key Workloads
Regional Transportation Planning	Conduct intergovernmental coordination on transportation issues to participate in regional planning, operations coordination, congestion management, legislative advocacy, and outside transportation funding.	<ul style="list-style-type: none"> The Division supported the City Council on long-range transit and highway improvement issues with the Valley Transportation Authority, including the completion of two highway corridor studies, and review of the Valley Transportation Plan 2030 and Long Range Transit Capital Improvement Program. The Division participated in a number of intergovernmental activities. Staff served on the VTA Capital Improvement Program Sub-Committee, the VTA LOS/Modeling Committee; the VTA Surface Transportation Program Committee; the County Traffic Safe Communities Network Advisory Committee, and the VTA Community Oriented Design Enhancements Committee. Staff also were assigned 14 Council IGR assignments.
Traffic Signal Operation and Management	<p>Design, operate, and manage the contractual maintenance, and coordinate traffic signal operations within the City to facilitate the safe and efficient movement of traffic through signalized intersections by:</p> <ul style="list-style-type: none"> Managing the contractual preventative maintenance on City traffic signals by contract; Managing the contractual repairs in a timely manner; Optimizing the operation of City traffic signals; Planning and conducting modifications to the traffic signal system; Performing infrastructure replacement; and Coordinating signal operations with other agencies operating traffic signals within or adjacent to the City limits. 	<ul style="list-style-type: none"> Workload indicators in FY 2004-05 for traffic signal operations and maintenance include: <ul style="list-style-type: none"> 727 maintenance actions completed 101 signals optimized There are a total of 129 intersections with traffic signals. A significant number of traffic signal infrastructure improvements progressed through the design or construction phases. A 40-year traffic signal infrastructure replacement plan was prepared. New interconnect systems were installed on Wolfe Road and Homestead Road, along with new signal communications systems along Homestead and Evelyn Avenue. The Division spent much time addressing issues associated with contract traffic signal maintenance services.

Exhibit 13 (3)

Function	Description of Services	Key Workloads
Development Review	<p>Provide development review of proposed transportation facilities and assure proposed mitigation measures are adequate to meet City plans, design standards, and legal requirements by:</p> <ul style="list-style-type: none"> • Reviewing land use and building permit applications and submittals. • Participating on the Project Review Committee. • Overseeing the preparation of required development-related transportation studies. • Issuing transportation permits to meet legal requirements for high/wide load vehicles. • Providing information on transportation requirements to City staff, developers, architects, design engineers, and project construction staff. 	<p>The Division reviewed 130 land development permit applications and 22 building permit submittals (not including revisions), including an increased number of large residential projects.</p> <p>Transportation study work was performed on several major land use/development proposals, including three private elementary schools, a hotel to residential conversion, a major corporate campus, and a mixed-use development.</p>
Outside Grant Funding	<p>Seek outside grant funding for transportation projects.</p>	<p>A total of \$3,246,183 in grants funding was secured from Federal, State and regional sources. Grants from TFCA 60%, TFCA 40%, California Bicycle Transportation Account, Federal Surface Transportation Program, Federal Transit Administration, the Metropolitan Transportation Commission Transportation for Livable Communities and Regional Signal Timing Programs, and the VTA Community Design and Transportation Program were secured.</p>

3. EMPLOYEE SURVEY

3. EMPLOYEE SURVEY

As part of the Optimum Staffing Study of the Sunnyvale Department of Public Works, the Matrix Consulting Group conducted a confidential employee survey to obtain perceptions regarding staffing, operations, management, etc.

1. A SURVEY WAS DISTRIBUTED TO ALL THE EMPLOYEES OF THE PUBLIC WORKS DEPARTMENT.

After distributing the survey to all the employees of the Public Works Department, there were 113 employees providing a response, representing a response rate of over 50%. This is a good response rate for Public Works Departments. The number of respondents is shown below per Division:

Current Assignment	Number of Respondents
Administration	8
Field Services	21
Fleet, Trees, and Landscaping	20
WPCP	36
Engineering	10
Solid Waste	7
Traffic Engineering	5
Unknown	6
Total	113

The survey contained two sections.

- The first section was a “multiple choice” section designed to cover a wide range of topics about the management, organization, and operation of the Pubic Works Department, while minimizing the employee’s time and effort in completing this survey. Employees were asked to respond to 33 statements by selecting “no response,” “strongly agree,” “agree,” “disagree,” and “strongly disagree.”
- The second section consisted of open-ended questions. This question provided the opportunity for employees to identify opportunities for improvement.

The survey results are organized as follows:

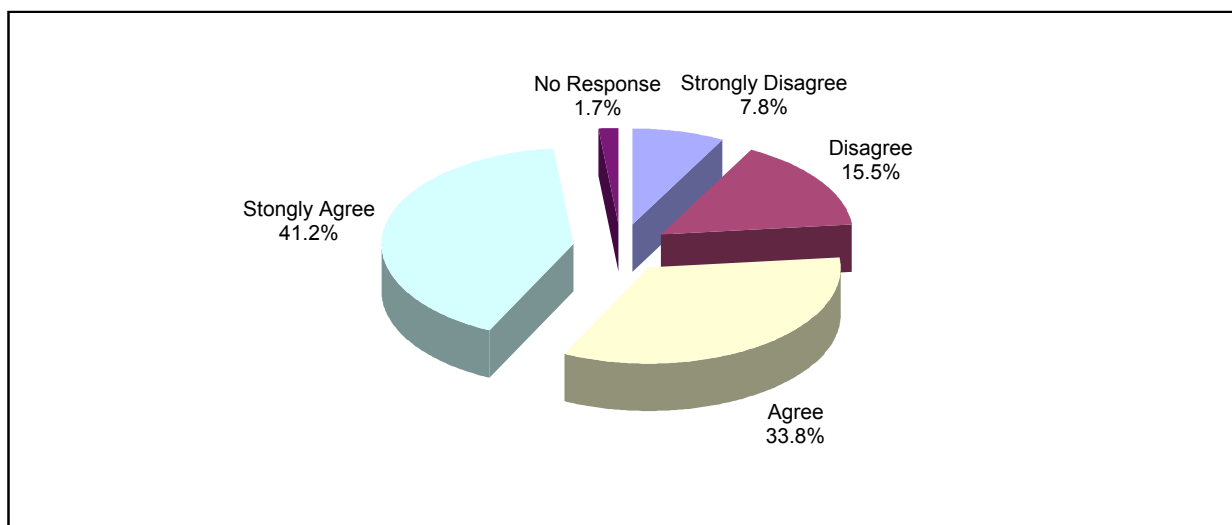
- Overall Department

- Administration
- Field Services
- Fleet, Trees, and Landscaping
- Water Pollution Control Plant
- Engineering
- Solid Waste Division
- Traffic Engineering Division

The following section summarizes the overall response.

2. OVERALL, EMPLOYEES CITED A HIGH NUMBER OF POSITIVE ASPECTS OF THE PUBLIC WORKS DEPARTMENT, AS WELL AS SOME OPPORTUNITIES FOR IMPROVEMENT.

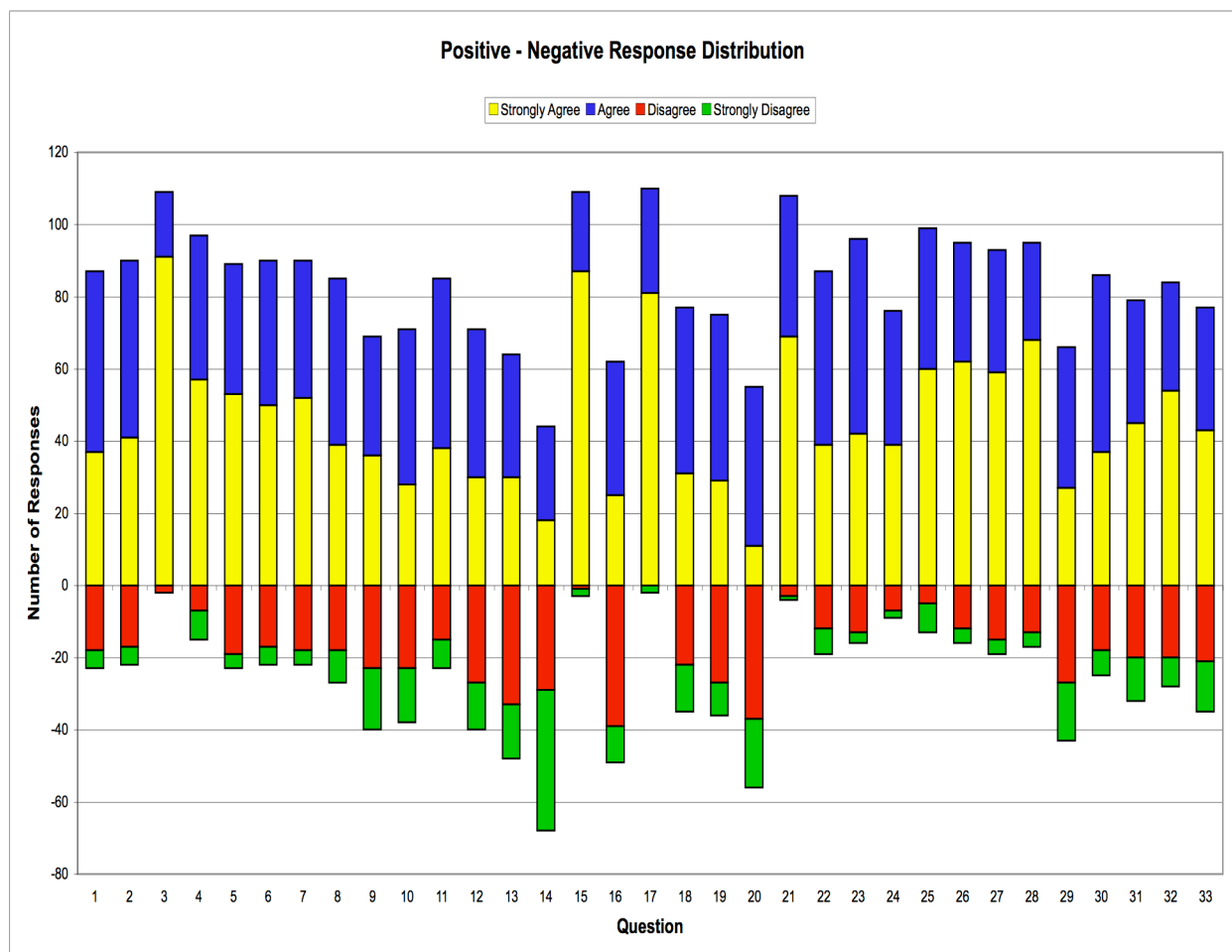
In reviewing the responses to the first section of the employee questionnaire, it is important to look at the pattern of responses for the entire group versus individual responses. The chart below summarizes the overall distribution of responses to statements.



The response pattern for all statements in the first section of the employee survey indicates employees had relatively high levels of agreement with the various

survey statements. Approximately, 75% of responses were positive (either “agree” or “strongly agree”) and 25% were negative (either “disagree” or “strongly disagree.”)

To gain a more detailed sense of the responses from the first section of the employee survey, it is useful to look in more detail at the statements that elicited the strongest positive and negative responses. The chart found below plots the actual number of positive and negative responses for each statement. Statement numbers are shown along the bottom of the chart. Neutral responses are excluded.



The chart, above, presents the positive and negative responses for each statement provided in the first section of the employee survey. The positive responses (e.g., “agree” and “strongly agree”) are plotted **above** the X axis. The negative responses

(e.g., “disagree” and “strongly disagree”) are plotted **below** the X-axis. The chart provides an overall visual representation of the response to each statement. It allows strongly positive or negative responses to be singled out. Those strongly positive or negative statements are highlighted below.

(1) Of the Thirty-Three Statements, Respondents Had Positive Perceptions and Attitudes with Respect to Twenty-Four.

A review of the positive and negative responses to the statements provided in the first section of the employee survey shows that there are twenty-four statements to which employees responded positively. At least 66% of respondents selected “agree” or “strongly agree” in response to the statements presented below.

- Statement #1 – 77% of the respondents agree that the organizational structure of their Division is well suited to its responsibilities.
- Statement #2 – 80% of the respondents agree that their Division has clear, well documented policies and procedures to guide day to day work.
- Statement #3 – 96% of the respondents agree that they receive an annual performance evaluation.
- Statement #4 – 86% of the respondents agree that they get enough feedback from immediate supervisors about performance.
- Statement #5 – 79% of the respondents agree that the immediate supervisors do a good job of communicating important information.
- Statement #6 – 80% of the respondents agree that they receive an appropriate amount of guidance from immediate supervisors.
- Statement #7 – 80% of the respondents agree that goals and objectives are clearly communicated.
- Statement #8 – 75% of the respondents agree that their Division operates efficiently.
- Statement #11 – 75% of the respondents agree that their Division contracts out the right types of services.

- Statement #15 – 99% of the respondents agree that their Division provides a high level of service to the residents of Sunnyvale.
- Statement #17 – 97% of the respondents agree that staff in their Division work hard in the delivery of services to the residents of Sunnyvale.
- Statement #18 – 68% of the respondents agree that they have the tools and equipment to efficiently perform.
- Statement #19 – 66% of the respondents agree that they are given real opportunities to improve skills.
- Statement #21 – 96% of the respondents agree that the quality of work provided is high.
- Statement #22 – 77% of the respondents agree that the vehicles assigned to their Division are in good condition.
- Statement #23 – 85% of the respondents agree that their Division has established clear performance expectations for its services.
- Statement #24 – 91% of the respondents agree that the employees of their Divisions are dedicated to meeting customer expectations.
- Statement #25 – 88% of the respondents agree that their immediate supervisor empowers them to make decisions concerning their work.
- Statement #26 – 84% of the respondents agree they are a valued member of their respective Division.
- Statement #27 – 82% of the respondents agree that the current work assigned enables them to apply and practice their respective knowledge and skills.
- Statement #28 – 84% of the respondents agree that their Division is a good place to work.
- Statement #30 – 76% of the respondents agree that the working relationships between the Divisions are generally good.
- Statement #31 – 70% of the respondents agree that their Division is open to new ideas suggested by staff.
- Statement #32 – 74% of the respondents agree that they are recognized and appreciated by their immediate supervisor for their work efforts.

The following section presents those statements to which respondents had mixed perceptions.

(2) Respondents Had Mixed Perceptions and Attitudes with Respect to Nine Statements.

There were nine statements to which employees had a more mixed response. The statements are provided in the points below, as well as the percentage (%) of respondents selecting “disagree” or “strongly disagree.” At least 30% of respondents selected “disagree” or “strongly disagree” in response to the statements presented below.

- Statement #9 – 35% of respondents disagree with the statement that the disciplinary process is fair.
- Statement #10 – 34% of the respondents disagree that the promotional process is fair.
- Statement #12 – 35% of the respondents disagree that their Division has the administrative support it needs to accomplish its goals and objectives efficiently and effectively.
- Statement #13 – 57% of the respondents disagree that their Division is frequently in a crisis mode due to workload that exceeds staff resources.
- Statement #14 – 60% of the respondents disagree that staffing is adequate for the workloads handled.
- Statement #16 – 43% of the respondents disagree that workload is evenly balanced among staff in their respective Division.
- Statement #20 – 50% of the respondents disagree that opportunities exist in the Department for career advancement.
- Statement #29 – 38% of the respondents disagree that in the past year, they have had adequate training to develop the skills needed to perform their job well.
- Statement #33 – 31% of the respondents disagree that they have the right number of managers and supervisors in their respective Division.

The following table ranks the survey results for all the Department staff, with those statements that respondents agreed with the most, presented in descending order.

Statement	Agree	Neutral	Disagree
Staff in our Division work hard in the delivery of services to the residents of Sunnyvale.	97.3%	0.9%	1.8%
I receive an annual performance evaluation.	96.5%	1.8%	1.8%
My Division provides a high level of service to the residents of Sunnyvale.	96.5%	0.9%	2.7%
The overall quality of work being done in my Division is high.	95.6%	0.9%	3.5%
The employees in my Division are dedicated to meeting customer expectations.	91.2%	0.9%	8.0%
My immediate supervisor empowers me to make decisions concerning my work.	87.6%	0.9%	11.5%
I get enough feedback from my immediate supervisor about my performance to know if I am performing up to his/her expectations.	85.8%	0.9%	13.3%
My Division has established clear performance expectations for its services.	85.0%	0.9%	14.2%
I feel that I am valued as a member of my Division.	84.1%	1.8%	14.2%
My Division is a good place to work.	84.1%	0.9%	15.0%
My current work assignments enable me to apply and practice my knowledge and skills.	82.3%	0.9%	16.8%
My Division has clear, well-documented policies and procedures to guide my day-to-day work.	79.6%	0.9%	19.5%
I receive an appropriate amount of guidance from my immediate supervisor.	79.6%	0.9%	19.5%
The goals and objectives of my Division are communicated clearly to me.	79.6%	0.9%	19.5%
My immediate supervisor does a good job of communicating important information to me in a timely manner.	78.8%	0.9%	20.4%
The organizational structure of my Division is well suited to its responsibilities.	77.0%	2.7%	20.4%
The vehicles assigned to my Division are in good condition.	77.0%	6.2%	16.8%
The working relationships between the different divisions in the Public Works Department are generally good.	76.1%	1.8%	22.1%
My Division operates efficiently.	75.2%	0.9%	23.9%
My Division contracts out the right types of services.	75.2%	4.4%	20.4%
I am recognized and appreciated for my work efforts by my immediate supervisor.	74.3%	0.9%	24.8%
My Division is open to new ideas suggested by others or myself.	69.9%	1.8%	28.3%
I have the tools and equipment I need to efficiently perform my job.	68.1%	0.9%	31.0%
We have the right number of managers and supervisors in my Division.	68.1%	0.9%	31.0%

Statement	Agree	Neutral	Disagree
I am given real opportunities in my Division to improve my skills.	66.4%	1.8%	31.9%
The promotional process is fair.	62.8%	3.5%	33.6%
My Division has the administrative support it needs to accomplish its goals and objectives efficiently and effectively.	62.8%	1.8%	35.4%
The disciplinary process is fair.	61.1%	3.5%	35.4%
In the past year, I have had adequate training to develop the skills I need to perform my job well.	58.4%	3.5%	38.1%
My Division is frequently in a crisis mode due to workload that exceeds staff resources.	56.6%	0.9%	42.5%
Workload is evenly balanced among staff in my Division.	54.9%	1.8%	43.4%
Opportunities exist in the Public Works Department for career advancement.	48.7%	1.8%	49.6%
In my Division, at present, staffing is adequate for the workloads we handle.	38.9%	0.9%	60.2%

The following points highlight the survey results above:

- Regarding management and supervision, respondents highly agree that performance evaluations are received, that immediate supervisors empower them to make decisions, that there are clear performance expectations for service, and that work assignments are applicable to their respective knowledge and skills. Respondents identify issues regarding the lack of opportunities which exist for career advancement, the balance of workload among staff, the frequency of being in a crisis mode due to lack of staffing, the adequacy of training to develop skills, the fairness of the disciplinary process, and the fairness of the promotional process.
- Regarding organization and operations, respondents highly agree that the quality and level of service being provided is high, that employees are dedicated to meeting customer expectations, and that they are highly valued as a member of their respective Division. Respondents identify issues regarding the adequacy of staffing to handle workload, including that of administrative staff, as well as the number of managers and supervisors.

The following sections provide the survey results for the divisions.

3. EACH OF THE DIVISIONS WITHIN THE PUBLIC WORKS DEPARTMENT IDENTIFIED DIFFERENT CHALLENGES FACING THE DIVISION.

The response patterns within each of the divisions of the Public Works Department varied, as would be expected. The respondents in each division identified

unique challenges that faced that division. The paragraphs that follow present these challenges for each of the divisions.

(1) Administration Division

Although the majority of respondents in the Administration Division agree that policies and procedures are clear, that goals and objectives are clearly communicated, and that supervisors give enough feedback, half of respondents wanted a greater amount of guidance from supervisors. Further, half of respondents believed that workload needed to be more evenly balanced among staff in the Division.

(2) Field Services Division

For the personnel of this Division, most respondents indicated that the fairness of the promotional process needed to be addressed, that the Division needed additional administrative support, and that staffing was not adequate given its workload.

(3) Fleet, Trees, and Landscaping Division

For this Division, the respondents indicated concern with the adequacy of staffing, the fairness of the promotional process, and opportunities for career advancement in the Public Works Department.

(4) Water Pollution Control Plant

For this Division, respondents expressed concerns regarding opportunities for career advancement.

(5) Engineering Division

The respondents within the Engineering Division expressed concern regarding opportunities to improve their skills, the adequacy of training to develop their skills, the adequacy of staffing, and opportunities for career advancement.

(6) Solid Waste Division

Respondents within this Division were satisfied with a number of areas, however, expressed some concerns regarding staffing, opportunities for career advancement, and the adequacy of training.

(7) Traffic Engineering Division

Respondents in the Traffic Engineering Division expressed concern regarding the adequacy of administrative support, opportunities for career advancement, the adequacy of staffing, and the clarity of performance expectations for its services.

4. RESPONDENTS WERE ASKED TO IDENTIFY KEY STRENGTHS AND OPPORTUNITIES FOR IMPROVEMENT.

Employees were asked to identify key strengths and opportunities for improvement. The Matrix Consulting Group reviewed each survey for responses to the open-ended questions. Key themes identified by respondents are presented in the points below.

(1) Many Respondents Commented Positively on Employee Relations and Working Environment, as Well as the Levels of Service and Management Provided.

A high number of comments were received regarding the quality of employee working relationships, and the high quality of the service levels being provided, the work efforts, and management and supervision. The following comments provide a representative sample in each of the major areas:

- **Employee Relations and Working Environment**
 - “Dedicated co-workers that are always willing to help out.”
 - “Teamwork – we know we are the best at what we do.”
 - “The people I work with are great.”

- “Good relationship with all of operations and all of maintenance.”
- “The people are hard working, want to do a good job, doing the right thing the first time, and want high customer satisfaction.”
- “The people, in general, communicate well and provide adequate support to one another.”
- **Levels of Service Provided**
 - “We are making our City look beautiful and well maintained for years to come.”
 - “There are opportunities to make a positive impact on the community.”
 - “It’s great to be serving the public.”
 - “We provide a safe and efficient service to the residents and businesses of Sunnyvale.”
 - “Good opportunity to serve the public both in direct services as well as education.”
 - “Ability to protect the environment while serving the City.”
- **Management and Supervision**
 - “The managers and supervisors are always open to hearing new ideas.”
 - “Management is supportive to employee concerns.”
 - “The communication between managers and employees is good.”
 - “Managers appreciate efforts from Division members.”
 - “The support from direct supervisors to set goals and develop projects that will help implement regulatory requirements.”
 - “Employees are given assignments and allowed to work on them without micromanaging.”

The following section summarizes the comments with which significant number of respondents disagreed.

(2) Many Respondents Indicated Concerns Regarding Training, Staffing, Equipment, and Some Management Issues.

A high number of comments were received regarding the level of training provided, the adequacy of staffing resources, the general lack of useful equipment, and management / supervision:

- **Training**

- “Replace the constant need for temps with full-time employees. Temps are only allowed to work for six months at a time, so it is constant retraining”
- “There is inadequate time and resources to develop skills, learn new programs, etc.”
- “There is inadequate funding for attendance at conferences that improve skills, broaden horizons, anticipate potential for future needs, etc.”
- “Training is non-existent, the only training that gets approved benefits the City from a liability standpoint.”

- **Equipment**

- “Better tools for doing engineering work.”
- “Better equipment to make repairs in a timely manner, and in an efficient and safe operational way.”
- “More up to date computer hardware / software.”
- “The equipment down time is long, the repairs by the shop need to improve.”
- “Improve preventive maintenance for all equipment, instruments, etc.”

- **Staffing**

- “There is not enough administrative support.”
- “Need extra staffing to cover vacancies, sickness, etc. for scheduling requirements.”
- “We are terribly understaffed and have been for years.”

- “More staffing to help relieve the workload and ensure coverage requirements.”
- “Increase staff to accomplish goals, objectives, and performance targets.”
- **Overall management and supervision**
 - “More respect from supervisors, leaders, etc.”
 - “Favoritism needs to end, managers need to lead by example, and suggestions need to be taken seriously.”
 - “Need more accountability from senior supervisors, more direction and concrete policies and procedures within the Department.”
 - “Need more specific direction and management needs to hold those who are not performing more accountable.”
 - “The communication between management and line personnel needs to improve.”
 - “The disciplinary actions need to be consistently applied to all personnel, in all sections.”
 - “Managers need to be trained on how to measure how well staff is doing.”
 - “There needs to be clearer designation of responsibility between leaders and managers.”
 - “Have managers and supervisors attend a “Supervisor Academy.”
 - “Need to have clearer definition of expectations as it relates to work performed and whether it is an effective use of resources.”

4. COMPARATIVE SURVEY

4. COMPARATIVE SURVEY

This chapter presents the results of the comparative survey conducted by the project team to identify primary issues with how the Sunnyvale Department of Public Works is staffed, organized and / or operated, in comparison to other cities. The project obtained information from the Hayward, Palo Alto, San Mateo, and Santa Clara. These cities were selected due to their close proximity to Sunnyvale and provide a similar service mix as the Public Works Department in Sunnyvale.

The following sections focus on the significant comparisons which could provide the most impact on how the Public Works Department is operated or staffed within the following areas: engineering, traffic engineering, environmental, field services, fleet services, trees and landscaping services.

1. ENGINEERING DIVISION

The table on the following page summarizes the responses of the four other cities regarding engineering. Important points to note concerning these responses are presented below.

- Two of the four cities identify engineering staffing requirements for all the capital projects in the first year of the five-year capital improvement program. These two cities are Hayward and Palo Alto. Sunnyvale does not identify engineering staffing requirements.
- Outside of Palo Alto, none of the responding cities base their staffing for design and inspection of capital projects utilizing cost of construction guidelines. Sunnyvale does not base their staffing upon cost of construction guidelines.
- All of the four cities produce a Gantt chart schedule for capital improvement projects for a two- or three-year period, although to varying levels and complexities of projects in some instances. Sunnyvale does not generate a Gantt chart schedule.

QUESTIONS	SUNNYVALE	HAYWARD	PALO ALTO	SANTA CLARA	SAN MATEO
Does your Agency identify engineering staffing requirements for all the capital projects in the first year of the five-year capital improvement program?	No. Staffing requirements for all of the CIP in the first year of the five-year capital improvement program have not been identified.	Yes – a project manager is assigned to each new project.	Yes	No, We have a fixed staff that is supplemented by consultants when needed.	No. Some analysis done as part of the two year budget cycle.
Is staffing for design and inspection of capital projects based upon cost of construction guidelines?	No. Staffing for design and inspection of capital projects is not based upon cost of construction guidelines.	No. The level of staffing is dependent on the complexity of the project.	Yes	No. Staff is budgeted for a base line of projects in the annual budget. It is not budgeted based on construction cost of individual projects.	No
Does the engineering staff produce a Gantt chart schedule for capital improvement projects for a two- or three-year period?	No. A Gantt chart schedule has not been developed for capital improvement projects.	Yes – City uses summary and detail sheets for each fund to track progress of each project; project managers also submit quarterly goals and objectives which advise senior members of Public Works staff as to the status and proposed timelines for projects.	Yes – per specific project	Yes, depending on the type of project.	Yes and no. Required for all large projects and complex projects. Not for all projects.

QUESTIONS	SUNNYVALE	HAYWARD	PALO ALTO	SANTA CLARA	SAN MATEO
Do you utilize a project cost accounting system to enable comparisons of planned versus actual staff hours for the design and inspection of capital projects?	No. A project cost accounting system is not utilized for non-grant funded projects to charge staff hours to projects.	Yes. Each project is tracked individually on the City's financial management system (both cost per certain portions of project and staff hours).	Yes (SAP). Engineers also use Microsoft Project.	No, staff is budgeted in the operating budget. However, on some key projects, staff time is tracked for performance measurement purposes.	No. The EDEN financial system can budget and track dollars but not hours.
Is a single project manager assigned to the management of the design, construction inspection, and construction management of capital improvement projects?	No. During the design phase, there is an assigned design project manager. This is then assigned to a construction manager during the building phase.	No – one project manager oversees the design portion of the project, while the City's Construction Inspection section oversees the actual in-the-field work with the contractor. However, the Design project manager is also involved during construction.	No, each project team manages their projects	No. There is a project manager for design. After completion of design, it is transferred to the Field Services Division and a different Project manager is assigned for Construction Management.	Yes, generally.
Do you utilize an automated project management system for all engineering staff to manage capital improvement projects?	No. However, project managers have access to the automated financial management system.	No	No	Some times on key projects.	No

QUESTIONS	SUNNYVALE	HAYWARD	PALO ALTO	SANTA CLARA	SAN MATEO
Do you have an updated Master Plan for the storm-water, water, and sanitary sewer collection system and the wastewater treatment plant?	No.	No	Yes, for stormwater and for the Wastewater Treatment Plant.	No, however, one is being prepared for Sanitary Sewer conveyance system. Next year, a storm drain master plan will be prepared.	An updated sanitary sewer master plan has been prepared. Storm drain master plan consists of specific area studies.
Does Engineering fully recover the costs of development review including direct and indirect costs?	No. Engineering does not fully recover its costs for development services.	Yes-the City charges a certain rate for the review of projects that takes into account such items as salary, benefits and cost for materials.	Not quite.	We are low in some cases. Every year we are allowed to increase fees up to 20% until we reach cost recovery.	Yes
Do Inspectors utilize automated input devices to record inspection results or display inspection history in the field?	No.	No – Construction Inspectors utilize diaries in the field and transfer all written information onto the computer when they return to the office.	No.	No, it is done manually.	No

- Two of the four cities utilize a project cost accounting system in which staff hours are charged to projects by engineering and construction inspection staff to enable comparisons of planned versus actual staff hours for the design and inspection of capital projects. Sunnyvale does not utilize a project cost accounting system except for grant-funded projects.
- None of the four cities utilizes a project manager concept from cradle to grave for the management of the design, construction inspection, and construction management of capital improvement projects. Each tends to assign a project manager for design and a separate project manager for construction. This is the same approach utilized by Sunnyvale.
- None of the four cities utilize an automated project management system. Sunnyvale does not utilize an automated project management system

The next section presents the results for traffic and transportation.

2. TRAFFIC AND TRANSPORTATION.

The table on the following page summarizes the responses of the four other cities regarding traffic and transportation. Important points to note concerning these responses are presented below.

- With the exception of San Mateo, all of the cities have developed a transportation master plan. Sunnyvale has similarly developed a master plan – the TSP.
- Three of the four cities have a traffic improvement program in place to proactively design and implement traffic system management measures to reduce traffic congestion and travel time delay. San Mateo does not. Sunnyvale does not have a traffic improvement program in place.
- All of the cities, including Sunnyvale, review signal timing of all interconnected traffic signals every 3 to 5 years to assess changes in traffic flows.
- Two of the cities – Palo Alto and Santa Clara – coordinate signal timing across jurisdictional boundaries. Sunnyvale coordinates signal timing across jurisdictional boundaries.
- All of the cities preventively maintain their traffic signal cabinets once a year.

QUESTIONS	SUNNYVALE	HAYWARD	PALO ALTO	SANTA CLARA	SAN MATEO
Does your City have a transportation master plan that identifies deficiencies in the street network, weaknesses in the traffic control system, etc.?	LUTE will need to be updated in the near future, but the TSP is very recent and identifies citywide deficiencies and weaknesses as well as solutions and a funding mechanism to pay for the improvements.	Yes – these are noted in the Circulation Element of the City of Hayward's General Plan.	Yes. The Transportation Implementation Plan sets forth in broad terms priorities for implementation of projects and programs contained in the 1998-2010 Palo Alto Comprehensive Plan, the Palo Alto Bicycle Transportation Plan, and other Council-adopted plans and policy documents.	Yes. With every General Plan Update, deficiencies are identified. There is also a list of pending signal installation projects.	No.
Does your agency have a traffic improvement program in place to proactively design and implement traffic system management measures to reduce traffic congestion and travel time delay?	No. A traffic improvement program is not in place to proactively design and implement traffic system management measures.	The City has a section of its CIP that is directly related to traffic improvements; it is updated annually and needed projects are discussed amongst staff at committee meetings related to the CIP.	Yes. It is part of the Transportation Implementation Plan.	Yes, as stated above.	No.

QUESTIONS	SUNNYVALE	HAYWARD	PALO ALTO	SANTA CLARA	SAN MATEO
Is signal timing of all interconnected traffic signals reviewed every 3 to 5 years to assess changes in traffic flows?	Yes. The Division re-times 75% of signals and signal systems each year.	Signal timings on major arterials are reviewed and modified as funding from MTC is provided. The City does not have sufficient resources to do a Citywide comprehensive signal retiming review.	Yes.	Yes.	Yes, for the Hillsdale and downtown areas.
Is signal timing coordinated across jurisdictional boundaries in support of corridor operations?	Sunnyvale-Saratoga was retimed to coordinate at times with DeAnza Blvd. in Cupertino a few years ago. Sunnyvale also coordinates signal timing with Santa Clara.	No, since the traffic dynamics in Hayward are different than in most of the County, corridor-wide coordination is not practical, although the City is working on a signal timing plan for Hesperian Boulevard.	Yes.	Yes, with San Jose and Sunnyvale.	No.
Are your traffic signal cabinets preventively maintained once a year, including performing the input/output test, cleaning the cabinet, checking detectors, testing the conflict monitor, and a visual inspection?	Yes. Traffic signal contractor is required to perform monthly checks and annual checks that meet this requirement.	Yes – the CIP contains a project which specifically relates to traffic signal cabinet repair and/or replacement each fiscal year.	Yes	Yes. There is also a cabinet replacement program.	Yes.

QUESTIONS	SUNNYVALE	HAYWARD	PALO ALTO	SANTA CLARA	SAN MATEO
<p>Does your city have an adaptive traffic signal system in place that adjusts the timing of signals in real-time and provides the automated flexibility to change the timing of signals in response to both daily and seasonal traffic patterns for signalized intersections with unpredictable traffic demand (e.g., in the vicinity of shopping centers)?</p>	<p>Yes. SCATS adaptive system was installed on Mathilda and Maude Avenues. BiTran QuicTrac was installed on Fair Oaks. Rhodes was installed at 6 City intersections adjacent to Lawrence Expressway. Will be expanding SCATS to Sunnyvale-Saratoga this year.</p>	<p>The City does have different signal timing plans on major arterials that are implemented during peak and non-peak times.</p>	<p>Yes. The Transportation Division is currently in the process of upgrading the entire city-owned traffic signal system to an Advanced Transportation Management System (ATMS). The scope of the ATMS project includes the following specific items:</p> <ul style="list-style-type: none"> • New state-of-the-art Traffic Operations Center (TOC); • New traffic signal controllers to replace existing controllers at 82 intersections; • New traffic signal controller cabinets to replace existing cabinets at 21 intersections; • Individual traffic signal controllers to communicate with TOC via Ethernet. 	<p>Yes, there is a signal center and two people are dedicated to implementing this function.</p>	<p>No.</p>

QUESTIONS	SUNNYVALE	HAYWARD	PALO ALTO	SANTA CLARA	SAN MATEO
Is traffic signal technology used that enables the traffic signals to page signal technicians when it goes to “flasher?”	No. Staff is not alerted automatically by the traffic signal management system when problems occur. Is done when citizen or public safety reports problems. Traffic management center is not operated routinely only on reactive basis.	No – this must be reported to staff and then to the signal maintenance contractor.	No.	No. Staff is called out in such circumstances either by citizens or City staff working in the area.	No.
Have you established the thresholds for when traffic mitigation studies need to be prepared? And have they been identified in the applicant brochures?	Yes. The City uses the VTA Transportation Impact Analysis Requirements. During the preliminary project review (before the formal application) applicants are informed of the Transportation Study requirements.	Yes – this is included in the City’s guidelines for traffic studies which are given to traffic engineering firms as the need for traffic studies is identified.	Yes. This is available on the Transportation Division website.	Yes. Generally, VTA Guidelines are followed. In some cases, even if less than 100 trips are generated, traffic studies are required.	Yes. These are included in the application guides developed by the Planning Division.
Does your agency have an inventory of approved signal phasing and timing settings for each intersection?	Yes. Staff does have hard copy inventory of most traffic signal phasing and timing sheets at traffic signal and at City Hall. Have some designs on AutoCad.	Yes – for City owned signals but not for all CalTrans-owned signals.	Yes.	Yes.	No. However, the signal phasing and timing settings are maintained in the controller cabinet.

- Three of the four cities have installed adaptive traffic signal systems that adjust the timing of signals in real-time and provide the automated flexibility to change the timing of signals in response to both daily and seasonal traffic patterns for signalized intersections. Only San Mateo has not installed such a system. Sunnyvale has also installed an adaptive traffic signal system. Palo Alto is making a significant investment – upgrading the entire city-owned traffic signal system.
- None of the cities have traffic signal technology that enables the traffic signals to page signal technicians when it goes to “flasher.” This includes Sunnyvale.
- All of the cities, including Sunnyvale, have established thresholds when traffic mitigation studies are required.
- All of the cities – with the exception of San Mateo – have inventories of approved signal phasing and timing settings.

The next section provides an analysis of wastewater treatment plants.

3. THE WASTEWATER TREATMENT PLANT HAS MORE OVERALL STAFFING RELATIVE TO PLANT SIZE THAN COMPARABLE JURISDICTIONS.

The project team obtained basic information for surrounding wastewater treatment plants, particularly from Hayward, Palo Alto and San Mateo. This information included design capacity and average flow, staffing, etc. The design capacity and average daily flow for each of the cities is identified as follows:

- Sunnyvale – design flow of 29.5 MGD and actual average daily flow of 15.3 MGD;
- Hayward – design flow of 16.5 MGD and actual average daily flow of 13.7 MGD;
- Palo Alto – design flow of 39 MGD and actual average daily flow of 23.3 MGD;
- San Mateo – design flow of 15.7 MGD and actual average daily flow of 13.4 MGD.

The points below summarize the comparative data from the four other cities and provide a comparison to Sunnyvale.

- **Operations Staffing.** The project team collected the number of authorized full-time positions for operations staffing (which include supervisors, senior operators, operators, etc.), as follows:

	Sunnyvale	Hayward	Palo Alto	San Mateo
Operations	26	14	24	18

As shown above, Sunnyvale is authorized 26 positions for operations. In comparison, Hayward is allocated 14 positions, Palo Alto 24 positions, and San Mateo 18 positions.

- **Maintenance Staffing.** The project team collected the number of authorized full-time positions for plant maintenance (which include supervisors, mechanics, electricians, etc.), as follows:

	Sunnyvale	Hayward	Palo Alto	San Mateo
Maintenance	8	8	12	6

Sunnyvale is authorized 8 positions for maintenance of its water pollution control plant excluding the storekeeper. In comparison, Hayward is authorized 8 maintenance positions, Palo Alto 12 positions, and San Mateo 6 positions.

- **Lab Staffing.** The project team collected the number of authorized full-time positions for lab personnel (which include chemists, lab technicians, etc.), as follows:

	Sunnyvale	Hayward	Palo Alto	San Mateo
Lab	11	4	8	3

Sunnyvale is authorized 11 positions for the laboratory for its water pollution control plant. In comparison, Hayward has 4 positions, Palo Alto has 8 positions, and San Mateo has 3 positions. San Mateo is not responsible for a water utility.

- **Pre-Treatment.** The project team collected the number of authorized full-time positions for pre-treatment personnel (which include industrial waste inspectors, technicians, etc.), as follows:

	Sunnyvale	Hayward	Palo Alto	San Mateo
Pre-Treatment	8	4.5	6	1

Sunnyvale is authorized 8 positions. In comparison Hayward is authorized 4.5 positions, Palo Alto 6 positions, and San Mateo 1 position.

The following table provides the results for the cities for wastewater treatment plants.

QUESTIONS	SUNNYVALE	HAYWARD	PALO ALTO	SAN MATEO
What is the daily design capacity for your wastewater treatment plant in terms of MGD? What was your actual daily average flow last year in terms of MGD?	Capacity of 29.5 MGD. Average daily flow is approximately 15 MGD.	Rated capacity of the plant is 16.5 MGD. Average daily flow in 2005 was 13.7 MGD.	Plant Dry Weather Design flow is 39 MGD Plant Flow for 2005 was 23.3 MGD	Design flow of 15.7 MGD Actual average flow of 13.4 MGD.
Does your plant have a centralized control center and SCADA system to control the operations of the plant?	No	Yes	Yes	Yes
Is a CMMS installed and utilized, including a work order system, annual work program, a reporting system to report actual versus planned performance, asset management system, and defined service levels and performance standards for each work activity?	Yes. MAXIMO	Yes (Mainsaver software)	Yes. The work order system is incorporated into the City's financial data base system (SAP)	Yes. Azteca
Are precision maintenance technologies being utilized including thermographic imaging, vibration analysis, ultrasonic analysis, oil analysis, laser alignment, and dynamic balancing for plant maintenance?	Some, but not all, of these precision technologies are utilized.	Yes. The WPCF has vibration analysis capability and other precision maintenance technologies are contracted out.	Yes	Yes

QUESTIONS	SUNNYVALE	HAYWARD	PALO ALTO	SAN MATEO
How does your plant dewater sludge (such as sludge dewatering presses)?	Tiles, solar and air drying	Solar and air drying	Belt filter presses	Vacuum filter; switching to centrifuges
What operations staff are authorized for your plant (by class title)?	1 Manager 5 Sr. Operator 19 Operator 1 Utility Worker	1 WPCF Operations / Maintenance Manager 1 WPCF Operations Supervisor 6 Lead Operators 6 Plant Operators	Plant Manager (1) Shift Supervisors (5) Senior Operators (6) Operators (16)	Shift Supervisor (4) Sr. Operator (4) Operator (10)
What maintenance staff are authorized for your plant (by class title)?	1 Manager 1 Sr. Plant Mechanic 6 Plant Mechanic 1 Sr. Storekeeper	1 Maintenance Supervisor 3 Maintenance Mechanics 2 Electricians 2 Maintenance Worker	Assistant Plant Manager (1) Senior Mechanic (1) Mechanics (6) Lead Electrician (1) Electricians (3)	2 Plant Mechanic III 2 Plant Mechanic II 1 Plant Mechanic I
What laboratory staff are authorized for your plant (by class title)?	1 Manager 2 Sr. Environmental Chemist 6 Environmental Chemist 2 Field Technicians	1 Laboratory Supervisor 3 Laboratory Technicians	Lab Manager (1) Senior Chemist (1) Chemists (3) Laboratory Technicians (2.5) Environmental Program Manager (0.5) Source Control Inspector ()	1 Lab Supervisor 2 Lab Analyst II

QUESTIONS	SUNNYVALE	HAYWARD	PALO ALTO	SAN MATEO
What industrial waste pre-treatment staff are authorized for your plant (by class title)?	1 Sr. IW Inspector 4 IW Inspector 3 Lab Technicians	1 Senior Water Pollution Source Control Inspector 3 WPSC Inspectors 0.5 Intern (Water Pollution Control Administrator and two additional WPSC Inspectors are funded in the Stormwater Program)	Environmental Control Program Manager (1); Industrial Waste Inspector (1); Investigators (3); Engineer Tech III (1).	0.25

4. FIELD SERVICES

The table on the following page summarizes the responses for field services; only two responses were received – San Mateo and Hayward. Important points to note concerning these responses are presented below.

- Only San Mateo has acquired and installed a computerized maintenance management system. Sunnyvale has not acquired and installed a formal CMMS in place to schedule preventive maintenance, or to directly link field activities to assets. There is no formal asset management system installed.
- The crew sizes utilized by Sunnyvale for its water and wastewater utility are comparable to Hayward. Hayward, however, flexibly staffs its distribution valve crew, fire hydrant crew, and air release crew (one or two staff) depending on the traffic volume and hazards of streets; Sunnyvale uses a two-person crew. San Mateo does not own and operate a water utility.
- Hayward utilizes predictive maintenance (such as thermography and vibration analysis) for critical equipment for the water distribution system and wastewater collection system. Sunnyvale does not utilize predictive maintenance.
- Sunnyvale preventively maintains its fire hydrants once every two years. Hayward preventively maintains their fire hydrants on an 18 to 24 month schedule.
- Unlike Hayward, Sunnyvale has a change out and testing program for its water meters.
- The crew sizes utilized by Sunnyvale for wastewater collection are like those used for wastewater and stormwater collection.

QUESTIONS	SUNNYVALE	HAYWARD	SAN MATEO
Is a CMMS (or computerized maintenance management system) installed and utilized, including a work order system, annual work program, a reporting system to report actual versus planned performance, asset management system, and defined service levels and performance standards for each work activity?	No. There is no formal CMMS in place to schedule preventive maintenance, or to directly link field activities to assets. There is no formal asset management system installed.	No. Not at this time, but currently under study	Yes. Azteca.
For water operations and distribution, what are your crew sizes for the following: <ul style="list-style-type: none"> • Distribution valves • Fire hydrant maintenance • Air release valve maintenance • Residential meter change outs • Dead-end flushing • Water service replacement 	Distribution valves: 2 Residential meter: 1 Dead-end flushing: 1 Water service replacement: 3 Fire Hydrant maintenance: 2 Air Release valve maintenance: 2	Distribution valves: 1-2 Fire hydrant maintenance: 1-2 Air release valve maintenance: 1-2 Residential meter change outs: 1-2 Dead-end flushing: 1-2 Water service replacement: 3-4	The City does not own and operate a water utility.
Is predictive maintenance (such as thermography) routinely utilized for critical equipment for the water distribution system and wastewater collection system?	No. The Division does not utilize thermography, vibration analysis, or oil analysis.	Yes. Vibration and electrical analysis for pumps, motors and related equipment	No.
Are fire hydrants preventively maintained annually?	Maintenance every other year per hydrant.	Maintained on a 18 to 24 month schedule	The City does not own and operate a water utility.

QUESTIONS	SUNNYVALE	HAYWARD	SAN MATEO
Have you established a multi-family water meter change out program for water meters, 1" to 2", that results in these meters being changed out on a four-year schedule?	On a 10-year schedule for 1" and 2" meters, and on a 15-year schedule for 5/8 to 3/4-inch meters. Will only test older water meters after a complaint.	There is not a formal schedule in place, but meters are changed as needed.	The City does not own and operate a water utility.
Have you established a water meter registration accuracy-testing program for 3", 4", and 6" meters that result in these meters being field tested on a one-year schedule?	On a two-year accuracy-testing program for large meters. Test approx 240 large meters per year.	Meters are tested for accuracy, both in the field and on the bench, as potential problems are identified. There is not a formal one-year schedule.	The City does not own and operate a water utility.
For wastewater and storm-water operations, what are your crew sizes for the following: <ul style="list-style-type: none"> • Wastewater jetting • Catch basin cleaning • Wastewater or storm-water main repair 	Wastewater jetting: 2 Catch basin cleaning: 2 (1 if done by hand) Wastewater or storm-water main repair: 3	2-person crews	2-person crews for wastewater jetting and catch basin cleaning. 3 person crew for main repair.

5. TREE AND LANDSCAPING SERVICES

Only one response was received for tree and landscaping service - for the City of Palo Alto. Important points to note concerning the response by Palo Alto, and a comparison to Sunnyvale are presented below.

- Neither city provides a proactive program for inspection of sidewalks to identify tripping hazards. However, both cities utilize sidewalk replacement, ramps or grinding to eliminate tripping hazards.
- Neither city utilizes a computerized maintenance management system for median maintenance. Palo Alto has outsourced its median maintenance.
- Palo Alto has developed an ADA transition plan to ensure its facilities and assets are compliant with Federal and State ADA requirements, including sidewalks and sidewalk ramps. Sunnyvale has not developed such a transition plan.
- Palo Alto and Sunnyvale outsource curb, gutter and sidewalk replacement. Palo Alto replaces sidewalks, curbs and gutters for the “Hot Spot” program city-wide.
- Palo Alto and Sunnyvale utilize TreeKeeper as their computerized maintenance management system for tree maintenance.
- Palo Alto has developed a formal tree master plan and reforestation plan outlining the species to be planted, planting guidelines, diversification of species, and general maintenance and removal, etc. Sunnyvale has not developed such a plan.
- While Palo Alto provides proactive tree planting services, not just for replacements of tree removals, Sunnyvale provides minimal replacement services, generally only upon removal.
- Palo Alto and Sunnyvale outsource stump removal and tree planting.
- Palo Alto, unlike Sunnyvale, outsources area or block-by-block trimming.

The table on the following page summarizes the responses for tree and landscaping services; only one response was received – Palo Alto.

QUESTIONS	SUNNYVALE	PALO ALTO
<p>Does your agency have sidewalk inspection and repair program in place that includes:</p> <ul style="list-style-type: none"> • A systematic inspection of sidewalks once every three to five years to identify tripping hazards; • Resolving the tripping hazards within thirty days of hazard identification; and • Use of sidewalk replacement, ramps or grinding to eliminate tripping hazards. 	<p>No</p> <p>Yes</p> <p>Yes</p>	<p>No</p> <p>No</p> <p>Yes</p>
Does your agency utilize a computerized maintenance management system (CMMS) for median maintenance?	No.	Palo Alto has outsourced median maintenance.
Has your City implemented an ADA Transition Plan to ensure its facilities and assets are compliant with Federal and State ADA requirements and best practices in a “reasonable period of time.” This includes sidewalks and ramping?	The City does not have an ADA Transition Plan implemented to prioritize and communicate plans for resolving outstanding ADA issues.	Yes
What type of services does your Agency contract out related to concrete maintenance and / or repair?	Sidewalk, curb & gutter repair/replacement	Sidewalk, curb & gutter repair/replacement within District Areas
What concrete maintenance services does your Agency provide with in-house staff?	Sidewalk grinding and temporary asphalt patching.	Sidewalk, curb & gutter repair/replacement for “Hot Spot” program Citywide.
Does your agency utilize a computerized maintenance management system (CMMS) for urban forest management? If so what type?	An inventory exists in TreeKeeper software regarding trees including species, location and the like.	TreeKeeper 2.5 version for Inventory and Work History

QUESTIONS	SUNNYVALE	PALO ALTO
Does your agency have a formal, written tree master plan and reforestation plan outlining the species to be planted, planting guidelines, diversification of species, and general maintenance and removal?	There is no Master Plan that coordinates the efforts of Street Trees. Different service levels are performed dependent on annual performance targets, budgets, resulting in a lack of uniform service levels in the City (e.g. Street Tree maintenance versus Park Tree maintenance.)	Yes
When trees are removed, are the stumps also removed?	Not at the same time	Yes
Are all trees that are removed replaced?	Trees are not planted on a consistent basis within a specific time frame due to lack of performance targets in the contract language.	All, except trees with conflicts
Is tree planting provided proactively, in established neighborhood planting areas where tree stocking is inadequate, based on existing canopy coverage?	Tree planting occurs based on tree removals. Proactive tree planting is now minimal.	Yes
What is the performance standard for City staff to respond to tree complaints (e.g., within one working day, tree complaints are inspected)?	Upon receipt of complaint, trees are inspected by the arborist within 9 working days. After an evaluation, the City takes action within 10 weeks, 90% of the time.	Tree complaints inspected within 10 days
What tree maintenance services are contracted out?	Stump removal and tree planting	Stump grinding; Area Trimming; some planting
What tree maintenance is performed with in-house staff?	Trimming, pruning, spraying, inspection, etc.	Tree removals, trimming, pruning, spraying, inspection, and planting
What crew size do you utilize for in-house tree trimming?	3 person crew	2-3 person crew

6. FLEET SERVICES

Only one response was received for fleet services – for the City of Palo Alto. Important points to note concerning the response by Palo Alto, and a comparison to Sunnyvale are presented below.

- Palo Alto and Sunnyvale utilize a replacement reserve or sinking fund to ensure the timely replacement of fleet assets.
- Palo Alto and Sunnyvale have developed replacement schedules for their fleets.
- Neither Palo Alto nor Sunnyvale provide preventive maintenance after hours.
- Palo Alto and Sunnyvale utilize the same computerized maintenance management system for their fleet – Fleet Focus.
- Palo Alto, unlike Sunnyvale, does not have a formal program for driver and operator training, in general, or for problem drivers.
- Palo Alto is implementing a two-tier Motorized Equipment Mechanic job family. The second tier requires an ASE Master Certification in addition to another significant qualification, such as an AA degree, welding certification or smog license. The proposal includes a 5% pay increase for achieving the second tier.

The table on the following page summarizes the responses for fleet services; only one response was received – Palo Alto.

QUESTIONS	SUNNYVALE	PALO ALTO
Does your agency utilize a replacement reserve or sinking fund to ensure the timely replacement of fleet assets?	The City has a replacement fund program.	Yes – departments make annual contributions for each asset based on its cost, its life, and an escalation factor (which covers inflation and the cost of technology).
What are your vehicle replacement policies by class of vehicle (e.g., 10-year replacement plan for sedans, etc.)?	Vehicle replacement is based upon the class of vehicles and is based upon the age of the vehicle and the mileage.	Fleet replacement criteria is in place for the various types of equipment utilized. These will be updated this year.
Are preventive maintenance services completed after normal working hours in order to increase convenience to customers?	PMs are not completed after normal working hours but attempts are made to schedule PMs during users' days off. Fleet typically picks up units at users' locale and brings them to garage for service.	No. In the past, these programs have not proven to appreciably increase customer convenience. In addition, for a small operation, they are difficult to manage and can be costly, due to generally lower productivity. A second shift could be effective if full-time management supervision was available.
What type of fleet information system does your City utilize?	MAXIMUS Fleet Focus captures data sufficiently relative to workload, vehicle inventory, vehicle history, parts, fuel, etc. GasBoy fuel system is interfaced with Fleet Focus.	MAXIMUS Fleet Focus
Does your agency utilize a formal program for driver and operator training, in general, or for problem drivers?	The Public Works Department has an operator training program for such equipment as backhoes, cranes, vactors, etc.	The City does not currently have a formal driver/operator training program. Each department/division is responsible for providing this training. Our Human Resources Department does offer occasional Defensive Driving training courses for problem drivers.

QUESTIONS	SUNNYVALE	PALO ALTO
Are technicians in your shop encouraged to keep skill levels current through financial incentives to obtain ASE certification?	No financial incentives are available. Training has been minimized due to budgetary issues.	Palo Alto is currently in the process of implementing a two-tier Motorized Equipment Mechanic job family. The second tier requires an ASE Master Certification, in addition to another significant qualification such as an AA degree, welding certification or smog license. The proposal includes a 5% pay increase for achieving the second tier.

5. ENGINEERING DIVISION

5. ENGINEERING DIVISION

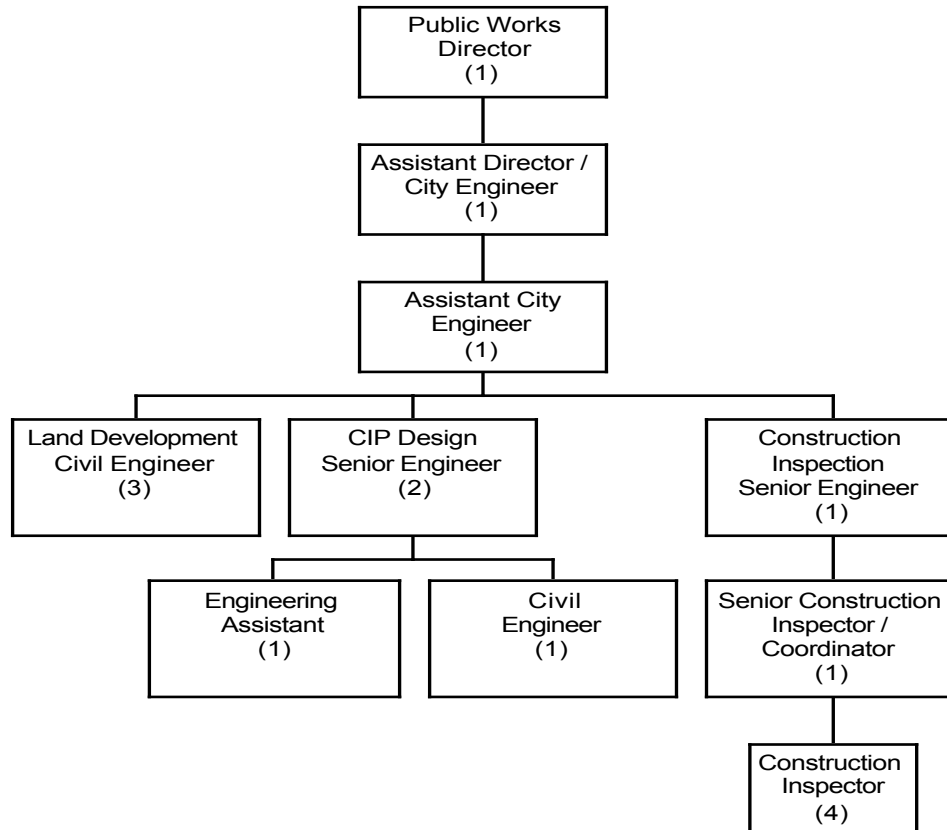
This chapter presents an analysis of the Engineering Division, including:

- The development review process;
- The level of staffing;
- The plan of organization for engineering; and
- The process utilized by the Public Works Department to manage the capital improvement program.

The chapter opens with an analysis of the plan of organization for the Engineering Division.

1. THE PLAN OF ORGANIZATION FOR THE ENGINEERING DIVISION SHOULD BE MODIFIED.

The present plan of organization for the Engineering Division is presented below.



The Matrix Consulting Group evaluated the effectiveness of the organization of the Engineering Division on the following factors:

- The Division's organizational structure eliminates unnecessary overlapping functions and excessive administrative layers;
- The Assistant Public Works Director/City Engineer has reasonable spans of control;
- Like functions are grouped together;
- The structure enables efficient and effective management of the Division; and
- The Assistant Public Works Director/City Engineer is able to manage the number of functions in the Division and hold her section-heads accountable for the delivery of cost effective services.

The paragraphs below present an evaluation of the organizational structure for the Engineering Division considering its existing plan of organization and the factors indicated above.

- **The Division has a one-over-one managerial structure.** The Assistant Public Works Director/Assistant City Engineer supervises the Assistant City Engineer.
- **The Assistant City Engineer supervises five staff.** This managerial position supervises the Senior Engineer for Construction Inspection, the two Senior Engineers for Capital Improvement Program Design, and the two Civil Engineers in Land Development.
- **There are two Senior Engineers in charge of Capital Improvement Program Design.** The Engineering Assistant and the Civil Engineer assigned to this section have two managers – the two Senior Engineers. Two Senior Engineers are responsible for management of the Capital Improvement Program Design section, fragmenting the managerial responsibility for managing the design of capital improvement program projects. As a consequence, the responsibility for managing these projects fall to the Assistant City Engineer and the Assistant Director/City Engineer.
- **The Engineering Division lacks a supervisor for development review.** There are two Civil Engineer positions assigned to engineering development review. Both of these positions report to the Assistant City Engineer. As a consequence, the responsibility for managing engineering development review falls to the

Assistant City Engineer and the Assistant Director/City Engineer. (It should be noted that the Division requested a supervisor for development review as part of the fiscal year 2006-07 budget process).

- **The Senior Engineers are not designated nor utilized as managers.** These positions are utilized as supervisors. This is not the norm in cities as the data indicates below. As the survey indicates, each of these other cities – Alameda, Fremont, Hayward, Milpitas, Mountain View, Palo Alto, Richmond, San Mateo, and Santa Clara – have designated their senior engineers as management positions.

City	Classification	FLSA Exempt?	Management Position?
City of Sunnyvale	Senior Engineer	Yes	No
City of Alameda	Senior Engineer	Yes	Yes
	Supervising Civil Engineer	Yes	Yes
City of Fremont	Senior Engineer	Yes	Yes
City of Hayward	Senior Civil Engineer	Yes	Yes
City of Milpitas	Principal Engineer	Yes	Yes
City of Mountain View	Senior Civil Engineer	Yes	Yes
	Senior Engineer	Yes	Yes
City of Palo Alto	Senior Engineer	Yes	Yes
	Senior Project Engineer	Yes	Yes
City of Richmond	Senior Civil Engineer	Yes	Yes
City of San Mateo	Senior Engineer	Yes	Yes
	Construction Manager	Yes	Yes
City of Santa Clara	Senior Project Engineer	Yes	Yes
	Principal Engineer	Yes	Yes

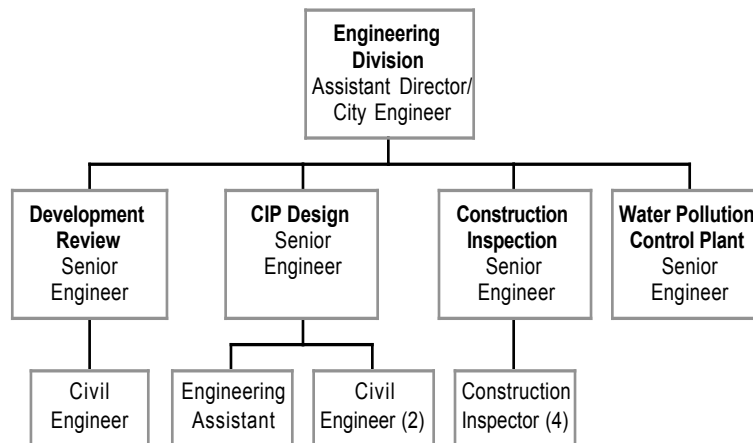
- **Construction Inspection has a one-over-one supervisory structure.** The Senior Engineer for Construction Inspection supervises a Senior Construction Inspector that, in turn, supervises three (3) Construction Inspectors. The Senior Construction Inspector fulfills a number of tasks including the following:
 - Supervises the Construction Inspectors, as well as contract inspectors, when needed;
 - Assists the Senior Engineer in all phases of construction, from pre-construction to project closeout;
 - Monitors performance of inspectors, regularly meeting with them to discuss project status, issues, and future activities;
 - Ensures that quality control and quality assurance activities are working effectively (including regularly checking design submittals, construction submittals, testing, training, documentation, etc.).

The plan of organization for the Engineering Division should be modified as described below.

- **The Assistant City Engineer position should be eliminated.** The spans of control in the Engineering Division are not sufficient to warrant one-over-one management.
- **The Senior Engineers should be designated as managers.** At present, this classification is designated as a miscellaneous classified employee. Without these Senior Engineers fulfilling a responsibility as section managers, the Assistant Public Works Director/City Engineer would be placed in a difficult position of supervising five staff and providing day-to-day direction for these programs. This would limit the ability of the Assistant Public Works Director/City Engineer to address a number of long-term infrastructure challenges facing the City such as its water pollution control plant.
- **One of the two Civil Engineer positions in development review should be upgraded to Senior Engineer.** This position should be assigned responsibility for managing engineering development review.
- **One of the two Senior Engineers assigned to Capital Improvement Program Design should be designated as the manager for this section, while the other should be assigned to the Water Pollution Control Plant with responsibility for managing capital projects for the plant.** It is clear that the Water Pollution Control Plant will require a significant investment of City funds over the next ten years based upon the Asset Condition Assessment completed by Corollo Engineers in 2006. The complexity, size and scope of these projects require the dedication of a Senior Engineer. This Senior Engineer should be physically located at the Water Pollution Control Plant. The remaining Senior Engineer should be assigned responsibility for managing the Capital Improvement Program Design Section.
- **The Senior Construction Inspector position should be eliminated.** The Senior Engineer should supervise the three (3) Construction Inspectors. This is not an excessive span of control.

The proposed plan of organization for the Engineering Division is presented below. As the proposed plan of organization indicates, the Division would consist of the Assistant Public Works Director/City Engineer and four Senior Engineers. These four Senior Engineers would be responsible for development review, CIP Design,

Construction Inspection, and management of capital projects at the Water Pollution Control Plant.



The annual fiscal impact of the proposed plan of organization is presented in the table below. As the exhibit indicates, the proposed plan of organization would reduce annual salary and fringe benefit costs by approximately \$300,000 annually.

Annual Cost Increases		Annual Cost Decreases	
Recommendation	Annual Cost Impact	Recommendation	Annual Cost Impact
Upgrade one of the two Civil Engineer positions in development review to Senior Engineer	\$22,700	Eliminate the Assistant City Engineer position	\$187,650
		Eliminate the Senior Construction Inspector position.	\$135,250
Total Annual Increase	\$22,700	Total Annual Decrease	\$322,900

Recommendation: The Assistant City Engineer position should be eliminated.

Recommendation: One of the two Civil Engineer positions in development review should be upgraded to Senior Engineer.

Recommendation: One of the two Senior Engineers assigned to Capital Improvement Program Design should be designated as the manager for this section, while the other should be assigned to the Water Pollution Control Plant with responsibility for managing capital projects for the plant.

Recommendation: The Senior Engineer assigned to the Water Pollution Control Plant should be physically located at the Water Pollution Control Plant.

Recommendation: The Senior Engineers should be designated as managers in the City's labor agreements.

2. THE MANAGEMENT OF THE CAPITAL IMPROVEMENT PROGRAM SHOULD BE IMPROVED.

The Engineering Division is leanly staffed for capital improvement program staff: four for capital improvement program design and five for construction inspection. Given these scarce resources, it is essential that effective project management practices be utilized for the capital improvement program. Indeed, the Division uses a number of best practices such as the following:

- For design, most work is contracted out (more complex projects), with the more simple designs (e.g., sidewalk replacement, etc.) handled internally.
- The Division publishes the "blue sheets" that list the Capital Improvement Program's active projects, including the charge number, project number, project title, description, budget amount, project manager name, and dates associated with design, construction, etc.
- A project management procedures manual has been developed.
- 30%/60%/90% reviews of the design of capital improvement projects are conducted by inspectors and contract administrators.
- Change order authority has been appropriately delegated to the City Engineer and the Public Works Director.
- The Division maintains in-depth records of change orders to assure sufficient documentation is available should challenges be made later by the contractor.
- 15% (and sometimes more) of the total project budget is allocated as a change order contingency.

At the same time, there are a number of opportunities for improvement. It is clear that one of these improvements is enhancing the Division's ability to deliver projects on time. More specifically:

- In reviewing the “blue sheets” for April 2006, 20 projects had dates for design completion original and design completion revised;
- 17 of these 20 projects had delays of more than six months between the dates for design completion original and design completion revised;
- The delay in months at the median for these 20 projects was 14.7 months; and
- At the 75th percentile, the average delay was 28.6 months.

The table below presents the data for these 20 projects.

Charge Number	Design Completion - Original	Design Completion - Revised	Extent of the Delay (Months)
821570	01-Jan-03	01-Aug-03	7.07
823690	01-Jan-04	01-Apr-05	15.20
821870	01-Jul-03	01-Sep-06	38.60
824910	01-Aug-05	01-May-06	9.10
824130	01-Jan-04	01-May-06	28.37
817950	01-Mar-02	01-Aug-04	29.47
819630	01-May-02	01-Mar-03	10.13
819610	01-Nov-05	01-Mar-06	4.00
812750	01-Apr-00	01-Jul-03	39.53
820821	01-Mar-00	01-Dec-03	45.67
821110	01-Oct-04	01-Dec-05	14.20
822620	01-May-02	01-Dec-03	19.30
822781	01-Apr-03	01-Apr-04	12.20
822790	01-Jun-03	01-Dec-05	30.47
811700	01-Jun-03	01-Apr-04	10.17
824300	01-Aug-04	01-Dec-05	16.23
815202	01-Dec-03	01-May-04	5.07
824310	01-Nov-04	01-Jun-06	19.23
824830	01-Jan-05	01-Jun-05	5.03
824840	01-Jan-05	01-Oct-05	9.10
Median			14.70
75% Quartile			28.64

The project team acknowledges that there are a number of factors that influence the ability of the Engineering Division to deliver these projects according to schedule, and that some of these factors are beyond the control of the Division (such as funding, client “buyoff” to the project scope, etc.). However, there are significant delays in delivering these twenty (20) projects, and this indicates a need to improve the project management of capital improvement projects by the Division.

There are a number of challenges that inhibit the ability of the Division to deliver these projects on schedule. One of these challenges is staffing (which will be addressed in a subsequent section). The other challenge is the methods used by the Division to manage the capital improvement program. These opportunities available to the Division to improve the management of the capital improvement program are presented in the paragraphs below.

- Staffing requirements for all of the capital projects in the first year of the five-year capital improvement program have not been identified using cost of construction guidelines.
- Billability targets have not been set for engineering staff. It appears from a review of the allocation of staff hours within the Division, that staff has not been adequately focused on design and construction management/inspection of capital projects.
- An 18 to 24-month Gantt chart schedule has not been developed for capital improvement projects for each project and overall for all of the funded projects. The Division has the capability (Microsoft Project), but does not utilize the program.
- A project cost accounting system is not utilized for non-grant funded capital projects.
- The blue sheets do not report all of the necessary accountability information (such as original design start date and revised design start date).
- Project scoping documents (or design authorization documents) are not prepared that define the project, financing and cost, accountability for the project (design, construction management, environmental impact, right-of-way acquisition, etc.), design considerations, project constraints, coordination requirements (such as CalTrans), the schedule for the project (design, bid package preparation, advertise/award, etc.), estimated staffing requirements and consulting engineering requirements, etc. These documents would be reviewed with the client department prior to commencement of design.
- A preliminary design review report is not prepared at 10% completion of design to enable the client department to review and approve the proposed design approach.

- The Engineering Division does not prepare a final report at project closeout that analyzes the project upon completion, the mistakes and weaknesses of the project, and provide client department feedback regarding the quality of design and construction.
- While the Engineering Division has developed a capital project management manual, it is not posted to the Division's website.

Recommendations to address these opportunities for improvement are presented below. **It should be recognized that some of these techniques, such as the final report at project closeout, should be "sized" to the size or the nature of the problems of a capital project.** A final report at project closeout should be utilized for larger capital improvement project or a project that has encountered significant problems in terms of change orders, schedule delays, etc.

(1) A Summarized Twenty-Four Month Bar Chart Schedule Should Be Prepared for All Capital Projects That Will Be Designed and Inspected by the Engineering Division.

This schedule should portray start and finish dates for each capital project by simple activity descriptions for design, bid package preparation, advertise/award, right-of-way acquisition, environmental impact evaluation, and construction. This schedule should be prepared for all capital projects that will be assigned to the Engineering Division during the next twenty-four months based upon the twenty-year capital improvement program.

Recommendation: A summarized twenty-four month bar chart schedule should be prepared for all capital projects that will be designed and scheduled by the Engineering Division.

(2) A Design Authorization Form Should Be Completed Before Commencement of Design.

Design of a project should not be initiated until the resources required (staff hours and construction funding) for completing the project, the schedule, and other key

aspects of a capital project have been identified using the design authorization form, and the client department has approved the project based upon the design authorization form. The design authorization form should include the components enumerated below.

- The project title, including the phase of the project, if relevant.
- A general project description, including a narrative summary description of the project, specific physical improvements included, the location of the project, and the relationship to master plans.
- The capital project number (as noted in the twenty-year capital improvement program).
- The financing and cost, including the source of funds and appropriation status.
- A budget covering the project management or design staffing, survey staffing, construction inspection staffing, appropriate consultants, property acquisition, utility relocation, etc., by major expenditure component.
- The responsibility for completing the various components of the capital project ,including the following:
 - Design by in-house staff or by consulting engineer;
 - Construction inspection by in-house staff or by consulting engineer;
 - Design survey and construction staking by staff or consulting engineer;
 - Environmental evaluation required;
 - Right-of-way acquisition required and, if so, the number of parcels and their locations and assessor parcel numbers;
 - Utility relocations that need to be relocated, problems with relocation and timing issues; and
 - Other key responsibilities that need to be assigned and/or accomplished.
- The extent of coordination necessary, listing the inter-agency coordination by division, department, or outside agency with whom coordination will be required in the design and construction of the capital project, the nature of the coordination, and the key contacts;

- The preliminary schedule for completing the design and construction of the capital project including the schedule for design, bid package preparation, advertise/award, right-of-way acquisition, environmental impact reports, and construction and including the dates of important events such as approval of the award of construction contract by the City Council;
- A change order procedure that includes a documented, systematic approach to the handling of construction change orders (that would merely document the Division's existing well-documented approach);
- Staffing levels required throughout the design and construction phase, including the estimated staffing required in terms of person hours required for design and construction inspection utilizing the cost of construction guidelines;
- Materials testing policies and procedures;
- Design and construction reporting requirements, including cost and schedule control procedures;
- Design considerations or issues related to the capital project such as complexities of the design; and
- Community relation and public information requirements including public hearings or meetings and how the public will be informed and involved in the preliminary design and informed about progress of design and construction.

Recommendation: A design authorization form should be completed before commencement of design, and approved by the client department.

(3) Costs of Construction Guidelines Should Be Utilized to Document Resource Requirements for the Design and Inspection of Capital Improvement Projects.

The exhibit, following this page, presents an example of guidelines for the design and inspection of capital improvement projects as a percentage of construction. These guidelines have been developed based upon data developed by the project team. Percentage of construction cost has been widely used for determining the compensation of consulting engineers on assignments where the principal responsibility is the design of various works, and the preparation of drawings, specifications, and other contract documents as necessary. The following points should be noted concerning this cost of construction guideline.

- Two different levels of complexity are noted: average and above average. An above average level of complexity should be based upon the need to deal with other agencies (e.g., CalTrans), the design complexities of the project, or problems with planning and construction, determining the compensation of consulting engineers on assignments where the principal responsibility is the design of various works, and the preparation of drawings, specifications, and other contract documents as necessary.
- These guidelines are customized to fit the different types of construction jobs such as street construction, street reconstruction, traffic control, water and sewer.
- These guidelines were developed to fit the different types of work activities in each capital project. These include planning and scoping, design development, design survey, design administration, construction survey, construction inspection, construction management, and project closure.
- The guidelines are expressed as a percentage of construction (e.g., the cost of staffing as a percentage of construction). To determine the number of staff hours required, divide the cost of the work activity based upon the cost of construction guidelines by the current loaded hourly cost for engineering staff.
- The guidelines identify resource requirements for each work activity associated with a project. These include design development, design administration, etc.
- If a consulting engineer is accomplishing the design, the project manager in the Engineering Division would utilize the guideline for design administration, and not design development.

The section managers within the Division should determine the staffing requirements for each project, in terms of person hours required for design and construction inspection, utilizing the cost of construction guidelines.

The City Engineer should customize these costs of construction guidelines based upon the experience of the City of Sunnyvale. The guidelines will need to be adjusted to the local circumstances.

Recommendation: Cost of construction guidelines should be utilized to determine the engineering staffing requirements for each capital improvement program project in terms of person hours required for design and construction inspection.

Exhibit 14

**Allocation of Staff Resources for
Design and Inspection as a Median
Percentage of Net Construction Costs**

Type of Project	Street Construction				Street Reconstruction				Traffic Control		Water and Wastewater			
Level of Complexity	Above Average		Average		Above Average		Average		Average		Above Average		Average	
Construction Cost (+/-)	\$0.25 million	\$1 million	\$0.25 million	\$1 million	\$0.25 million	\$1 million	\$0.25 million	\$1 million	\$0.25 million	\$1 million	\$0.25 million	\$1 million	\$0.25 million	\$1 million
Planning and Scoping	0.5%	0.5%	0.5%	0.5%	0.5%	0.5%	0.5%	0.5%	0.5%	0.5%	0.5%	0.5%	0.5%	0.5%
Design Development	10%	8%	9%	7%	13%	11%	10%	8%	8%	6%	9%	8%	8%	6%
Design Survey	1 ½%	1%	1 ½%	1%	1 ½%	1%	1%	½%	1 ½%	½%	1%	½%	1%	½%
Design Administration	2%	2%	1 ½%	1 ½%	2%	2%	1 ½%	1 ½%	1 ½%	1 ½%	1 ½%	1 ½%	1 ½%	1 ½%
Construction Survey	3%	2 ½%	2 ½%	2%	2%	1 ½%	1 ½%	1%	0.1%	0.1%	2 ½%	2%	2 ½%	2%
Construction Inspection	5%	5%	4%	4%	5%	5%	4%	4%	3%	3%	4%	4%	4%	4%
Construction Management	3%	3%	2%	2%	3%	3%	1 ½%	1 ½%	2%	2%	3%	3%	2%	2%
Project Closure	0.4%	0.1%	0.4%	0.1%	0.4%	0.1%	0.4%	0.1%	0.4%	0.1%	0.4%	0.1%	0.4%	0.1%
Total	25.4%	22.1%	21.4%	18.1%	27.4%	24.1%	20.4%	17.1%	17%	13.7%	21.9%	19.6%	19.9%	16.6%

(4) Develop an Additional “Blue Sheets” Report That Provides Expanded Information, and Issue These Reports Monthly.

The Engineering Division prepares a capital improvement program project status report. This report is called the “blue sheets.” The “blue sheets” include a number of data regarding each project including the following:

- Charge number;
- Project number;
- Project title;
- Project description;
- Budget amount including the original budget and the current revised budget;
- Design project manager;
- Construction project manager;
- Origination date;
- Design completion date – original and revised;
- Construction start – original and revised;
- Construction end – original and revised; and
- Comments.

An additional “blue sheets” report should be developed that provides expanded information in addition to that provided in the existing “blue sheets.” This additional information should include the following:

- A comparison of actual project costs to-date versus planned, including:
 - Design budget;
 - Design expenditures to-date, separately identifying staff expenditures from consulting expenditures;

- Construction management expenditures to-date, separately identifying contract administration, construction inspection, and consulting engineering expenses;
 - Construction cost as budgeted; and
 - Current construction cost as estimated by the project manager responsible for construction management.
- The status of the project should be expanded beyond design completion date – original and revised, construction start – original and revised, and construction end – original and revised, to include the date the design was scheduled to begin and actually begun.

These reports should be developed on a monthly basis (in May 2006, the Division had only posted the April 2006 “blue sheets” to its website).

Recommendation: The “blue sheets” should be expanded to provide additional information.

Recommendation: The “blue sheets” should be updated and posted to the Division’s website each month.

(5) The Engineering Division Should Utilize the Project Accounting System to Track the Costs Associated with Design, Inspection and Construction Management of Capital Projects.

The Engineering Division does not fully utilize the project accounting system within the City’s financial system to capture the staffing costs associated with the design and inspection of capital projects; it only captures these costs at the project level for grant-funded projects. The data should be input into the system for all projects, not just grant-funded projects.

Recommendation: The Engineering Division should utilize the City’s project accounting system to track the staffing costs associated with the design and inspection of capital projects.

(6) A Design Report Should Be Completed When the Design Is No More Than 10% Complete.

The Civil Engineer or Senior Engineer assigned as the project manager to the project should be responsible for preparing a design report. If a consulting engineer is completing the design of the project, then the consulting engineer should prepare this design report.

The design report should be prepared when the design is not more than 10% complete. The purpose of the design report is to serve as a preliminary design review to enable the project manager to review and approve the proposed design approach. More specifically, the design report should:

- Briefly identify the capital project and describe the project.
- Provide a background to the project, including project history, whether the project has any outside support or opposition, and whether any commitments regarding the project have been made.
- Define the problem the capital project is intended to solve and the alternatives considered that could possibly solve all or a portion of the problem.
- Outline the detailed scope of the project and the reasoning behind the selection of the alternative utilized for the design and other engineering decisions.
- Outline in detail the design criteria used for the capital project and the rationale for those criteria.
- Set forth the detailed construction costs for the capital project based upon a detailed review of expected problems and the completion of 10% design, and the sources of funding.

The Civil Engineer or Senior Engineer assigned to the capital project as the project manager should schedule a preliminary design review meeting with the client department and the management of the Engineering Division.

At this meeting, the Civil Engineer or Senior Engineer should briefly review the project, the alternatives considered, the selected alternative and why this alternative was selected, the design and construction cost estimate, special problems not resolved, the project schedule, and the staffing requirements (or consulting engineer) needed to complete the design and construction management.

Recommendation: A design report should be completed for each capital project when the design is no more than 10% complete.

(7) A Final Report Should Be Prepared Upon Completion of a Capital Project.

Without a formal analysis and distribution for review, the mistakes and weaknesses of one project will almost certainly be repeated on others. The final report should focus on analyzing the good and bad aspects of the completed project, transmitting that information to the staff of the Engineering and Design Division, and providing a convenient summary of the project.

At the completion of the project, the project manager assigned to the project should complete a final report including:

- Project name, project number, and a description of the project. Construction costs – planned versus actual with an identification of all of the change orders and the reasons for those change orders;
- The staff hours allocated to the project – planned versus actual;
- The schedule for completion of the project – planned versus actual including whether drawings, specifications, schedules, and cost estimates were prepared consistently according to schedule;
- The design costs for the project – planned and actual including cost per sheet;
- Construction management costs – planned versus actual;
- Whether as-built plans have been completed;

- Comments and discussion regarding the project as necessary, including unusual conditions encountered during the project such as contractor deficiency, quantity difference, scope change, etc.

This report should be circulated to the Civil Engineers, Senior Engineers, and the City Engineer. After distribution of this status report, it should be the basis of a meeting with the client department.

Recommendation: A final report should be prepared for capital projects upon completion of construction and acceptance of the improvements.

(8) Billability Targets Should Be Established for the Engineering Division Staff.

To assure the staff of the Engineering and Design Division is efficiently utilized, the Division Chief – Engineering and the Division Chief – Construction and Inspection should set billability targets for staff, including the civil engineers and the inspectors. These targets would represent that proportion of their work time that these staff would be billable to projects. These staff should be billable to projects for not less than 1,500 hours annually.

The project accounting system should be utilized to monitor the performance of these staff against these targets.

Recommendation: Billability targets should be established for staff of the Engineering and Design Division, and Construction and Inspection Division Staff.

(9) The Engineering Division Should Utilize a Rating System That Was Previously Developed to Evaluate the Performance of Each Consulting Engineer Utilized on City Construction Projects.

The Engineering Division has developed, but does not utilize, a formal evaluation mechanism that rates each consulting engineer's performance as part of the close out of each construction project. The consulting engineer's performance should be evaluated on factors such as:

- Ability to complete the project on schedule;
- Ability to complete the project within the established budget;
- Whether as-built documentation is provided and is accurate and thorough;
- Timeliness of communications to staff, including periodic status reports and early identification of potential issues that would impact the projects completion on time or within budget;
- Ability of engineer of record to perform the assigned duties within the budget agreed upon for professional services fees; and
- Quality of documentation provided on projects.

A simple rating scale should be applied to each factor rated, such as exceeded expectations, met expectations, and below expectations. An overall rating should be applied. Any consulting engineer's performance that receives an overall rating of below expectations should not be utilized for future projects. The project manager and the client department should be responsible for rating the consultant.

Recommendation: The Engineering Division should implement a consulting engineer evaluation system and utilize this system as part of the final project closeout.

(10) The Project Management Manual Should Be Posted to the Engineering Division Intranet Website.

The City is one of the few clients (if not the only) of the Matrix Consulting Group that have developed a project management manual for capital improvement program projects. Some of the client departments appear to be unaware of its existence. The project management manual should be published to the Division's Intranet website so that client departments are aware of its existence and the methodology used by the Division to manage capital improvement projects. This manual should be published using HyperText Markup Language (HTML) to facilitate browsing the manual by the client departments.

Recommendation: The Engineering Division should publish the project management manual for capital improvement program projects to its Intranet website using HyperText Markup Language.

3. AN ADDITIONAL TWO CIVIL ENGINEERS SHOULD BE AUTHORIZED AS PROJECT MANAGERS FOR CAPITAL PROJECTS.

The Engineering Division allocates four staff to Engineering for capital project design. These positions are presented below.

- Two Senior Engineers - responsible for managing the design of City's Capital Improvement Projects for all City facilities, including buildings, parks, bridges, etc.
- A Civil Engineer - prepares or assists in the preparation of specifications, plans, estimates and reports pertaining to the construction, maintenance and operation of capital projects, and assists the Senior Engineers on capital projects as appropriate.
- Engineering Assistant II - assists with capital projects including simple design work (e.g., fencing projects), working with AutoCAD, some administrative work, checking consulting contracts and invoices, etc. This position does not function as a project manager and is not a registered engineer.

Currently, the Engineering Division only has three project managers – the two Senior Engineers and the Civil Engineer. The existing capital project workload of the Division clearly exceeds this staff capacity, even with the City's almost exclusive reliance on consulting engineers for design of these projects. The project team analyzed the staffing requirements for civil engineering. The analysis of the staffing requirements is presented below.

- **The Division is responsible for the design administration and design development of \$43.1 million of capital projects.** The exhibit following this page presents the funded capital improvement projects that are currently assigned to the Engineering Division. Important points to note concerning these projects are presented below. This differs from the "blue sheets" given that some projects were under construction, were completed, or were in hiatus.

Exhibit 15 (1)

**Design Engineering
Workload Analysis**

Charge Number	Project Type	Project Title	Budget Amount	Design %	Design Insource/ Outsource	Staff Hours
816050	Street/Traffic	Calabazas Creek/Mountain View Alviso bridge repairs	\$2,000,000	0%	Outsource	421
820190	Street/Traffic	Traffic signal reconstruction-Sunnyvale				
		Saratoga/Fremont	NA	100%	NA	NA
		Traffic signal reconstruction - Sunnyvale				
820190	Street/Traffic	Saratoga/Remington	NA	100%	NA	NA
820690	Street/Traffic	Java Drive pedestrian bridge	NA	100%	NA	NA
821870	Street/Traffic	Borregas Avenue Bicycle Corridor	\$6,500,000	90%	Outsource	137
822710	Street/Traffic	Mathilda Avenue Overpass Improvements	\$17,000,000	30%	Outsource	2,505
823690	Street/Traffic	Evelyn Avenue bike lanes Bernardo to Sunnyvale	\$170,000	60%	Outsource	14
823490	Downtown	Downtown public improvements	\$62,000	0%	Outsource	13
824130	Street/Traffic	Sidewalk from Mathilda to Tennis Center	NA	100%	NA	NA
824910	Street/Traffic	Frances Street Transit Corridor	\$1,300,000	99%	Outsource	3
825080	Street/Traffic	Evelyn Avenue Bike Lanes Phase I	\$359,000	60%	Outsource	30
825510	Street/Traffic	Roadway rehabilitation	\$1,300,000	0%	Outsource	274
825590	Street/Traffic	Downtown wayfinding system	\$300,000	0%	Outsource	63
826020	Street/Traffic	Mary Avenue reconstruction Homestead to Dalles	\$1,000,000	99%	Outsource	2
817950	General/Park	Civic Center HVAC	\$365,000	0%	NA	77
818150	General/Park	Public Safety HVAC	\$1,000,000	95%	Outsource	11
818651	General/Park	Corporation yard building roofs	\$132,000	50%	Outsource	14
808100	General/Park	Fair Oaks industrial complex maintenance	NA	100%	NA	NA
818550	General/Park	Park buildings remodel	\$300,000	95%	Outsource	3
818150	General/Park	Public safety buildings remodel	NA	100%	NA	NA
819630	General/Park	Community Center building roofs	NA	100%	NA	NA
822790	Storm/Sanitary Sewer	Rehabilitation of manholes Lawrence trunk sewer	NA	100%	NA	NA
824300	Storm/Sanitary Sewer	Replacement of digester lids	NA	100%	NA	NA
822761	Storm/Sanitary Sewer	Storm pump station number 2 rehabilitation	\$70,000	10%	Outsource	13
822560	Storm/Sanitary Sewer	Energy use audit	\$300,000	30%	Outsource	44
825520	Storm/Sanitary Sewer	Pond sediment removal	NA	100%	NA	NA
801100	Storm/Sanitary Sewer	WPCP air conditioning project	\$340,000	0%	Outsource	72

Exhibit 15 (2)

Charge Number	Project Type	Project Title	Budget Amount	Design %	Design Insource/ Outsource	Staff Hours
825110	Storm/Sanitary Sewer	Tertiary plant tank modification	\$350,000	10%	Outsource	66
825100	Storm/Sanitary Sewer	Solids handling system improvement	\$250,000	0%	Outsource	53
826080	Storm/Sanitary Sewer	Borregas Avenue sewer rehabilitation	NA	100%	NA	NA
825330	Storm/Sanitary Sewer	Replacement/rehabilitation of sewer pipes	\$102,000	0%	Insource	86
811250	Solid Waste	SMaRT Station equipment replacement	\$3,900,000	15%	Outsource	698
824310	Water	Refurbishment of water tanks @ Wright Avenue	\$2,000,000	50%	Outsource	211
825240	Water	Equipment replacement at 5 Hetch Hetchy connections	NA	100%	NA	NA
825280	Water	Earthquake mitigation of water tanks	\$2,000,000	0%	Outsource	421
825300	Water	Pressure reducing valve replacement	NA	100%	Outsource	NA
825410	Water	Hamilton Plant reconstruction	NA	100%	Outsource	NA
825440	Water	Recycled water booster pump at golf course	\$175,000	30%	Outsource	26
825450	Water	Citywide water line replacement	\$360,000	5%	Outsource	72
825490	Water	Interior coating of water tanks	\$580,000	0%	Outsource	122
825480	Water	Renovation of well systems	\$200,000	0%	Outsource	42
820631		Curbs/Gutters/Sidewalks	\$500,000	0%	Insource	289
116012		Slurry Seal	\$220,000	0%	Insource	127
			\$43,135,000			5,492

- There are a total of 43 projects identified in the exhibit.
- These projects were initially identified based upon the most recent “blue sheets” published on the Division’s website. These “blue sheets” date from April 2006.
- The Assistant Public Works Director/City Engineer and Assistant City Engineer identified additional capital projects that were not on the “blue sheets.” These include such projects as slurry seal and sidewalk / curb/gutter replacement.
- 14 of these 43 projects are under construction, and another 5 projects are 90% or more design completion.
- The construction value of projects under design amounts to \$43.1 million.
- 26 of these projects have been outsourced to consulting engineers for design. These projects range from the small and technical, such as storm pump station number 2 rehabilitation with a construction value of \$70,000; to the large, such as Mathilda Avenue overpass improvements with a construction value of \$17,000,000.
- Only 3 of these projects would be insourced. These include the slurry seal project with a construction value of \$220,000, the sidewalk / curb / gutter replacement project with a construction value of \$500,000, and the replacement/rehabilitation of sewer pipes project with a construction value of \$102,000.
- Cost of construction guidelines were applied to these projects and an hourly rate of \$95 utilized to determine the number of hours required for project management/design administration or design development for the staff of the Engineering Division. These cost of construction guidelines were developed by Berryman and Henigar, and have been utilized by the project team in numerous management studies of engineering services. As the table on page 122 indicates, these cost of construction guidelines have been developed for reconstruction, and not just new construction.
- A total of 5,492 staff hours will be required for project management/design administration or design development of these capital projects.
- The largest amount of hours – 2,505 staff hours – would be required for project management / design administration of the Mathilda Avenue Overpass Improvements – a project with a construction value of \$17,000,000.

- **Four project managers should be allocated to the Engineering Division.** The Division is currently allocated two Senior Engineers and a Civil Engineer as project managers. The Senior Engineer assigned as the manager for the Design Section should not be expected to allocate available work hours as a project manager. Rather, this Senior Engineer should be expected to focus his efforts on managing the staff of the section and monitoring the adequacy of project management by this staff. This would result in a Senior Engineer and a Civil Engineer being available to manage projects. Two additional positions are required to manage these projects given the existing volume.
- **The Senior Engineer responsible for the Design Section would supervise three Civil Engineers and an Engineering Technician II.** The Engineering Technician II would continue in a support role for these staff assisting with capital projects including simple design work (e.g., fencing projects), working with AutoCAD, some administrative work, checking consulting contracts and invoices, etc. The three Civil Engineers would function as project managers or design those few minor capital projects that are designed in-house.
- **The other Senior Engineer would be responsible for being the project manager for the larger capital projects.** These could include such projects as Mathilda Avenue Overpass Improvements.

This would result in the addition of two Civil Engineers to the Engineering Division. The Engineering Division, with the addition of these two professional engineering positions, would be allocated a total of ten professional and technical engineering positions for capital projects and development review.

The annual fiscal impact of the addition of two Civil Engineer positions is presented in the table below reflecting salaries at the top of the range. As the exhibit indicates, the addition of the two Civil Engineer positions would increase annual salary and fringe benefit costs by approximately \$276,900 annually.

Annual Cost Increases	
Recommendation	Annual Cost Impact
Add two Civil Engineer positions for the project management/design development of capital projects.	\$276,900
Total Annual Increase	\$276,900

Recommendation: Two additional Civil Engineers should be authorized for the Engineering Division for capital project management and design development.

4. AUTHORIZE A CIVIL ENGINEER FOR LONG-TERM INFRASTRUCTURE PLANNING.

The Engineering Division has prepared a forty-(40) year infrastructure replacement plan. This infrastructure plan identifies \$783,702,918 in infrastructure replacement expenditures over this forty-(40) year period or \$19.6 million annually. The summarized allocation of these expenditures by type of asset is presented in the table below.

Type of Asset	40-Year Project Costs
Facilities	\$42,180,377
Parks	\$30,631,744
Golf, Swimming, Tennis	\$7,797,597
Traffic Signals	\$37,424,000
Water	\$286,588,156
Sewer	\$197,573,226
Storm	\$149,711,901
Solid Waste	\$31,795,917
TOTAL	\$783,702,918

This infrastructure replacement plan proposes \$286.5 million in capital expenditures for replacement of water utility infrastructure (or 37% of all expenditures), \$197.6 million in capital expenditures for replacement of sewer utility infrastructure (or 25% of all expenditures), and \$149.7 million for replacement of stormwater infrastructure (or 19% of all expenditures). The identification, planning, scoping, and prioritization of capital infrastructure projects in these long-term infrastructure plans is a complicated process.

The lack of engineering staff dedicated to infrastructure planning has resulted in problems for the City in the past, such as the inability to install and update the computerized wastewater collection model. The use of the model is important, both for

analysis of proposed development plans and also to assess alternatives for the design of the collection system.

A well-defined infrastructure planning process is key to achieving successful implementation of the capital improvement program, and maximizing the benefit of expenditures on capital infrastructure projects.

The Engineering Division should establish an Infrastructure Planning Section to provide infrastructure related budgeting, financing, program development, long-term infrastructure plans, studies, and reporting services to the public, City staff, and outside agencies. This section should be staffed with a Civil Engineer. The annual fiscal impact of the addition of a Civil Engineer position is presented in the table below, reflecting salaries at the top of the range. As the table indicates, the addition of a Civil Engineer position for long-term infrastructure planning would increase annual salary and fringe benefit costs by approximately \$138,500 annually.

Annual Cost Increases	
Recommendation	Annual Cost Impact
Add a Civil Engineer position for long-term infrastructure planning	\$138,500
Total Annual Increase	\$138,500

Recommendation: A Civil Engineer should be authorized for the Engineering Division for infrastructure planning.

5. AN ENGINEERING ASSISTANT II POSITION SHOULD BE UTILIZED AS ONE OF THE THREE POSITIONS FOR LAND DEVELOPMENT REVIEW.

The Engineering Division prepared an analysis of development engineering workload. The project team evaluated this workload and benchmarked the staff hours required by type of permit. The staff hours utilized by the Division were reasonable.

This workload analysis is summarized in the paragraphs below.

- **Review land use permit applications** (Community Development Department) – This involves the attendance of 22 PRC meetings, the plan checking of 75 major and 45 minor applications, and the plan checking of 45 complex applications (EIR, Specific Plans, etc. The estimated staff workload for the accomplishment of this activity amounts to 1,000 staff hours.
- **Review regular/minor building permit plans** – This involves plan checking 87 routine building permit plans, 20 complex building permit plans, and 33 minor building permit plans including re-submittals. The estimated staff workload for the accomplishment of this activity amounts to 835 staff hours.
- **Review parcel maps, final maps, and miscellaneous maps (lot line adjustments, easements, etc.).** – This involves the plan checking of an estimated 5 final maps and 4 parcel maps. The estimated staff workload for the accomplishment of this activity amounts to 500 staff hours.
- **Review and issue minor permits** – This involves the plan checking of an estimated 240 minor encroachment permits, such as joint trench utility permits, utility cut permits, and other miscellaneous minor permits. The estimated staff workload for the accomplishment of this activity amounts to 980 staff hours.
- **Review and issue major encroachment permits** – This involves the plan checking of 25 complex and major encroachment permits such as commercial building permits with water meter upgrades, sewer connections, sewer laterals, etc. The estimated staff workload for the accomplishment of this activity amounts to 2,775 staff hours.
- **General engineering services** – This involves providing customer service at the one-stop, over the phone, etc. The estimated staff workload for the accomplishment of this activity amounts to 1,200 staff hours.

The total amount of annual staff hours in this workload assessment amounts to 7,290. This is equivalent to four full-time positions. The Engineering Division is authorized three positions at present for the delivery of these services: three Civil Engineer positions.

While past workload may support four positions, the rising interest rates will likely cool the development engineering workload. Rather than add to the three existing professional engineering positions, the City should reclassify one of the three Civil Engineer positions to an Engineering Assistant II position for engineering development

review for the plan checking of minor permits. The annual fiscal impact of the reclassification of one of the three Civil Engineer positions to an Engineering Assistant II position is presented in the table below, reflecting salaries at the top of the range.

This reflects workload at this point in time. As development review workload changes either up or down, the staffing levels for development review should be similarly adjusted. In addition, the Engineering Division should utilize consulting engineers as the workload requires for plan checking of development plans and to maintain cycle time objectives.

Annual Cost Decreases	
Recommendation	Annual Cost Impact
Reclassify a Civil Engineer positions to Engineering Assistant II for development review	(\$11,000)
Total Annual Decrease	(\$11,000)

Recommendation: One of the three Civil Engineer positions should be reclassified to Engineering Assistant II position for routine engineering development review services.

Recommendation: The Engineering Division should utilize consulting engineers, as the workload requires, for plan checking of development plans to maintain cycle time objectives.

6. THE ENGINEERING DIVISION SHOULD ENHANCE THE AUTOMATED PERMIT INFORMATION SYSTEM.

The Engineering Division began utilizing SunGIS, the City's automated permit information system, in July 2004. This program has the capability to track and audit development review activities.

- **Log, track, monitor plan check activities** – Log in various type of plans, view any plan checker's comments for follow-up and reference, track plan check process and quantities, monitor service turn-around time, monitor and analyze plan check fees, monitor, assign and re-distribute plan checkers' workload, make comments available via City's web-site (by expanding existing Building E-Plan Check), provide link to view approved (and as building) plans.

- **Log, track, monitor encroachment permit activities** – Log in various types of encroachment permit applications, view permit applications and conditions for efficient follow-up and/or future reference, track permit issuance process and quantities based upon type (such as permits related to building applications, subdivision applications, utility company facilities, fiber optic, etc.) or by fee amount (minor, medium, major), monitor service turn-around time, monitor and analyze permit fees, monitor, assign and re-distribute engineers' workload, record and view inspection requests and inspectors' comments, make inspection requests available via City's website (by expanding the existing Building E-Permit), provide links to view approved permit plans and traffic control plans.
- **Log, track, monitor development impact fees, subdivision agreements, improvement securities, deposit and their release/refund** – Log in all pertinent data associated with subdivision projects for follow-up and/or future reference, monitor public assets donated by the developer, monitor and analyze development impact fees, track and monitor development project process, and provide links to view applicable documents.

Automated permit information systems provide powerful tools for customer service. The City of Sunnyvale uses their system for online building, planning, and planning permit services. This includes minor building permits, checking the status of building permit plans, scheduling building inspections, obtaining histories of building permits and planning projects, and obtaining zoning and parcel information. The Engineering Division does not have a presence on this site. Encroachment permit and land development information is located on the website for the Engineering Division.

The staff allocated by the Engineering Division to development review does utilize SunGIS for commenting on planning permits and building permits and conditioning these permits. The staff from the Planning and from Building Divisions are utilizing the SunGIS for commenting on and conditioning engineering permits.

However, there are a number of opportunities to enhance the effective use of this system by the Engineering Division.

- **The Engineering Division should place information regarding encroachment permit and land development information on the City's E-**

Permit website. This should include permit information, permit fees, information regarding contractor information and certificates of insurance, cash deposits/surety bonds, permit conditions, and permit inspections for encroachment permits. For land development projects, it should include final maps/parcel maps, improvement plans, lot line adjustments, and the land development fee schedule. A development review applicant should be able to find all permit information – building, planning, and engineering – on the City's E-Permit website.

- **The SunGIS system should be modified to prompt Land Development Engineering staff for bond reduction and bond release.** The system is not yet programmed to provide these prompts.
- **The SunGIS system should be modified to enable subdivision agreements to be attached as Adobe Acrobat PDF files.** At present, the system does not enable these documents to be attached as Adobe Acrobat files to enable staff to readily access these agreements and these subdivision plans.
- **Surety bonds should be entered into the SunGIS before July 2004.** A small percentage has been entered into the system – approximately 15%.
- **A number of limitations of the SunGIS system need to be addressed to enable Land Development Engineering to effectively utilize this system.** These limitations include the following:
 - Plan check logging for logging, tracking, and monitoring plan check activities has not been fully developed;
 - Logging, tracking, and monitoring development impact fees, subdivision agreements, improvement securities, deposits and their release/refund has not yet had all of the required data fields established.

Recommendation: The Engineering Division should enhance the SunGIS system to enable its full use by Land Development Engineering.

Recommendation: Information Technology Services should allocate the work hours necessary to support the Engineering Division to enhance the SunGIS system.

7. ENGINEERING SHOULD ENHANCE ITS COST RECOVERY FOR LAND DEVELOPMENT ENGINEERING.

The table below presents the revenues generated by Land Development Engineering for development engineering services.

Type of Fee	FY 03-04	FY 02-03	FY 01-02
Grading	\$9,305	\$3,049	\$710
Engineering	\$194,601	\$26,153	\$7,939
Street Cut	\$121,044	\$30,722	\$77,059
TOTAL	\$324,950	\$59,924	\$85,708
COST RECOVERY	(94%)	(17%)	(25%)

Important points to note concerning the data contained within the table are presented below.

- While Land Development Engineering had a significant cost recovery in fiscal year 2003-04, with \$324,950 in revenues collected, the two previous fiscal years only resulted in \$59,924 and \$85,708 in revenue.
- The annual salary and fringe benefit costs for the existing two Civil Engineer positions assigned to Land Development Engineering amount to \$277,000 annually at top step. Considering citywide overhead (of approximately 25%), the costs for this service approximate \$346,200 annually.
- In fiscal year 2003-04, the cost recovery for the services provided by Land Development Engineering amounted to approximately 94%. In the previous two fiscal years, the cost recovery amounted to 17% and 25%.

The Engineering Division does not appear to be recovering its costs. The Division should work with the Finance Department to conduct a cost of service study. It would appear that revenues could be increased marginally for the provision of development review services by the Division.

Annual Revenue Increases	
Recommendation	Annual Cost Impact
The Engineering Division should enhance its cost recovery for land development engineering	\$21,250
Total Annual Revenue Increase	\$21,250

Recommendation: The Engineering Division, in concert with the Finance Department, should conduct a cost of service study. This cost of service study should focus on enabling Land Development Engineering to fully recover their costs for providing development review services, including plan check services provided on behalf of Planning and Building.

8. THE ENGINEERING DIVISION SHOULD DEVELOP CHECKLISTS FOR THE PROCESSING AND PLAN CHECKING OF APPLICATIONS BY ITS OWN STAFF.

The purpose of the checklist is to focus the effort and attention of the plan checking staff of Land Development Engineering on the application to assure it meets all the requirements of local ordinances and State laws while the applicant is still at the counter. These checklists should specify what the applicant must submit in order for Land Development Engineering to accept the plan. The plan checking staff or the applicant would complete a checklist for each application.

As noted previously, while the Division has developed a checklist for improvement plans, it needs to be improved. Checklists for other types of applications have not been developed.

For example, the checklist that the City of Santa Rosa utilizes for improvement plans specifies the following factors in the general section:

- North arrow (to be upward facing if practical) and sheet number (all sheets).
- Scale, written and graphic (all sheets).
- Location map (with north arrow upward facing).
- Benchmark (established City benchmark).
- Symbols legend.
- Abbreviation legend.
- Index to drawings.
- General Notes.
- Title block (all sheets):
 - Name of engineering firm.

- Location for R.C.E. seal, signature, and expiration date.
 - City Engineer approval block.
 - Date prepared.
- Clear delineation of project boundaries
- Nature and dimension of existing and proposed easements:
 - To be in conformance with the final/parcel map.
 - Public and private easements clearly delineated.
- Typical section of all streets:
 - Width of street, property lines, easements, curb and sidewalk.
 - Crown and centerline locations.
 - Pavement and base type and thickness

There are, in addition, sections regarding streets, storm drainage, utilities, grading, and supporting data (e.g., soil reports). The applicant is required to sign this checklist.

The intent is to specify the criteria against which projects will be evaluated. When these checklists have been developed, orientation sessions with developers, builders, architects, consulting engineers and City staff should be held to explain and discuss the criteria so that their intent, meaning, and interpretation is clearly understood by all parties.

These checklists should be published on the City's website.

Recommendation: The Engineering Division should develop and utilize plan check checklists for the processing and plan checking of applications by its staff.

9. THE ENGINEERING DIVISION SHOULD DEVELOP A LAND DEVELOPMENT ENGINEERING PROCEDURES MANUAL.

The purpose of this manual should be to describe the functions of Land Development Engineering, the objectives that are to be achieved in development engineering, and the tasks and procedures required in development engineering. The various sections that could be included within this manual include the following:

- Procedures for plan checking tentative parcel and subdivision maps;
- Procedures for plan checking improvement plans;
- Procedures for plan checking building permits;
- Procedures for plan checking grading permits;
- Procedures for plan checking planning permits; and
- Procedures for plan checking encroachment permits.

Recommendation: The Engineering Division should develop and utilize a Land Development Engineering procedures manual.

* * * * *

A comparison of existing versus proposed positions within the Engineering Division is presented in the table below. As the table indicates, the net proposed increase in positions in the Engineering Division would amount to one position.

Class Title	Existing Number of Positions	Proposed Number of Positions
Assistant Director of Public Works/City Engineer	1	1
Assistant City Engineer	1	0
Civil Engineer	4	6
Engineering Assistant I	1	2
Senior Engineer	3	3
Senior Construction Inspector/Coordinator	1	0
Public Works Construction Inspector	4	4
TOTAL	15	16

6. TRANSPORTATION AND TRAFFIC

6. TRANSPORTATION AND TRAFFIC

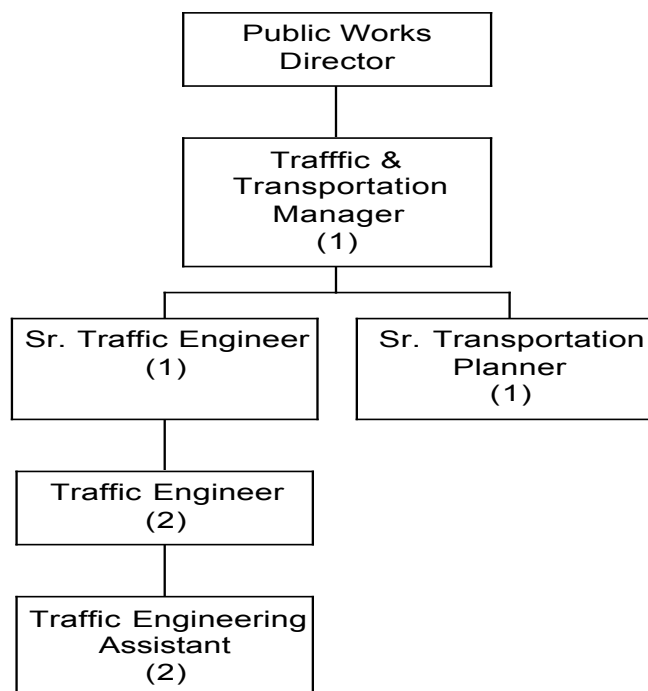
This chapter presents an analysis of the Transportation and Traffic Division, including:

- The level of staffing for traffic and transportation; and
- The traffic and transportation work program.

The chapter opens with a description of the present plan of organization for the Division.

1. THE TRAFFIC AND TRANSPORTATION DIVISION IS AUTHORIZED 7 POSITIONS.

The plan of organization for the Traffic and Transportation Division is presented in the chart below.



The allocation of the labor hours in fiscal year 2004-05 by work activity for these staff is presented in the table below.

Work Activity	Annual Labor Hours	% of Total
Traffic Design	743.50	6.9%
Warrant Studies	290.00	2.7%
Prepare Data/Analysis	793.50	7.3%
Permits and Internal Requests	1,027.50	9.5%
Planning Studies	1,210.00	11.2%
Citizen Inquiries	372.00	3.4%
Intergovernmental Coordination	630.00	5.8%
Operate and Maintain Signals	4,719.50	43.5%
Optimize Signals	521.50	4.8%
Administration	310.50	2.9%
Legal Response	22.50	0.2%
Support Services	5.00	0.0%
Training	196.50	1.8%
SDP-Wide Allocation	1.00	0.0%
TOTAL	10,843.00	100.0%

Important points to note concerning the allocation of these labor hours are presented below.

- A total of 10,843 hours were charged to various work activities by the staff of the Traffic and Transportation Division.
- Almost 44% of their labor hours were allocated to the operation and maintenance of traffic signals. This occurred during that period of time when the City did not have a contractor to maintain its signalized intersections.
- 11% of the labor hours were allocated to transportation planning studies.
- Almost 10% of the labor hours were allocated to permits and internal requests.
- A little more than 7% of the labor hours were allocated to prepare data/analysis.
- Almost 7% of their labor hours were allocated to traffic design.

Altogether, these five work activities accounted for 79% of the labor hours allocated to the Traffic and Transportation Division.

2. A FULL RANGE OF TRAFFIC AND TRANSPORTATION PROGRAMS SHOULD BE DEVELOPED AND DELIVERED.

The Transportation and Traffic Division delivers a variety of traffic and transportation services. Examples of the strengths of the services delivered by the Division are presented below.

- **Transportation Master Plan.** The Division has developed a Transportation Strategic Program that identifies citywide deficiencies and weaknesses, and recommends solutions and funding mechanisms for these improvements.
- **Levels of service.** The Division has identified levels of service at some intersections.
- **Traffic safety program.** The Division has a Crossroads Collision Database system that can be utilized to identify high accident intersections.
- **Signal timing.** The Division calibrates the timing of 75% of the traffic signals and signal systems each year. Traffic signal optimization software is utilized (Synchro) for simulation of optimized timing, field installation, observation and fine-tuning.
- **Adaptive traffic signal systems.** The Division actually has three (3) different adaptive traffic signal systems. The SCATS adaptive system was installed on Mathilda and Maude Avenues, and will be expanded to the Mathilda/237 interchange. The BiTran QuicTrac was installed on Fair Oaks. The Rhodes was installed at 6 City intersections adjacent to Lawrence Expressway. The Division will be expanding SCATS to Sunnyvale at Saratoga this year. The adaptive traffic signal systems adjust the timing of signals at critical intersections in real-time and provide the automated flexibility to change the timing of signals in response to both daily and seasonal traffic patterns.
- **Traffic model.** A computer forecasting model is utilized to assess the trips generated by development, model different land use options, develop long-term forecasts of traffic, and the benefits of mitigation measures. The model is currently being updated.

At the same point in time, there are a number of opportunities for improvement in the traffic and transportation work program. These opportunities are presented below.

(1) The Transportation and Traffic Division Should Enhance Its Traffic Safety Program.

The City does have a number of locations that generate more accidents than others. The top ten intersections for collisions for the time period from March 1, 2003 through March 31, 2006 are presented below.

Intersection	Total Collisions
Mathilda Avenue at El Camino Real	49
Wolfe Road at El Camino Real	48
El Camino Real at Remington Drive	37
Ross Drive at Mathilda Avenue	33
Hollenbeck Avenue at El Camino Real	29
Maude Avenue at Mathilda Avenue	28
Ahwanee Avenue at Mathilda Avenue	24
Mary Avenue at El Camino Real	23
Sunnyvale Saratoga Road at El Camino Real	22
Mathilda Avenue at California Avenue	21
Moffett Park Drive at Mathilda Avenue	21
Route 237 at Mathilda Avenue	21

Of these collisions, 72% were non-injury accidents. 27% of the collisions generated visible injuries or complaints of pain. Only 1% generated fatal collisions or severe injury (a total of 3 collisions). Compared to fifty-(50) other cities with a population between 100,001 to 250,000 that were ranked by the California Office of Traffic Safety, Sunnyvale compares favorably in some aspects and not in others as the table below indicates (this reflects data for 2004).

Type of Collision	Ranking By Daily Vehicle Miles Traveled	Ranking By Average Population
Total Fatal and Injury	46/50	45/50
Alcohol Involved	41/50	37/50
Had Been Drinking Driver <21	28/50	28/50
Had Been Drinking Driver 21 – 34	41/50	42/50
Pedestrians	47/50	49/50
Pedestrians <15	47/50	50/50
Pedestrians +65	14/50	14/50
Bicyclists	13/50	14/50
Bicyclists <15	21/50	23/50
Composite	42/50	40/50

Important points to note concerning this data are presented below.

- This data was compiled by the California Office of Traffic Safety. It represents data from 2004, and compares Sunnyvale to fifty (50) cities in California with a population between 100,001 to 250,000.
- On a composite basis, Sunnyvale ranks in the lowest 20th percentile in terms of accidents both for ranking by daily vehicle miles traveled and ranking by average population.
- However, Sunnyvale ranks in the 30th percentile of accidents per daily vehicle miles traveled for accidents involving pedestrians 65 and older and bicyclists.
- Pedestrians and bicyclists are the most vulnerable to injury and fatalities as a result of collisions.
- These collisions can result from a variety of problems including right turns across pedestrian crossings, double right turns, vehicle speeds, long pedestrian crossings, poor crosswalk visibility, poor connectivity (lack of a complete set of crosswalks for an intersection), and lack of way-finding signage.

At present, the Transportation and Traffic Division is not proactively addressing the causes of these accidents and proposing mitigation measures.

It is recommended that the Division develop and install a proactive traffic safety program. This would involve the identification of all intersections and half-mile segments with three or more accidents in one year, the analysis of accidents that have occurred at these locations with collision diagramming software, and the development of mitigation measures.

The Division should document the crash rate for each intersection, expressed in crashes per million vehicles. These locations should then be prioritized, and crash patterns at the highest crash rate locations developed and analyzed using collision diagrams prepared using the Crossroads Collision Database system. Mitigation measures should be identified after the analysis has been completed for each location. Collision diagrams are used to identify the most frequent types of crashes occurring at a

specific location. Given Sunnyvale's higher collision rate for bicyclists and pedestrians, the City should develop mitigation measures. The measures could include a range of alternatives such as the following:

- Identify modifications needed to improve capacity, visibility, pedestrian/bicycle operations or other safety-related features at critical intersections. Possible improvements could include improved roadway alignment, lane additions, removal of on-street parking, sidewalk/crosswalk modifications, traffic signal changes, and/or enhanced signing/pavement markings. More detailed engineering studies would be necessary to analyze and design the most feasible and effective intersection improvements for each location.
- Evaluate the need for pedestrian improvements. Likely improvements could include modification of the crosswalk configuration, installation of pedestrian signals/pushbuttons, removal of obstructions, sidewalk widening, increased visibility of pedestrian activities via construction of traffic-calming treatments, travel lane modifications, and/or adjustments to traffic signal phasing.
- Installation of traffic signs along roadways that alert motorists of the presence of pedestrians and bicyclists, e.g., "share the road" and "pedestrian crossing ahead."
- Creation of signed bike routes or bike lanes to either route bicyclists away from problematic locations in the roadway network or to allocate space for bicyclists to operate in bottleneck areas, such as congested intersections and typical narrow roadway sections.
- Improved use of available right-of-way width along critical routes. This could involve widening sidewalks, removal of on-street parking, and/ or modification of travel lanes.
- Provision of traffic-calming measures to reduce motor vehicle speed along roadways.
- Education campaigns for bicyclists and motorists aimed at addressing problems related to mixed-mode operation along city streets during rush hour conditions.

The benefits of reducing the rate of pedestrian and bicyclist accidents are significant. For example, the cost per pedestrian car collision amounts to an average of \$247,000 per injury. The injuries are typically severe or permanently disabling. These risks increase with age; this reflects the pattern in Sunnyvale.

Overall, the economic impact of motor vehicle crashes on U.S. roadways approximates \$231 billion a year – nearly 2% of the nation’s gross domestic product or an average of \$820 for every person living in the country – the National Highway Traffic Safety Administration reports. The yearly economic costs also include \$61 billion in lost workplace productivity; \$20.2 billion in lost household productivity; \$59 billion in property damage; \$32.6 billion in medical costs; and \$25.6 billion in travel delay costs.

Recommendation: The Transportation and Traffic Division should develop and install a traffic safety program.

(2) The Transportation and Traffic Division Should Upgrade Its Traffic Signal Inventory.

The Transportation and Traffic Division recently found that one of its traffic signal controllers was found in Morgan Hill. This is the result of reliance on a contractor for maintenance of the traffic signal system that also maintains such systems for other cities.

However, it is also the risk associated with the lack of a detailed inventory. The Division has developed a traffic signal inventory that encompasses pole types, LED’s, signal framework, and controller cabinet contents. It is been developed to the level of inventory by equipment serial numbers. This information is needed for warranties and for tracking of equipment during repairs.

In addition, the Division has not developed a comprehensive inventory of approved signal phasing and timing settings for each intersection. The Division does have a hard copy inventory of most traffic signal phasing and timing sheets in the traffic signal cabinet and at City Hall with some designs on AutoCAD. However, the inventory is not available electronically for most intersections (AutoCAD design drawings), and

timing sheets are not routinely updated at City Hall. Signal phasing/design drawings are not necessarily the most up to date or accurate.

The benefits of this detailed traffic signal inventory would be improved control over that inventory, enhanced warranty recovery for repairs during the warranty period, and enhanced efficiency of staff in evaluating and modifying traffic signal phasing and timing.

Recommendation: The Transportation and Traffic Division should upgrade its comprehensive traffic signal inventory.

Recommendation: The Transportation and Traffic Division should develop and install a comprehensive inventory of signal phasing and timing settings in AutoCAD, and maintain and update these drawings as necessary.

(3) The Transportation and Traffic Division Should Make the Necessary Changes to Convert BI Tran QuicTrac To A Fully Automated Mode.

A total of 88, or 68% of the signalized intersections (or 60 of the 88 intersections), operate with BI Tran software. These sixty (60) intersections operate on BI Tran QuicNet/4 Intelligent Traffic Management System (a robust advanced traffic management system that allows an entire traffic system to be monitored and optimized from a central site). With the installation of the communication system and central traffic control system, monitoring and adjusting the signal system for special events can be performed at the Traffic Management Center.

Another eleven (11) of the 88 intersections operate with the QuicTrac Adaptive system that enables real-time traffic adaptive control.

An adaptive control system (ACS) uses sensors to read the characteristics of traffic approaching a traffic signal, and using mathematical and predictive algorithms, ACS adapts the signal timings accordingly, optimizing their performance. ACS offers

substantial improvements over traditional reactive methods. Using detectors and faster than real-time modeling, traffic volumes and patterns can be predicted, and signal timings can be adjusted prior to the onset of congestion so that the needs of the traveling public are best met.

ACS will be increasingly important in Sunnyvale due to the limitations that the City faces in expanding its street network, such as widening streets, adding left or right-turn lanes, etc., to expand roadway capacity. New technology, such as traffic-responsive closed-loop systems or adaptive traffic signal systems using advanced surveillance and traffic management centers, will become increasingly critical for Sunnyvale to relieve congestion given these limitations.

The philosophy behind ACS is to mitigate the effects of a wide variety of roadway events and to manage short-term demand for existing roadway capacity. Analysis of the use of ACS by other local governments has demonstrated the ability to reduce overall travel time, the number of red lights where motorists must stop and the length of time they are stopped. In some corridors, travel times have been reduced by up to 30% during non-peak hours and up to 15% during peak hours. Crash rates were also reduced and those crashes that did occur were less severe in nature.

However, the Transportation and Traffic Division has not fully monitored and made the necessary adjustments to enable the QuicTrac system to operate in the fully automated mode.

Recommendation: The Transportation and Traffic Division should make the necessary adjustments to enable QuicTrac to operate in the fully automated mode.

(4) The Transportation and Traffic Division Should Analyze Citywide and Corridor Traffic Signal Timing.

Signal retiming is a process that optimizes the operation of signalized intersections through a variety of low-cost improvements, including the development and implementation of new signal timing parameters, phasing sequences, and improved control strategies. Signal retiming is oriented toward optimizing a controller unit's response to the demands of traffic, including all types of motor vehicles, bicycles and pedestrians. Signal timing strategies include the minimization of stops, delays, fuel consumption and air pollution emissions and the maximization of progressive movement through a system.

The Transportation and Traffic Division is limited in its ability to analyze signal timing on a city-wide and corridor basis. The current performance goal for the Division is to re-time 75% of signals and signal systems each year, but this is not a system wide analysis. This level of service is not adequate since the Division is only able to analyze individual signal operations rather than system wide operations, except for those corridors where the Division runs interconnect systems. There is only spot traffic counting at key locations and insufficient time is spent monitoring and fine-tuning signal plans.

Traffic signal timing analysis is a cost-effective way of reducing vehicle emissions, improving mobility, and enhancing safety on arterials. Traffic signal retiming is one of the most cost effective ways to improve traffic movement and make streets safer. Signal retiming is needed as much as patching potholes, restriping pavement lines and markings. Signal retiming has a number of benefits. These benefits are portrayed below.

- By coordinating or sequencing signals in relation to each other, platoons, queues, or groups of vehicles can travel through a series of signals with minimal or no stopping.
- The delay time on the approach to an intersection can be reduced by balancing the green time to reduce delay at that intersection.
- With developments such as the addition of new homes or stores, traffic increases and creates a need to adjust the timing of affected traffic signals.
- The diversion of traffic off a freeway or interstate due to an incident (an accident or event) associated with a computerized signal system can be accommodated.
- Motorist frustration caused by excessive delays or stops can be reduced by adjusting timing to reduce stops and delays and provide coordinated flow through groups of signals.
- Emissions and fuel consumption can be reduced by optimizing signal timing and coordinating traffic flow.
- Emergency vehicles, buses and commercial vehicles can save time.
- The number of severe collisions on city streets can be reduced by producing smoother traffic flow and fewer stops.
- The need for costly reconstruction can be postponed or eliminated by providing improved flow using existing resources in a more cost efficient manner.
- Changes in traffic flow for different times of day or days of the week can be accommodated.
- Signal retiming should be conducted during a reconstruction project when a lane closure or traffic detour causes a significant change in demand or capacity.
- Signal retiming is a cost effective method to improve traffic operation. It can produce significant benefit to cost ratios. For example, since the summer 2002, the Maryland DOT has retimed about 215 signals in the Washington, DC suburbs and an additional 30 signals on the Route 650 (New Hampshire Avenue) corridor between Montgomery County, Maryland and the District of Columbia. An analysis has shown that delays on these roads shrunk by about 13% and vehicles made 10% fewer stops at red lights. Fuel consumption also dropped by about 2 percent. Further, the Fuel Efficient Traffic Signal Management Program in California demonstrated a benefit-to-cost ratio of 58:1. The program retimed 3,172 signals, resulting in 15% savings in delays, 8.6% savings in fuel consumption, 16% savings in stops and 7.2% savings in travel time

Some of the information necessary for signal retiming can be collected by these QuicTrac signal interconnect systems, but only certain data can be gathered automatically such as corridor speed and volume data. Turning movement data, time-delay information, field calibration and before and after studies must be done by Division staff. The Division has tested one automated counting station, and the Division utilizes the Synchro software program to optimize corridor timings, which provide a small degree of improved efficiency. The Division has three signals that can automatically collect turning movement data, but this is not a cost-effective means to collect this data system-wide due to high installation and maintenance costs for loop detection.

Largely this information needs to be collected in the field by Traffic and Transportation Division staff. The products of this system-wide signal assessment would be as follows:

- Collection of traffic counts, 'before' travel time and delay study, review of actuated settings, including pedestrian timing, review of collision history, and review of transit volume and on-time performance, if applicable;
- Development of optimal timing plans including analyses of signal grouping, phasing, cycle lengths, splits, and offsets, comparison of time-space diagrams for existing and recommended timing plans, and description of expected improvements; and
- Preparation of timing sheets, implementation of approved signal timing plans, fine-tuning, calculation of performance measures including 'after' travel time and delay study, fuel consumption and emissions, and preparation of revised timing sheets.

Estimates of the time required vary according to available expertise and equipment. On average, it is estimated that generating four timing plans (for a.m. peak, noon peak,

p.m. peak and off-peak conditions) takes 25 to 30 hours per intersection. This effort should be focused on the critical and congested signalized intersections.

Recommendation: The Division should proactively and comprehensively conduct system-wide traffic signal timing analysis.

(5) Intelligent Transportation System Technology Should Be Evaluated and Implemented When Traffic Flow Efficiency or Transportation System Management Efficiency Realized.

The City has already implemented adaptive traffic control systems, a Transportation Management Center, and utilizes radio-spread spectrum and QuicNet remote monitoring and operation for traffic signals.

There remain a number of opportunities for improvement.

- Investment in expanded adaptive control systems to replace outmoded interconnect systems or add additional travel corridors not currently interconnected;
- Use of closed circuit TV for real time monitoring and adjustment of signal operations;
- Installation of fiber optic communications to traffic signals to provide reliable, high bandwidth communications;
- Update traffic signal controllers to maximize control efficiency;
- Interconnection of the City's Transportation Management Center (TMC) with other agencies' TMC's to facilitate cross-jurisdictional operations;
- Automated count and speed stations to facilitate efficient operations and signal timing; and
- Citywide emergency vehicle pre-emption of traffic signals to minimize response times and meet NFPA standards.

These projects have all been proposed, but are currently unfunded in the City budget.

Recommendation: The Finance Department and the Transportation and Traffic Division should collaborate to evaluate the benefits of these investments and develop a funding strategy for those projects that would clearly improve the efficiency of traffic flow or transportation system management.

(6) Speed Limit Radar Surveys Should Be Updated On A Five-Year Cycle.

The Transportation and Traffic Division tries to update speed limit radar surveys every five years, but the Division is currently behind. No surveys are done in the interim in response to roadway changes, etc. Surveys should be redone at least once every five years, and sooner if changes are made to traffic lanes, striping, roadway geometry, or developments in the area.

The updating of these surveys is important for traffic enforcement by the Public Safety Department. The Legislature has declared a strong public policy against the use of speed traps, to the extent that citations issued where a speed trap is found to exist, are likely be dismissed, particularly if radar enforcement methods are used (CVC 40803 – 40805). A provision of the CVC that Courts have generally considered very strongly states, “It is the intent of the Legislature that physical conditions such as width, curvature, grade and surface conditions, or any other condition not readily apparent to a driver, in the absence of other factors, would not require special downward speed zoning, as the basic rule of CVC 22350 (Basic Speed Law) is sufficient regulation as to such conditions” (CVC 22358.5). The words, “it is the intent of the Legislature,” are intended to alert traffic engineers and towards setting and maintaining speed limits. Such speed limits must be set carefully, as justified by appropriate factors, to avoid making such limits unenforceable. The survey-based realistic speed limits established by the City’s Traffic and Transportation Division makes it easier for the Public Safety Department to enforce the law using radar.

Recommendation: The Transportation and Traffic Division update its speed limit radar surveys on a five-year cycle.

(7) The Transportation and Traffic Division Should Update Its Traffic Volume Data Every Two Years.

The Transportation and Traffic Division has not updated its traffic volume map in ten years.

Traffic count data is typically collected by leaving a mechanical counter at a street location for (typically) 24 hours during a weekday, and then adjusting the count based on day of week/month of year factors. Traffic count data have a number of benefits. These benefits are summarized below.

- **Calibration of traffic models.** At the present time, the Division is updating its computer forecasting model. This model is utilized to assess the trips generated by development, model different land use options, develop long-term forecasts of traffic, and the benefits of mitigation measures. Since a traffic model is just a simulation, it is essential to check that it is realistic. The process of testing and adjusting the model is called calibration. An important part of this is comparing the results to known data, such as real traffic counts.
- **Determining the levels of service at intersections.** Whereas daily traffic volumes are often a common measurement used to compare one street with another, actual performance of the street system is based on how the intersections operate. This process is referred to as intersection level of service. The intersection level of service is a universal measurement of operational performance by an intersection, utilizing a simple grading scale from “A” to “F,” where “A” represents excellent level of service and “F” indicates failure. Intersection level of service is based on delay at an intersection. Critical to the evaluation of peak hour intersection level of service is the collection of AM and PM peak hour intersection turn movement. These are recorded for the left turn movement, the through movement, and the right turn movements for each intersection approach direction. In addition, these counts are recorded in 15-minute increments over a 2-hour AM peak period and a 2- to 3-hour PM peak period from which the respective peak hour is derived as the maximum of four consecutive 15-minute counts

The traffic volume map has not been updated for ten years. The Division should update its traffic counts at the City’s critical intersections and approaches once every two years.

Recommendation: The Transportation and Traffic Division should update its traffic counts at the City’s critical intersections and approaches once every two years.

2. AN ADDITIONAL TRAFFIC ENGINEER POSITION SHOULD BE AUTHORIZED FOR THE TRANSPORTATION AND TRAFFIC DIVISION.

The Matrix Consulting Group recommends that the City authorize an additional position for the Transportation and Traffic Division. This position should be utilized to address the challenges facing the Division noted above, including the following:

- Enhancing the traffic safety program;
- Converting the Bi Tran QuicTrak to an automated mode; and
- Analyzing Citywide intersection and corridor traffic signal timing.

In addition, the success in issuing a request for proposal and subsequently contracting for traffic signal maintenance should enable the Division to substantially reallocate the 4,719 labor hours allocated to traffic signal maintenance and operation to other work activities. These should include updating the traffic signal inventory, updating the traffic volume counts on a two-year cycle, and updating the speed limit radar survey on a five-year cycle.

The annual fiscal impact of the addition of the Traffic Engineer position is presented in the table below reflecting salaries at the top of the range. As the exhibit indicates, the addition of the Traffic Engineer position would increase annual salary and fringe benefit costs by approximately \$131,900 annually.

Annual Cost Increases	
Recommendation	Annual Cost Impact
Add a Traffic Engineer position to enhance the breadth and depth of transportation and traffic programs.	\$131,900
Total Annual Increase	\$131,900

Recommendation: An additional Traffic Engineer should be authorized for the Transportation and Traffic Division to enhance service delivery.

3. THE ADMINISTRATION DIVISION SHOULD SCHEDULE OFFICE HOURS FOR SUPPORT STAFF AT THE TRAFFIC AND TRANSPORTATION DIVISION.

Support staff for the Public Works Department has been centralized within the Administration Division. These support staff are in close proximity to the staff that they support with the exception of the Traffic and Transportation Division. The Division has raised a number of issues regarding the adequacy of the support that it receives as indicated below.

Existing Level of Service	Proposed Level of Service
Professional engineering and planning staff perform quite a bit of filing, paperwork processing, tracking of purchasing/budget information, timecard review, preparing mailers, and organizing. Available staff provide administrative support on a request/reactive basis.	Administrative work should be done on a proactive basis to support planning/engineering work and free up time for job-related duties.
Administrative support staff are located remote from the Transportation and Traffic office, and do not spend any time in the office. They do not have a detailed understanding of the operation of the Division.	Administrative support staff would be located in the office and would have an understanding of Division operations, therefore improving administrative efficiency.
Bicycle and Pedestrian Advisory Committee administration is by professional technical staff.	Agenda compilation, printing, distribution, meeting set up, preparation of minutes, etc., would be done by administrative staff.

The administrative support for the Traffic and Transportation Division is currently budgeted at 1,170 hours annually. This includes 720 hours for an Administrative Assistant and 450 hours for a Staff Office Assistant. This is equivalent to a 0.6 full-time equivalent position.

These staff hours should be utilized to establish “office hours” for these staff. During these office hours, these support staff would actually be physically located in the Traffic and Transportation Division and provide support to the staff of that division during those office hours.

Recommendation: The Administration Division and the Traffic and Transportation Division should establish “office hours” for support staff, during which these support staff would be physically located in the offices of the Traffic and Transportation Division.

* * * * *

A comparison of existing versus proposed positions within the Traffic and Transportation Division is presented in the table below. As the table indicates, the net proposed increase in positions in the Division would amount to one position.

Class Title	Existing Number of Positions	Proposed Number of Positions
Transportation and Traffic Manager	1	1
Senior Traffic Engineer	1	1
Senior Transportation Planner	1	1
Traffic Engineer	2	3
Traffic Engineering Assistant II	2	2
TOTAL	7	8

7. FIELD SERVICES

7. FIELD SERVICES

The Field Services Division provides a wide variety of services, including the operation and maintenance of the water, sewer, and storm drain systems, as well as the maintenance and repair of the City's streets and streetlights. The Division is authorized 73 positions.

The analysis of the Field Services Division is organized as follows:

- Street maintenance;
- Water distribution; and
- Wastewater collection.

The chapter concludes with issues concerning the Division as a whole.

1. FIELD SERVICES DIVISION PERSONNEL ACCOUNTED FOR OVER 127,000 HOURS FOR STREET, WATER, AND SEWER OPERATIONS.

In total, the Division personnel accounted for 127,890 hours providing various services in pavement operations, water supply and distribution, and sanitary sewer collection system maintenance. These hours are accounted for as follows:

Service	Hours	% of Total
Total - Pavement Operations (including streetlights)	49,334.3	38.6%
Total - Water Supply and Distribution	58,288.7	45.6%
Total - Sanitary Sewer Collection System Maintenance	20,267.1	15.8%
Total – Field Services Division	127,890.1	100.0%

As shown above, 45.6% of time was allocated to water supply and distribution services, followed by 38.6% for pavement operations, and 15.8% of time for sanitary sewer collection system maintenance.

(1) Street Operations Personnel Account for Their Time Under Street Maintenance and Sanitary Sewer Collection System Maintenance.

This section summarizes the allocation of hours for personnel during FY 2004-05 for pavement operations and sanitary sewer collection maintenance. The following table summarizes the total hours within each service delivery plan for pavement operations:

Pavement Operations	Hours	% of Total
Program Administration and Support	7,843.2	15.9%
Major Pavement Corrective Repair	1,315.0	2.7%
Minor Corrective Pavement Repairs	3,380.6	6.9%
Pavement Preventive Maintenance	20,272.9	41.1%
Traffic Signs	2,519.6	5.1%
Traffic Markings	4,712.1	9.6%
Street and Public Right-of-Way	6,744.8	13.7%
Streetlights	2,546.0	5.2%
Total - Pavement Operations	49,334.3	100.0%

As shown above, personnel spent over 41% of time on pavement preventive maintenance, followed by 15.9% for program administration and support, 13.7% for street and public right-of-way, and 9.6% for traffic markings. The exhibit on the following page summarizes the total hours per activity within each of the above service delivery plans. As shown in the exhibit, pavement operations accounted for a total of 49,334.3 hours for program administration and support, pavement maintenance and corrective repairs, maintenance, street sign repair and maintenance, street sweeping, etc. Estimating the total number of full-time equivalents (at 1,800 per non-management personnel), pavement operations accounted for approximately 27.4 budgeted positions.

Exhibit 16 (1)

**Allocation of Staff Hours for
Street Maintenance and
Sanitary Sewers**

Service Delivery Plan and Activity	Hours	% of Total
Program Administration and Support		
Provide Supervision	4,867.7	62.1%
Provide Support	1,088.7	13.9%
Provide Safety and Equipment Training	1,577.1	20.1%
Plan Review and Field Inspections	309.8	3.9%
Sub-Total	7,843.2	100.0%
Major Pavement Corrective Repair		
Reconstruct Streets	6.5	0.5%
Asphalt Overlay Streets	101.0	7.7%
Pavement Management System Administration	1,207.5	91.8%
Sub-Total	1,315.0	100.0%
Minor Corrective Pavement Repairs		
Temporary Patch	273.1	8.1%
Remove Pavement by Grinding	2,041.0	60.4%
Deep Lift Patching	1,039.5	30.7%
Unscheduled Repairs	27.0	0.8%
Sub-Total	3,380.6	100.0%
Service Delivery Plan and Activity	Hours	% of Total
Pavement Preventive Maintenance		
Crack Seal	1,536.6	7.6%
Apply Petromat	63.0	0.3%
Permanent Patching	12,820.7	63.2%
Slurry Seal	1,708.6	8.4%
Chip Seal	3,469.6	17.1%
Provide Advance Notice	451.0	2.2%
Maintenance and Repair for Facilities / Equipment	223.5	1.1%
Sub-Total	20,272.9	100.0%
Traffic Signs		
Silk Screen Fabrication	59.0	2.3%
Hand Fabrication	464.5	18.4%
Sign / Pole Installation	239.5	9.5%
Repair Traffic Sign / Pole	632.5	25.1%
Replace Traffic Sign / Pole	775.5	30.8%
Remove Traffic Sign / Pole	56.5	2.2%
Temporary Traffic Controls	292.0	11.6%
Sub-Total	2,519.6	100.0%

Exhibit 16 (2)

Traffic Markings	Hours	% of Total
Traffic Line Striping	1,127.0	23.9%
Pre-marking / Cat Tracking	450.0	9.6%
Maintain Thermoplastic Crosswalks and Limit Bars	236.0	5.0%
Maintain Thermoplastic Legends	374.0	7.9%
Maintain Paint Crosswalks and Limit Bars	539.5	11.4%
Maintain Paint Legends	667.5	14.2%
Curb Painting	97.0	2.1%
Install Transportation Reflectors	416.5	8.8%
Remove Traffic Marking	313.0	6.6%
City Owned Parking Lot Maintenance	119.0	2.5%
Maintenance and Repair for Facilities / Equipment	372.5	7.9%
Sub-Total	4,712.1	100.0%
Service Delivery Plan and Activity		
Street and Public Right-of-Way		
Sweep Curb Miles	3,510.1	52.0%
Provide Temporary No-Parking	22.0	0.3%
Sweep City Parking Lots	262.0	3.9%
Pick Up Leaves	226.0	3.4%
Haul Sweepings	331.5	4.9%
Remove Debris from Streets	386.6	5.7%
Remove Abandoned Shopping Carts	145.9	2.2%
Clean Walkways	474.5	7.0%
Clean and Maintain City Roadsides and Easements	232.5	3.4%
Repair Walkways, Guardrails, Barricades and Fences	220.0	3.3%
Maintenance and Repair for Facilities / Equipment	322.5	4.8%
Graffiti Abatement	611.1	9.1%
Sub-Total	6,744.8	100.0%

Exhibit 16 (3)

City Streetlight System	Hours	% of Total
Provide Electrical Power	1.5	0.1%
Provide Streetlight Construction	3.0	0.1%
Repair Streetlights - Electrical	802.5	31.5%
Repair Streetlights - Conduit	20.0	0.8%
Repair / Replace Streetlamp	513.0	20.1%
Repair / Replace Signal Light Lamp	65.0	2.6%
Repair / Replace Sign Lamp	2.0	0.1%
Repair Streetlight Knockdown	270.0	10.6%
Corrective Repair	63.0	2.5%
Misc. Service Request	26.0	1.0%
Provide Graffiti Removal	247.0	9.7%
Coordinate Utility Locates	308.5	12.1%
Fabrication / Equipment Repair	28.0	1.1%
Maintenance and Repair for Facilities / Equipment	51.0	2.0%
Provide Administration	65.0	2.6%
Provide Training	38.0	1.5%
Survey Streetlights	42.5	1.7%
Sub-Total – Streetlights	2,546.0	100.0%
Total – Streets	49,334.3	

The following table summarizes the total hours within each activity for the wastewater management service delivery plan:

Wastewater Collection	Hours	% of Total
Customer Service Request	798.2	3.9%
Rinconada Sewer Maintenance	688.6	3.4%
Jet Flush Sewers	2,689.7	13.3%
Sewer Lateral Foaming	5.0	0.0%
Video Inspection	622.5	3.1%
Maintain Lift Stations	467.5	2.3%
Inspect and Clean Manholes	620.8	3.1%
Facility Preventive Maintenance	634.0	3.1%
Remove Lateral Plugs	2,629.3	13.0%
Repair Manholes	399.5	2.0%
Cleanouts	2,326.8	11.5%
Remove Main Plugs	633.5	3.1%
Repair Sewer Mains	304.5	1.5%
Fabrication	75.5	0.4%
Facility Corrective Repair	104.5	0.5%
Emergency Response (Lift Stations)	123.3	0.6%
Emergency Response (Mains)	6.0	0.0%
Emergency Response (Laterals)	526.3	2.6%
Safety and Certification Training	1,043.0	5.1%
Program Coordination	2,359.7	11.6%
Support Services	1,868.2	9.2%
Locate Underground Utilities	670.4	3.3%
Standby Duty	670.3	3.3%
TOTAL	20,267.1	100.0%

As shown above, service-related sanitary sewer collection system maintenance accounted for a total of 20,267.1 hours, including jet flushing sewers, removal of lateral plugs, program coordination, and cleanouts. This equates to approximately 11.25 budgeted positions (at 1,800 hours each position).

(2) Water Operations Staff Allocate Their Time Under Water Supply and Distribution.

This section summarizes the allocation of hours for staff during FY 2004-05 for water supply and distribution. The following table summarizes the total hours within each service delivery plan:

Water Supply and Distribution	Hours	% of Total
Managing Water Resources	4,971.1	8.5%
Managing Water Distribution and Quality	30,984.8	53.2%
Managing Administration and Support	22,332.8	38.3%
Total - Water Supply and Distribution	58,288.7	100.0%

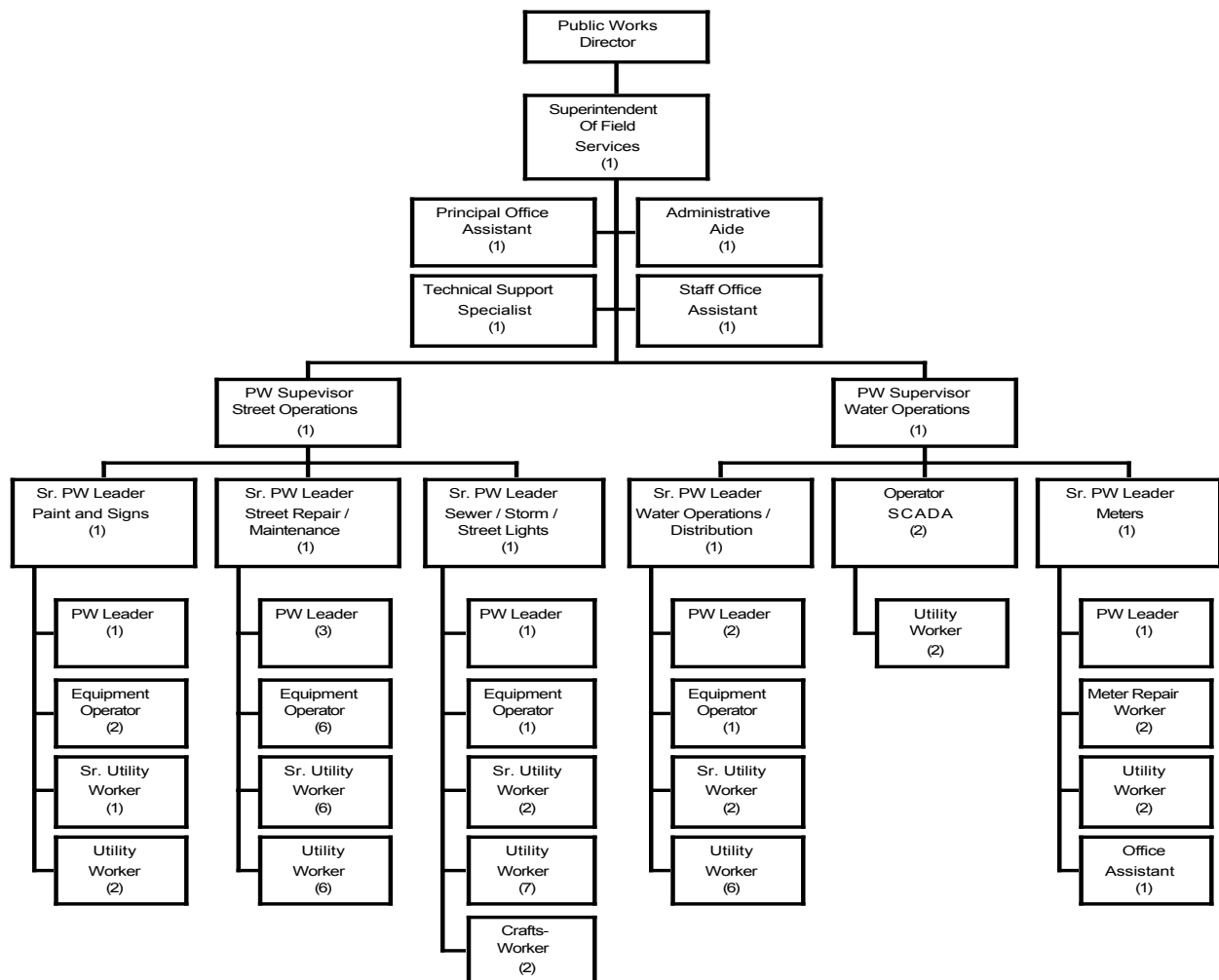
As shown above, staff in Water Operations spent 53.2% of their time on managing water distribution and quality. The following table shows the number of hours within each activity in this service delivery plan:

Water Supply and Distribution	Hours	% of Total
Managing Water Resources		
SF Water Department	13.0	0.3%
SCVWD	13.0	0.3%
City Wells	13.0	0.3%
Recycled Water Distribution	13.0	0.3%
SCADA Systems Operation	2,592.1	52.1%
Demand Management	687.5	13.8%
Administration	1,639.5	33.0%
Sub-Total	4,971.1	100.0%
Managing Water Distribution and Quality		
Preventive Maintenance	10,517.5	33.9%
Corrective Repairs	12,909.7	41.7%
New Service Installation	964.0	3.1%
Backflow Device in Compliance	2,184.8	7.1%
Test Completed	2,935.8	9.5%
Administration	1,473.0	4.8%
Sub-Total	30,984.8	100.0%
Managing Administration and Support		
Customer Service Requests	2,887.8	12.9%
Meter Service or Installation	3,958.5	17.7%
Administration	13,817.0	61.9%
Training	1,669.5	7.5%
Sub-Total	22,332.8	100.0%
Total - Water Supply and Distribution	58,288.7	

As shown above, services related to the water supply and distribution accounted for 58,288.7 personnel hours, with the most hours being utilized for administration (or nearly 30% of total hours), followed by corrective repairs (22% of total time) and preventive maintenance (18% of total time). This equates to approximately 32.38 budgeted positions (at 1,800 hours per position).

* * * * *

The existing plan of organization for the Field Services Division is presented in the chart below.



2. STREET MAINTENANCE

This section of this chapter presents an analysis of several issues regarding street maintenance including the following:

- Streetlight maintenance;
- The preventive maintenance program for the City's streets; and
- Crew sizes utilized for street maintenance.
- The level of street sweeping services provided by the Division.

(1) The Maintenance Crafts Worker/Electrician Class Description Should Be Updated, And The Salary Range Evaluated Before the Vacant Position Is Filled.

The City has developed a classification description for Maintenance Crafts Worker/Electrician. The definition of this classification was as follows: perform a variety of skilled electrician duties involved in the installation, maintenance, repair and extension of electrically controlled and/or operated equipment and of electrical wiring in city buildings. This classification includes duties that are relevant for streetlight maintenance, including:

- Removes and replaces streetlight poles, bases, arms and fixtures, sometimes under emergency conditions due to accidents;
- Installs, maintains and adjusts lighting equipment, replacing burned lamps, defective wiring and damaged receptacles; and
- Runs underground cables and strings overhead wires.

Other cities, such as San Mateo, utilize specialized classifications that maintain streetlights and traffic signals. The classification utilized by San Mateo is Traffic Lighting Technician. The salary range utilized by the City of Sunnyvale for Maintenance Crafts Worker appears to be competitive with these specialized classifications.

However, before the Field Services Division fills the vacant Maintenance Crafts Worker position, it should evaluate the competitiveness of this classification with other specialized classifications, and also update the classification; it was last updated in 1981. In updating the classification, the City should consider the following duties, knowledge, skills, and licenses.

- Repair, replace and maintain all components of streetlights including poles and bases, mast arms, span wires, guy wires, streetlight fixtures, conduit, junction boxes, and related wiring and circuitry in compliance with State and Federal regulations.
- Operate a variety of circuit testing and related tools and equipment to perform complex electrical repairs.
- Operate a variety of power and hand tools, including drills, electrical and gas chain saws, drill press, wrenches, sockets, pliers, and screwdrivers.
- Trouble shoot streetlight circuits and fixtures, and replace defective components.
- Operate a bucket truck to install, maintain and repair streetlight systems.
- Locate streetlight wiring for contractors and utility companies by interpreting maps and drawings and operating an electronic locator.
- Knowledge of solid-state technology as utilized in streetlight systems, methods, materials and techniques used in the construction of street lighting system construction and maintenance projects, operational characteristics of mechanical and hydraulic equipment used in the installation and repair of electrical systems, electrical systems repair and preventative maintenance techniques and procedures, tools and equipment used in the maintenance and repair of electronic and electrical systems.
- Possession of, or ability to obtain, International Municipal Signal Association (IMSA) Work Zone Safety and Traffic Control certification within one year of hire, and possession of, or ability to obtain, (IMSA) Level 1 Roadway Lighting certification within three years of hire.

Recommendation: The City should update the Maintenance Crafts Worker/Electrician classification before filling the vacant position within the Field Services Division and assure that the salary range for the classification is competitive.

(2) The Field Services Division Should Allocate 1.4 Full-Time Equivalent Maintenance Crafts Workers/Electricians to Maintenance of the City's Streetlight System.

The Matrix Consulting Group utilizes a benchmark of 6,500 streetlights per streetlight technician. The City of Sunnyvale owns 8,019 streetlights (excluding 841 streetlights owned by Pacific Gas and Electric). This would indicate that the Division should dedicate 1.4 full-time equivalent Maintenance Crafts Workers/Electricians to the maintenance and repair of the City's street lighting system. The Division is presently allocating the equivalent of 0.9 full-time equivalent Maintenance Crafts Worker/Electrician and the assistance of another employee.

In fiscal year 2004-05, the Field Services Division allocated 2,456 staff hours to street light system. This is equivalent to 1.3 full-time employees. The level of staffing would appear to be sufficient at the present time.

Recommendation: The City should allocate 1.4 full-time equivalent Maintenance Crafts Workers/Electricians to the maintenance and repair of the City's street lighting system.

(3) The Field Services Division Should Develop A Replacement Program For Streetlights.

The interview with the Maintenance Crafts Worker/Electrician dedicated to the maintenance and repair of streetlights in Sunnyvale indicated that many of the streetlights are beginning to fail due to age, and that the City is not systematically replacing its streetlights based upon age. Many of the City's streetlights are more than fifty-(50) years in age.

These assets have a replacement value of \$2,799,664. The City should utilize a replacement cycle for its streetlights of not more than forty-(40) years. The Field Services Division should be expending \$70,000 annually, given that replacement cycle,

in the replacement or refurbishment of this asset in terms of the poles, underground conduits, luminaries, photo cells, electrical service panels, etc. Streetlight fixtures, however, have a replacement cycle of twenty (20) years. Therefore, the \$70,000 represents a minimum level of investment required.

In addition, the Division should be exploring alternatives to reduce electrical utility costs for streetlights such as low energy LED lights and solar powered streetlights. While these technologies appear to be several years away from being a cost-effective alternative to standard products, these alternatives show promise for the future in reducing energy and maintenance costs.

The Field Services Division has developed an inventory of its streetlights. The Division should utilize that inventory to develop a multi-year replacement program for its streetlights with proposed funding levels required to replace streetlights in accordance with the proposed replacement program.

Annual Cost Increases	
Recommendation	Annual Cost Impact
The Field Services Division should develop a replacement program for streetlights	\$70,000
Total Annual Increase	\$70,000

Recommendation: The Field Services Division should develop a multi-year replacement program for its streetlights with proposed funding levels required to replace streetlights in accordance with the proposed replacement program.

(4) The City Should Evaluate Enhancing the Extent of Seal Coat Treatments.

The City's streets are among its most expensive infrastructure assets. The fiscal year 2004-05 Comprehensive Annual Financial Report indicated that the value of these assets amounted to \$157,813,883.

The Field Services Division utilizes a comprehensive preventive maintenance program for its streets. This includes the use of slurry seal, chip seal, the use of petromat with chip seal, and the milling and repair of streets in preparation for surface treatments. The Pavement Operations Program allocates a significant number of staff on an ongoing basis to maintenance and repair of the City's street system. The crew sizes used by the Program meet or are comparable to benchmarks, including a two-person crew for saw cutting asphalt, a six person crew for milling, a six person crew for "patching" (which is more comparable to skin patching than pothole patching) with the exception of the crack sealing crew in which a five to eight person crew is utilized.

However, there are a number of indications that the Division should adjust some of the approaches utilized for pavement management.

The table below presents the frequency of seal coat surface treatments utilized by the Field Services Division since 1998-99.

Fiscal Year	Chip Seal	Slurry Seal T	TOTAL
FY 98-99	2,186,000	4,515,000	6,701,000
FY 99-00	2,654,000	4,730,000	7,384,000
FY 00-01	2,252,000	5,184,000	7,436,000
FY 01-02	2,747,000	4,872,000	7,619,000
FY 02-03	1,595,000	3,053,000	4,648,000
FY 03-04	1,822,000	3,944,000	5,766,000
FY 04-05	1,597,000	3,397,000	4,994,000
FY 05-06	1,571,000	3,465,000	5,036,000

The amount of seal coat surface treatments has varied from a high of 7.6 million square feet in 2001-02 to a low of 4.6 million square feet in 2002-03.

However, it is important to recognize that the Division applies a cape seal surface treatment for its streets: a chip seal and a slurry seal (in addition to crack sealing the street and applying petromat before the application of the surface treatment). The slurry seal is applied one year after the chip seal.

The result is that less square footage of streets receives a slurry seal treatment. For example, in 2005-06, 3,465,000 square feet of chip seal was applied; however, 1,597,000 square feet of this slurry seal was applied to the chip seal applied the previous year. As a consequence, only 1,868,000 of slurry seal was applied to streets, and only 3,439,000 square feet of seal cost surface treatment was applied (excluding the slurry seal applied to the previous years chip seal). It is also important to recognize that the City does not provide seal cost surface treatments for arterial or for collector streets; these treatments are utilized only for residential streets.

The City has approximately 54,000,000 square feet of paved streets. Given the current level of application of chip and slurry seal, the City is on a 16-year cycle for these seal coat surface treatments (this includes collectors and arterials).

The effectiveness of preventive maintenance of this street system has a direct impact on its ongoing costs for repair. For example, the cost of slurry seal approximates 15% of the costs of conventional overlay. The cost of repairing streets increases geometrically over time. The effective use of seal coats as a surface treatment is far cheaper than overlay or hot in place recycle.

A possible cycle for preventive maintenance of streets is presented in the table below.

Type of Street	Type of Treatment	Timing of Treatment After Reconstruction or Overlay
Arterial	Chip/Slurry Seal	6 years
	Chip Slurry Seal	12 years
	Overlay	18 years
Collector	Chip/Slurry Seal	8 years
	Chip Slurry Seal	16 years
	Overlay	24 years
Residential	Chip/Slurry Seal	10 years
	Chip Slurry Seal	20 years
	Overlay	30 years

The table suggests, for example, that arterial streets should receive a chip or slurry seal six years after an overlay or reconstruction, another chip or slurry seal 12 years after the previous chip or slurry seal, and then an overlay at 18 years after an overlay or reconstruction.

These are guidelines; the actual pavement management approach would be based upon the pavement condition index for each street and a visual evaluation of the needs of each street by the staff of the Field Services Division.

However, the City would need to apply almost 7,000,000 square feet of seal coat surface treatment to meet these guidelines (excluding the slurry seal used for application to streets that received a chip seal the previous year).

Recommendation: The Field Services Division should develop a proposal for consideration of the Council regarding the cost implications and benefits of enhancing the extent of seal coat treatments.

(5) The City Should Evaluate the Cost-Effectiveness of Some of Its Preventive Maintenance Practices for Streets.

At present, the Field Services Division uses a number of practices for seal coating of its streets that differ from its peers.

- The Division uses chip seal for its residential streets. Before application of chip seal, the Division applies petromat.
- The Division uses a double chip for chip seal of its streets.
- The Division then applies a slurry seal one year after it has chip sealed these streets. This is, in essence, a cape seal.
- The Division only crack seals streets the year that the street will be chip sealed.

This is an effective approach for preventive maintenance, but a practice that is expensive and not the norm used in other cities for residential streets. Most other cities in urban areas utilize slurry seal, and not cape seal or chip seal. Cape seal costs a little

more than twice as much as slurry seal, and is more a rehabilitation measure than preventive maintenance. Sacramento County utilized petromat and cape seal for streets whose pavement condition index averaged 53. In the evaluation six years later, these streets pavement condition index averaged 83. Sacramento County noted that the use of a double chip did not result in an overall better rating than single chips versus double chip seal when petromat was utilized.

The use of slurry seal on residential streets is based upon the lower traffic patterns on residential streets. Cape seal is typically utilized for streets with heavier traffic patterns such as arterials. The cape seal technique consists of applying a conventional “Oil and Chip” surface seal followed by a slurry seal application to seal in the rock layer. This method, first used in Cape Town, South Africa, adds some structural strength to surface treated streets. If successful, this method may be used on more surface treated streets that are showing signs of early distress.

Recommendation: The Field Services Division should evaluate the cost-effectiveness of some of its preventive maintenance practices for streets.

(6) The Field Services Division Should Address Problems With the Pavement Management System.

The street system of the City of Sunnyvale has one of the highest pavement condition indexes in the San Francisco Bay area. The last reported index was 81 (out of a possible 100). This index will increase to 86 based upon preliminary results from June 2006. The index, however, is flawed and reports a condition that is higher than actual conditions. This results from a number of problems as identified below.

- Once the street condition is evaluated, the index for that street does not change until it is next evaluated.

- The City rates its streets once every two years. It rates 100% of the streets once every two years, and not in the intervening year.
- In the intervening year, the only index scores that are adjusted are those streets that receive a surface treatment. The index score of these streets increases to the high 80's or low 90's (out of 100).
- The Division has not yet applied a trending capacity that would allow the pavement management software to trend the deterioration in streets in the intervening years. The software is unwieldy, and the use of this capacity is not readily accomplished.

The City's street system does not have an index of 86; the index is less than that. The Division will be conducting a visual evaluation of its streets this fall. The index will be less than 86 once the evaluation is completed.

These practices, however, result in flawed pavement condition index scores and lead to decisions that could result in expensive long-term consequences for the City. These high levels of pavement condition index scores incorrectly suggest that the City can spend significantly less for preventive maintenance of its streets without consequence.

The Division is planning on upgrading to the most current version of the Metropolitan Planning Commission pavement management software. This may assist in addressing some of these issues.

Recommendation: The Field Services Division should evaluate one-half of its street system each year.

Recommendation: The Field Services Division should address the limitations with the Metropolitan Planning Commission pavement management software.

(7) The Crew Size For Crack Sealing Should Be Adjusted.

At present, the Pavement Operations Program uses a five to eight person crew for crack sealing. This crew size exceeds benchmarks that the project team has observed utilized in other cities.

This crew size should be adjusted to five persons. A larger crew size should only be utilized if crack sealing is being performed on arterial or collector streets when additional flagging is required for traffic control.

Recommendation: Reduce the crew size of the crack sealing crew to five staff.

(8) The City Should Evaluate Residential Street Sweeping Levels of Service.

For a number of years, the Field Services Division swept streets every other week. However, as part of the cost saving service level reductions implemented in fiscal year 2003-04, the frequency of street sweeping was reduced. This included the elimination of an Equipment Operator position and a street sweeper.

The Field Services Division allocates two Equipment Operators to street sweeping: one Equipment Operator to the day shift and one Equipment Operator to the graveyard shift. The Equipment Operator assigned to the graveyard shift sweeps a higher proportion of arterials, and utilizes a broom sweeper to be able to pick up larger debris. The Division has four street sweepers: three regenerative air and one broom. The three regenerative air sweepers are allocated as follows: one for sweeping streets, one for the pavement crew clean-up, and one that is back-up for all sweepers. These street sweepers are ten to eleven years of age. This is old equipment in terms of normal replacement cycles of seven to eight years. The Fleet Manager indicated that one of these four street sweepers was going to be replaced in

the short-term.

The level of service for street sweeping in Sunnyvale is as follows:

- Residential streets are swept once a month;
- Commercial/industrial streets are swept once a month;
- Arterials with bike lanes are swept twice per month
- The downtown is swept 3 times per week;
- The municipal and park parking lots are swept once per month; and
- The downtown parking district parking lots are swept once per week.

This is a lower level of service than other comparable cities, such as Santa Clara, Palo Alto, or Mountain View. Street sweeping in the residential areas of Santa Clara occurs one day after the garbage collection day, at least bi-weekly. The City of Mountain View Streets Division maintains a bi-weekly sweeping schedule of Mountain View's 340 curb miles of streets. All streets in Palo Alto are swept on a minimum weekly schedule.

The cost of restoring this level of service would approximate \$151,000 annually and the one-time capital outlay of \$165,000.

Recommendation: The City should evaluate and consider restoring the street sweeping level of service.

3. WATER DISTRIBUTION

There are a number of positive aspects to the City's water distribution system. For example, the extent of unaccounted for water in fiscal year 2005 amounted to 3.8%. That is a low extent of unaccounted for water. The American Water Works Association reports in Benchmarking: Performance Indicators for Water and Wastewater Utilities: Survey Data and Analysis Report that the median distribution system water loss in the

western United States was reported as 6.2%, and for cities with a population between 100,000 to 500,000 as 7.6%

The City has developed four alternative sources of water: the Santa Clara Valley Water Protection District, San Francisco Hetch Hetchy, its own wells and reclaimed wastewater. The system has recently installed a robust SCADA system connecting water storage tanks, wells, etc. This system has significantly reduced off-shift requirements and enables the operators to address system problems from their home using a laptop computer to access the SCADA system.

However, a review of some of the work practices of the water distribution program indicates a number of opportunities for improvement.

(1) The Frequency With Which Distribution Valves Are Exercised Should Be Enhanced and Crew Sizes Should Be Adjusted.

The American Water Works Association has defined a standard for the exercising of gate valves on a one to two year cycle. The water distribution system has 9,530 gate valves with most being 4-inch valves and 8-inch valves. Interviews with the staff of the Field Services Division indicated that these valves were exercised on a three-year cycle. Data provided by the Division substantiates this level of service.

The following table shows the number of valves (per size), which had both a current turn date and a last turn date, and the average difference (in days) between turns.

Size of Gate Valve (Inches)	Number of Valves	Avg. Days Between Turns
4	157	1,278.2
6	1,249	1,276.2
8	653	1,292.3
9	1	1,303.0
10	115	1,293.3
12	190	1,268.1
18	1	1,230.0
Total	2,366	1,281.0

As shown above, this analysis identified 2,366 valves (out of 9,530) having both turn dates, with the average span of days being 1,281 days between turns.

The table below presents the number of valves (per size), which only had one turn date associated with it, as well as the average difference (in days) between that date and January 1, 2006 (approximate date of data collection).

Size of Gate Valve (Inches)	Number of Gate Valves	Elapsed Days
2	2	1,126.0
3	4	758.5
4	811	786.1
6	3,540	780.5
7	1	578.0
8	1,859	825.5
10	437	731.8
12	382	732.0
13	1	807.0
14	3	511.7
16	16	453.1
Total	7,056	786.6

As shown above, there were 7,056 valves that have only been turned once, with the average number of elapsed days being 786.6 (or over 2 years since being turned). Further, there were 108 valves that have never been turned (based on the data).

The American Water Works Association recommends that valves larger than 10" be exercised annually, and that those smaller than 10" be exercised once every two

years. Exercising the City's gate valves on a one to two-year cycle would require approximately one crew year.

Equipment Type	Projected Maintenance Frequency	Number To Be Maintained Annually	Task/Per Unit Standard Hours Per PM Task	Total Person Hours Required
Valve (< 10")	Average of Once Every Two Years	6,217	.4	2,486
Valve (> 10")	Annually	839	.6	1006
TOTAL				3,492

The crew size that should be utilized for this service would be one to two staff, depending upon whether the gate valves are located on residential streets or arterials; overall, a one-person crew should be utilized for valves smaller than 10" and a two-person crew for valves larger than 10". Overall, the Division should allocate approximately 3,500 staff hours annually to exercising gate valves or approximately 2.3 staff years.

Currently the Water Distribution program utilizes a two-person crew for gate valve exercising. By splitting the crew into two one-person crews for the purposes of exercising gate valves smaller than 10", the Division should be able to enhance the level of service within the existing levels of staffing. This may require an additional pickup truck. However, as will be noted later, a significant proportion of the City's light truck fleet is underutilized. Light trucks in the City's fleet average 7,188 miles of use a year. However, two-thirds of the fleet averages less than this annual usage. This indicates an opportunity to evaluate this portion of the City's fleet and reassign a pickup truck to the gate valve crew.

Recommendation: Gate valves should be exercised every one to two years based upon the size of the valve.

Recommendation: The Water Distribution Program should utilize a one-person crew for exercising gate valves less than 10” and a two-person crew for gate valves larger than 10”.

(2) A One-Person Crew Should be Utilized For Fire Hydrant Maintenance and the Level of Service for Preventive Maintenance of Fire Hydrants Enhanced.

At present, the Water Distribution Program utilizes a two-person crew for fire hydrant maintenance. There are 3,410 fire hydrants in the City. These hydrants are currently preventively maintained once every two years.

Routine maintenance of fire hydrants typically involves painting the fire hydrant, opening and closing the operating nut, opening and closing the hydrant, checking for ease of operation and flushing foreign material, opening and closing the fire hydrant distribution valve, lubricating the threads of outlet-nozzle caps and the operating nut, etc.

The level of service for fire hydrant maintenance should be an annual preventive maintenance to meet the requirements of the American Water Works Association. Two crews, each consisting of one staff, will be more than sufficient to deliver this level of service as indicated in the table below.

Equipment Type	Projected Maintenance Frequency	Number To Be Maintained Annually to Meet Frequency	Task/Per Unit Standard Hours Per PM Task	Total Person Hours Required
Fire Hydrant Maintenance	Annually	3,410	0.5	1,705

Important points to note concerning the data contained in the table are presented below.

- The level of service proposed would be an annual preventive maintenance of fire hydrants. That would require that 3,410 fire hydrants be maintained annually.
- A total of 12 fire hydrants can be preventively maintained each day on average.

- This would require 1,705 staff hours annually using a one-person crew.

This would require 1.2 staff years to provide this level of service using a one-person crew. The balance of the available staff resources would likely be required for repair of these fire hydrants.

Splitting this two-person crew into two one-person crews may require an additional pickup truck. However, as will be noted later, a significant proportion of the City's light truck fleet is underutilized. Light trucks in the City's fleet average 7,188 miles of use a year. However, two-thirds of the fleet averages less than this annual usage. This indicates an opportunity to evaluate this portion of the City's fleet and reassign a pickup truck to the gate valve crew.

Recommendation: Fire hydrants should be preventively maintained once each year.

Recommendation: A one-person crew should be utilized for fire hydrant maintenance.

(3) The Level of Service and the Crew Size For Maintenance of Pressure Reducing Valves Should Be Reduced.

The City has 94 pressure reducing valves. These valves are preventively maintained twice a year. Pressure reducing valves should be inspected, exercised, and maintained as necessary. The Water Distribution Program uses a three-person crew.

The level of service utilized for preventive maintenance of pressure reducing valves exceeds the standard set by the American Water Works Association. The crew size utilized exceeds that typically utilized by other water utilities.

The proposed level of service and the staffing requirements are presented in the table below.

Equipment Type	Projected Maintenance Frequency	Number To Be Maintained Annually to Meet Frequency	Task/Per Unit Standard Hours Per PM Task	Total Person Hours Required
Pressure Reducing Valve	Annual	94	4.0	752

The workload requirement for preventive maintenance of pressure reducing valves is sufficient to warrant a two-person crew for one-quarter of the staff year. The annual workload is insufficient to warrant the full-time assignment of a three-person crew.

Recommendation: The level of service for maintenance of pressure reducing valves should be reduced to once annually from its current level of service of twice annually.

Recommendation: The crew size utilized for maintenance of pressure reducing valves should be reduced to two staff.

Recommendation: The third position assigned to the pressure reducing valve crew should be reallocated to gate valve maintenance and the temporary position currently utilized for gate valve maintenance eliminated.

Annual Cost Decrease	
Recommendation	Annual Cost Impact
Eliminate a temporary position assigned to gate valve maintenance.	\$30,000
Total Annual Decrease	\$30,000

(4) The Level of Service for Flushing Blow Off Valves Should be Increased.

There are 512 blow off valves in the water distribution system. These blow off valves are located at water main dead ends. The current level of service is to flush blow off valves once every two years.

This is a longer level of service than recommended by the project team. This level of service should be increased to once every year. The previous analysis indicates

that there is sufficient staff available to enhance this level of service. The pressure reducing valve crew could be utilized to address this service level adjustment.

Equipment Type	Projected Maintenance Frequency	Number To Be Maintained Annually to Meet Frequency	Task/Per Unit Standard Hours Per PM Task	Total Person Hours Required
Blow Offs	Annual	512	0.3	153

Recommendation: The level of service for blow off valves should be increased to once a year.

(5) The Level of Service for Commercial Meter Testing and Crew Sizes for Residential Meter Replacement Should Be Adjusted.

The Water Distribution Program is responsible for the maintenance of approximately 27,837 water meters. This excludes meters on fire lines. The inventory of water meters by size is presented below.

Type of Water Meter	Number of Water Meters
5/8" x 3/4"	16,114
3/4"	6,290
1"	3,066
1.5"	905
2"	954
3"	234
4"	118
6"	101
8"	48
10"	6
12"	1
TOTAL	27,837

The service level utilized by the Meter Shop for replacement of residential meters and testing of commercial meters is presented below.

- 5/8" and 3/4" meters are replaced on a fifteen (15) year schedule;
- 1", 1 and 1/ 2", and 2" meters are replaced on a ten (10) year schedule; and
- Meters larger than 2" are tested every two years.

The Meter Shop replaced 2,100 residential water meters in 2005/06 (5/8” through 2”). This would result in approximately a 13-year schedule for replacement.

The Meter Shop tests approximately 240 large commercial water meters annually, and there are 508 commercial meters. This would result in the provision of a two-year testing schedule for commercial meters. This exceeds the benchmarks established by the American Water Works Association.

These commercial meters should be tested annually. The impact of this adjustment in service level is presented below.

Equipment Type	Projected Maintenance Frequency	Number To Be Maintained Annually to Meet Frequency	Task/Per Unit Standard Hours Per PM Task	Total Person Hours Required
Commercial Water Meters	Annual	508	4.0	2,032

A crew size of two staff should be utilized to provide this service. This would require 1.3 staff annually to meet this benchmark.

There is sufficient capacity within the meter shop to enhance this level of service. The Meter Shop is presently utilizing a two-person crew size for residential meter replacement. The benchmark utilized by the project team for residential meter replacement is one person. The adjustment of this crew size should enable the reallocation of one staff year to commercial meter testing.

Equipment Type	Projected Maintenance Frequency	Number To Be Maintained Annually to Meet Frequency	Task/Per Unit Standard Hours Per PM Task	Total Person Hours Required
Residential Water Meters	10 to 15 year cycle	2,100	0.67	1,400

Given the significant industrial base within Sunnyvale, these larger commercial meters should be tested annually, and not on a two-year cycle.

Splitting the two-person crew size for residential meter replacement into two one-person crews may require an additional pickup truck. However, as will be noted later, a significant proportion of the City's light truck fleet is underutilized. Light trucks in the City's fleet average 7,188 miles of use a year. However, two-thirds of the fleet averages less than this annual usage. This indicates an opportunity to evaluate this portion of the City's fleet and reassign a pickup truck to the gate valve crew.

Recommendation: The level of service for testing of the registration accuracy of commercial water meters should be increased to annually.

Recommendation: The crew size used for replacement of residential water meters should be reduced to one.

(6) The Water Distribution Program Should Develop and Install an Energy Conservation Program To Enhance the Energy Efficiency of the Water Distribution System.

The purchase and operation of pumping systems represents a significant expense for most water utilities. Electrical motors account for two-thirds of the industrial electrical consumption in the United States. Pumping systems account for an estimated 25% of this consumption nationwide. Pump loads typically account for as much as 90%, or more, of the energy cost of potable water production and distribution.

A recent US Department of Energy study estimated energy savings of approximately 20% or more than 200,000 GWh per year through the optimization of industrial pumping systems using proven techniques and technologies.

The Department of Energy has prepared a pumping system assessment tool software program. The program is available at no cost. The program estimates existing motor and pump efficiency using field measurement and nameplate type motor and

pump information. It also estimates achievable efficiencies if the motor and pump were optimally selected to meet specified flow and head requirements.

Assistance is also available from Pacific Gas and Electric to assess and identify the energy efficiencies that can be achieved.

Recommendation: The Water Distribution Program should solicit the assistance of Pacific Gas and Electric and the pumping system assessment tool software program available from the US Department of Energy to develop a plan for enhancing the energy efficiency of the water distribution system.

4. WASTEWATER COLLECTION

There are a number of positive aspects to the wastewater collection program. These positive aspects include the following:

- Lift stations (all electric motors) are checked weekly for operations. Detailed inspections get completed on as-needed basis.
- Catch basin drop inlets are cleaned once per year.
- Sewer manholes inspections are inspected by flushing crews when they are flushing sanitary sewer mains. There are 5,783 sanitary sewer manholes in the City, in which approximately 1,500 (or 26%) are inspected annually. Each manhole gets inspected once every 4 years.

However, there are also a number of opportunities for improvement. These opportunities are portrayed below.

(1) The City Should Monitor the Costs of Removing Wastewater Lateral Plugs and Installing Lateral Cleanouts.

The staff allocated to the sanitary sewer system collection maintenance spent approximately 2,629 hours for the removal of lateral plugs. The City only provides these services for residences whose lateral is in close proximity to a City street tree. Other jurisdictions do not provide this service: the resident must call a plumber to remove the

lateral plug. This is a policy decision that has already been discussed by the City Council and the City Council reaffirmed this level of service.

This is a service level policy decision that will have an impact on resource needs. If the City chose to discontinue removing lateral plugs, this could result in a reduction of approximately 2,600 hours annually, or approximately 1.5 full-time equivalents (based on 1,800 budgeted hours per position). The annual fiscal impact for providing this level of service approximates \$160,000 annually.

Similarly, the Division allocates a significant number of staff hours to installing sewer lateral cleanouts – 2,326 hours in 2004-05. Other jurisdictions do not provide this service: the resident must call a plumber to install a sewer cleanout. The cost of providing this level of service approximates \$120,000 annually.

Altogether, providing these services – removing lateral plugs and installing lateral cleanouts – costs the City approximately \$280,000 annually.

Recommendation: The Division should monitor the annual costs of removing lateral plugs and installing lateral cleanouts.

(2) The Field Services Division Should Increase the Extent of Sewer Mains that It Televises on an Annual Ongoing Basis.

The Field Services Division has not televised much of its sewer mains. In the last several months, the Division has contracted for the televising of 12,000 linear feet of sewer mains. This work focused on those mains that had significant problems. The results indicated a number of problems including 150 linear feet of sewer main that was about to collapse. Approximately 10% of the repairs identified by the televising of these mains have been addressed to date.

There are 353 segments (approximately 35% of total segments) on the 30, 60, and 90 day hydro-flushing cycle. This is an extraordinary level of service necessary because these segments, without this frequent cleaning, would experience frequent plugs. The Field Services Division has indicated that much of this is the result of damaged sewer mains.

In fiscal year 2004-05, the Division did not televise any of the City's sewer mains. However, the City has budgeted funds in fiscal year 2006-07 to expand the program for televising of sewer mains.

Cities typically televise approximately 3% of their sewer mains annually. This would require that the Field Services Division televise 8.5 miles of sewer mains annually. The benefit is the identification of sewer mains that suffer from significant infiltration and inflow, enabling their replacement, and the reduction of the amount of wastewater treated by the Water Pollution Control Plant.

Recommendation: The Field Services Division should issue a contract annually for the televising of 3% of its sewer mains.

Recommendation: The Field Services Division should focus sewer televising on those sewer mains on the 30, 60, and 90 day hydro-flushing cycle.

(3) The Level Of Service For Sewer Cleaning Should Be Enhanced.

In fiscal year 2003-04, the Sanitary Sewer Collection Program hydro-flushed 480,300 linear feet of sewers (or 90.9 miles of sewer mains). In fiscal year 2004-05, the Program hydro-flushed 368,703 linear feet of sewer mains (or 69.8 miles of sewer mains). At this level of service, the Program is cleaning sewer mains on a three to four year cycle. This is a somewhat longer cycle than the benchmarks utilized by the project

team. Other cities clean their sewer mains typically not less than every two to three years.

Some segments receive a higher level of service. There are 353 segments (approximately 35% of total segments) on the 30, 60, and 90 day hydro-flushing cycle. Further, the Division has re-initiated the citywide flushing by dedicating one truck (as time and workload permits), whose goal is to flush the entire City system within a 3 to 4 year period. However, staff has been concentrating on the “hot list” areas that historically cause the most problems (those within the 30 and 60 day cycle).

The result of this level of service may be a higher rate of main plugs than other cities. In 2003-04, the City had 142 main plugs (or one plug every two miles of main), and in 2004-05 the City experienced 113 plugs (or one plug every two and one-half miles of sewer main). This is a higher level of sewer plugs or backups than the benchmarks utilized by the project team.

The Program should enhance the level of service for sewer cleaning. The table below presents the recommended level of service for sewer cleaning.

Equipment Type	Projected Maintenance Frequency	Number To Be Maintained Annually to Meet Frequency	Task/Per Unit Standard Hours Per PM Task	Total Person Hours Required
Sewer main	2 to 3 year cycle	113 miles	0.75	2,400

The Program typically allocates two crews each day to hydro-flushing (including the 30, 60, and 90 day hydro-flushing cycle). If one crew is dedicated 80% of the fiscal year to hydro-flushing of the sewer mains (in addition to the 353 segments on the 30, 60, and 90 day hydro-flushing cycle), the Program should be capable of providing a two and one-half year cleaning cycle.

Recommendation: The Sanitary Sewer Collection Program should allocate a hydro-flushing crew 80% of the fiscal year to routine sewer main cleaning.

Recommendation: The level of service for routine sewer main cleaning should be enhanced.

(4) The Field Services Division Should Work with the Water Pollution Control Plant to Expand the Application of Reclaimed Wastewater.

Currently, the Water Pollution Control Plant reclaims approximately 3 million gallons of wastewater daily. This is Title 22 water or disinfected tertiary water. Sunnyvale currently has 91 recycled water customers all north of the CalTrain tracks, and most north of Highway 237. Daily sales ranged from 0.95 million gallons per day to 2.6 million gallons per day. Reclaimed wastewater represents 7.6% of the City's water supply. The City has prepared a reclaimed water master plan that identifies potential for the expansion of the system and the infrastructure necessary to support the expansion. The first two of the five phases within the master plan have been completed.

A cost of service study is presently being completed.

However, there are two City parks (Fair Oaks and Encinal) that while plumbed for reclaimed wastewater, are not using reclaimed wastewater due to concerns that this recycled wastewater might contact surfaces on which food might be prepared. Since this reclaimed wastewater is Title 22 water or disinfected tertiary water, this should not present a problem.

Recommendation: The two City parks plumbed for the use of reclaimed wastewater should utilize reclaimed wastewater where cost effective.

Recommendation: Upon conclusion of the cost of service study, the Field Services Division and the Water Pollution Control Plant should prepare a plan to continue implementation of the reclaimed water master plan if the cost of service study indicates that the pricing is competitive.

5. THE FIELD SERVICES DIVISION SHOULD INSTALL A COMMERCIAL OFF-THE-SHELF MAINTENANCE MANAGEMENT SYSTEM.

The Field Services Division has not developed a comprehensive maintenance plan.

The Field Services Division should acquire and install a commercial off-the-shelf (COTS) maintenance management system. The system should be scalable and provide the capacity to enable managers to readily answer such questions as the following:

- **Are Field Services Division preventive maintenance procedures working?** The management of the Department should be able to look at total employee hours, grouped by work type or class, comparing the amount of Emergency/Breakdown repairs to the amount of preventive maintenance work accomplished. This should enable management to assess the extent of a decline in Emergency/Breakdown repairs if preventive maintenance tasks are performed at the correct frequency. The Field Services Division cannot answer this question.
- **Are Field Services Division preventive maintenance inspection frequencies adequate?** The management of the Division should be able to look at the number of scheduled work orders grouped by work type or asset comparing the amount of work that was identified as a result of performing preventive maintenance (such as televised inspections of sewer mains or leak detection inspections of water mains) to preventive maintenance standards and guidelines promulgated by such organizations as the American Water Works Association. The Field Services Division cannot answer this question.
- **Where are Field Services Division problems in reliability and where should the Field Services Division focus their limited resources?** The management of the Division should be able to look at the total cost for work type or class, Emergency/Breakdown and Call-In, sort the work requests by asset, and sort by location. This will identify by asset where all the costs are being accumulated. This is typically referred to as the “Top 10” list or “Bad Actors” report. This is essential in identifying where water or wastewater mains should be replaced, streets resurfaced, etc. The Division cannot answer this question.
- **Where is the Field Services Division spending its energy?** The management of the Division should be able to look at the total employee hours grouped by work type or class. Depending on the established work types this will identify the type of work that the maintenance organization is accomplishing. This is critical to ensure true maintenance work is being accomplished in support of production goals and targets.

- **What is our backlog of Field Services Division work?** The management of the Division should be able to look at the backlog of work, assuring that there is no less than 2 weeks and no more than 4 weeks of backlog (all parts/materials available waiting scheduling) and between 4 to 6 weeks in the total backlog. The Division cannot answer this question.
- **How efficient is the Field Services Division maintenance workforce?** The management of the Division should be able to review the labor hours per work order and compare these to benchmarks that exist for the different work activities such as pothole patching, street sweeping, distribution valve exercising, etc. The Division cannot answer this question.
- **How much money is the Division spending on maintenance and repair for the various types of work activities?** This includes parts, material and supply costs, contractor costs, and maintenance labor costs. The management of the Division should be able to look at the material cost, contractor cost, and labor cost grouped by work type. The Division cannot answer this question.

A COTS maintenance management system should be acquired to serve as the basis of a comprehensive maintenance plan that identifies the services provided (e.g., traffic striping), the levels of service (e.g., streets striping is repainted once a year), the outputs of each of these services (e.g., the miles of street striping), and the costs of those service, both total and per unit of output. This is not an idealized perspective of what the Division should be doing, but a basic perspective of what is necessary to manage the maintenance and repair of the infrastructure.

There are a number of elements to the successful installation of a comprehensive maintenance plan by the Field Services Division. These elements include the following:

- **Asset Management.** An asset inventory must be developed. This data is the constant of a successful comprehensive maintenance plan. Even if the latest technology tools have been implemented, a system without data is not very useful. Keeping asset information – features and location – up-to-date, accessible and understandable is the challenge of a successful comprehensive maintenance plan.

- **Work Management.** Work management includes all the activities involved in maintaining assets at a pre-defined condition level. The value of a successful comprehensive maintenance plan is its ability to recommend maintenance actions, such as which assets should be inspected or evaluated; and of those, which should have maintenance activities scheduled. Effective work management predicts and tracks the costs of labor, equipment and materials needed for maintenance and budget planning, and monitors the performance of actions taken.
- **Service Request Management.** As a starting point for many of the activities and work orders within a Field Services Division, service request management provides access to information such as citizen requests, work order generation and caller history. The ability to track the request(s) for work on an asset(s) provides the Field Services Division with the ability to keep better track of their data and in turn provide a better level of service to their citizens.
- **GIS Integration.** The term Geographic Information System (GIS) has often been used as the broad term to describe asset management. In reality, a GIS is only one piece of the process – without up-to-date supporting asset data it has limited use. However, linking a database and a GIS makes another level of management available by providing more options to analyze asset information.
 - **Visual information.** A GIS can display asset symbols on a map with links to their corresponding database records. The GIS provides the ability to analyze data based on geographic information, allowing patterns to emerge on a map that may not be as obvious in rows and columns of data.
 - **Communication.** Asset information can be shared in a visual format that is often better understood by others including the Mayor, City Council and the public.
 - **Asset location.** Finding the location of an asset is faster and easier with the help of a map.

A COTS maintenance management system needs to be acquired for the Field Services Division. However, there are a number of steps that need to be accomplished before the COTS maintenance management system can be effectively utilized in the development of this comprehensive maintenance plan. These steps are presented below.

(1) A Complete Inventory of Work Activities Performed by the Field Services Division Needs to Be Developed.

The Field Services Division needs to assure that all of the primary work activities (i.e., street sweeping, repairing water main leaks, pothole patching, crack sealing, drainage inlet cleaning, pavement legend painting, etc.) that consume the majority of staff work hours are defined. This would include all forms of leave. All 2,080 staff hours for each employee should be included within the system.

(2) Performance Standards Need to Be Developed.

Performance standards are formally established criteria for determining the need for work, required quality of work, the resources necessary to achieve quality and expected rate of productivity, etc. Maintenance standards are developed for each maintenance activity.

Each performance standard should include, at a minimum, six components:

- A brief description of the specific work involved;
- The frequency with which the work should be performed (or the level of service);
- The crew size required for the job;
- The equipment, material, and tools needed;
- The performance expectations for each job or average daily productivity; and
- The recommended procedures for completing the job.

A sample performance standard for pavement messages is presented in the exhibit following this page.

Exhibit 17

Sample Performance Standard

ACTIVITY NO:	ACTIVITY NAME:	DATE:
	Pavement Messages	Jan 06

ACTIVITY DESCRIPTION:

Painting of traffic messages on city owned streets and parking lots as required by routine maintenance, overlays, preventive seals and Traffic Engineering requests. All painting shall conform to the manual on Uniform Traffic Control Devices.

PERFORMANCE CRITERIA:

PRIORITY SERVICE

Painting of overlays and preventive seals should be performed in a timely manner
Some special projects may require immediate service

SCHEDULED MAINTENANCE

All other painting should be performed as it can be scheduled
Repaint all existing pavement messages at least once a year

TYPICAL CREW SIZE: 2 Person

WORK METHOD:

Load striper with paint or load preformed thermal plastic messages.
Load striper and additional paint on flat bed truck
Locate truck in a safe position at job site and set up traffic control
Clean area if necessary and paint message or preheat asphalt prior to applying thermal plastic message.
Ensure traffic does not cross wet paint
Store tools and materials securely on truck and proceed to next job site

EQUIPMENT:

1 2 ton flat bed	1 Walk behind striper w/removable gun	Traffic Cones
Stencils	Hand Tools	Propane torch

MATERIAL:

Beaded traffic paint | Paint rollers | Preformed thermoplastic

PRODUCTION STANDARDS:

UNIT OF MEASUREMENT: message
AVERAGE DAILY PRODUCTION: 37
MAN HOURS PER WORK UNIT: 27

NOTES: Working in heavy traffic may require a three-man crew to perform the painting of pavement messages in a safe fashion.

(3) An Annual Work Plan Needs to Be Developed.

An annual work plan needs to be developed within the COTS maintenance management system that will not only guide the Field Services Division in prioritizing and performing specific tasks, but will provide the managers with a document to hold their staff accountable for results.

The annual work plan estimates the kind and amount of work to be done in the next fiscal year. The managers in these programs should prepare the annual work plans as part of the budgetary preparation process. The development of an annual work program takes into consideration two major questions:

- What amount of work is needed to provide the desired levels of service to the public?
- What required levels of staff, equipment, and materials will be needed to provide that level of service and at what cost?

The annual work program is prepared once a year and serves as a planning document that establishes objectives for the coming fiscal year in terms of the specific work activities to be performed, the service levels to be provided, and the allocation of staff in the provision of these services. It provides a clear indication of the relationship between funding and service levels. It also serves as a valuable tool to model trade-offs between different funding levels and the level of service that can be provided.

The Field Services Division should establish service levels for each of the work activities and services the Division provides. Further, once these targeted service levels are established, with staffing, the Division should report on the planned and accomplished work on a monthly and annual basis using the COTS maintenance management system.

A sample of an annual work program is presented in the exhibit following this page. As the exhibit indicates, the Division should establish service levels for each of the work activities and services they provide. Further, once these targeted service levels are established, with staffing, the Division should report on the planned and accomplished work on a monthly and annual basis using the COTS maintenance management system.

(4) A Monthly Performance Report Should Be Generated Comparing Planned Versus Actual Performance and Costs.

A sample monthly report is presented in the second exhibit following this page. The monthly report should be generated by the automated work order system. It should be designed to enable:

- A comparison of planned versus actual staff hours per work activity for the previous month and year-to-date for each work activity;
- A comparison of actual versus planned work output (miles of curbs swept by street sweepers) per month and year-to-date for each work activity;
- A unit cost analysis that compares the planned versus actual unit costs for each work activity per month and year-to-date; and
- A comparison of actual productivity (work output per staff hour) versus the expected productivity as stated in the performance standards.

Unfortunately, some asset management systems are unsuccessful or fail to even make it off the ground. The points below present common pitfalls to which Public Works Departments, without the proper planning, often fall victim. Anticipating these challenges will help an organization head off any potential problems and ensure the success of its management system.

Exhibit 18

**Sample Annual Work Program for
Maintenance Operations**

Work Activity	Quantity	Inventory Unit	Effort Level	Work Quantity	Work Unit	ADP	Crew Days	Crew Size	Labor Days	Labor \$	Equip. \$	Mat'l \$	Total \$
Program 01 – Street Maintenance Administration													
Vacation	2,200	Labor Hour	1.0	2,200.0	Labor Hour	24.0	91.7	3.0	275.0	\$68,750	\$0	\$0	\$68,750
Other Time Off	800	Labor Hour	1.0	800.0	Labor Hour	32.0	25.0	4.0	100.0	\$25,000	\$0	\$0	\$25,000
Sick	800	Labor Hour	1.0	800.0	Labor Hour	28.5	28.1	3.6	101.1	\$25,263	\$0	\$0	\$25,263
Meetings/Training	850	Labor Hour	1.0	850.0	Labor Hour	30.0	28.3	3.7	104.8	\$26,208	\$1,784	\$0	\$27,992
Program Totals									580.9	\$145,221	\$1,784	\$0	\$147,005
Program 02- Pavement Maintenance and Repair													
Pothole Patching	420	Lane Mile	0.6	252.0	Tons	2.8	90.0	2.0	180.0	\$45,000	\$19,008	\$19,548	\$83,556
Remove/Replace Base	420	Lane Mile	6.0	2,520.0	Sq. Yds	62.5	40.3	3.0	121.0	\$30,240	\$13,862	\$10,777	\$54,879
Skin Patching	420	Lane Mile	55.0	23,100.0	Sq. Yds	218.0	106.0	3.0	317.9	\$79,472	\$59,315	\$52,830	\$191,617
Crack Sealing	420	Lane Mile	5.0	2,100.0	Lbs. Sealant	350.0	6.0	3.0	18.0	\$4,500	\$3,586	\$1,775	\$9,861
Program Totals									636.8	\$159,212	\$95,771	\$84,930	\$339,913

Exhibit 19

Sample Performance Report

Year-to-Date Work Progress Report for Maintenance Operations
Period: July 1, 2006 – July 30, 2006

Work Activity	Labor Days		Amount of Work		Total Cost		Productivity	
	Plan	Actual	Plan	Actual	Plan	Actual	Plan	Actual
<i>Program: 08 – Pavement Maintenance</i>								
Pothole Patching	15	18	42 tons	40 tons	\$6,963	\$7,862	2.8 tons per crew day	2.4 tons per day
Remove/ Replace Base	10	26	210 Sq. Yds.	456 Sq. Yds.	\$4,573	\$9,602	62 ½ Sq. Yds. Per crew day	68 ½ Sq. Yds. Per crew day

The estimated costs for acquisition of COTS maintenance management software necessary to support the maintenance management system are presented below.

- The City should seek concurrent licenses, not “per seat” licenses for the system.
- The project team estimates that the Field Services Division will ultimately need approximately 15 to 20 concurrent licenses. The cost for these licenses will cost approximately \$135,000.
- Initially, however, the Department should phase in implementation with one division only – such as Streets. The cost for the initial set of 5 concurrent licenses would approximate \$15,000.
- The annual licensing for the 15 to 20 concurrent licenses will approximate \$35,000 annually. This cost would not occur until the 2nd year.
- Training should be provided to the staff that would be utilizing the system. The estimated cost for on-site training would approximate \$1,750 per day, and an estimated three to five days training would be required or a total cost approximating \$8,750.
- Technical assistance from the vendor for setting the system up and installing the system would cost approximately \$5,000.

The Technical Services Coordinator has the know-how and the time resources to support installation as long as implementation is phased-in as recommended previously.

The one-time and ongoing cost data presented previously is summarized in the table below.

Total One-Time Cost Increases	
Recommendation	Annual Cost Impact
Purchase a COTS CMMS	\$135,000
Provide training to staff of the Field Services Division in the use of the COTS CMMS	\$8,750
Obtain technical assistance in the installation of the COTS CMMS	\$5,000
Total One-Time Increase	\$148,750
Annual licensing for the COTS CMMS	\$35,000

Recommendation: The Field Services Division should develop and install a maintenance management system.

Recommendation: The Field Services Division should acquire commercial off-the-shelf maintenance management software.

6. THE OVERTIME UTILIZED BY THE FIELD SERVICES DIVISION FALLS WITHIN BENCHMARKS

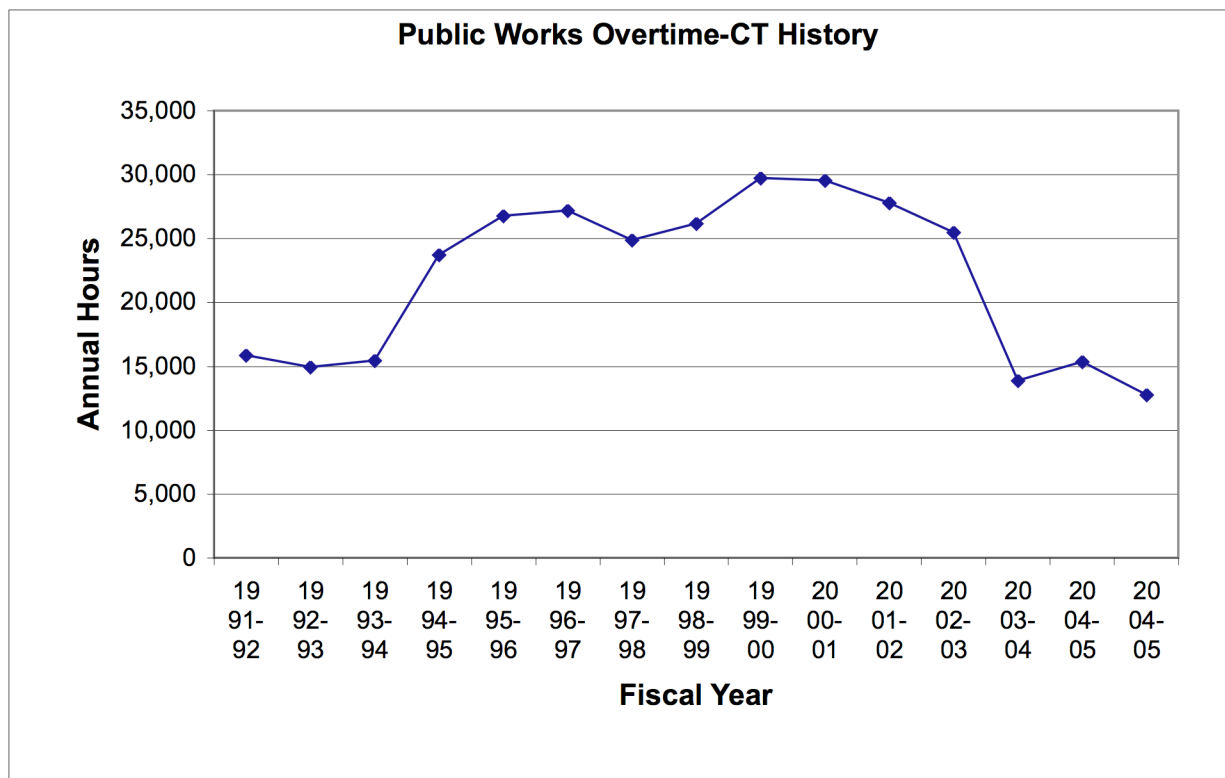
In fiscal year 2004-05, the Field Services Division utilized 6,251 hours of overtime. This is approximately 70% of the overtime utilized in the Public Works Department. The cost of this overtime amounted to \$284,127. The Division has been effective at continuing to reduce the extent of overtime. This is clearly evident in the points below.

- The extent of overtime utilized by the Pavement Operations program has decreased from 5,534 hours in 1995-96 to 1,146 hours in 2004-05.
- The extent of overtime utilized by Water Supply and Distribution has remained largely unchanged since 1995-96, amounting to 4,748 hours in 1995-96 versus 4,824 hours in 2004-05.

The amount of overtime should be considered in light of the total annual hours worked by the 73 positions authorized for the Field Services Division – approximately 118,000 hours annually. This would indicate that the number of overtime hours approximates 5.3% of the total hours worked. This is not unreasonable.

The amount of overtime hours is not out of line with other cities that the project team has benchmarked in the past. The benchmark used by the project team is the percentage of overtime expenditures to total personnel costs. The benchmark approximates 3.2%. The actual use of overtime in the Field Services Division falls below that benchmark.

This reflects a pattern within the Public Works Department. The Public Works Department has made significant progress in reducing the extent of overtime. The extent of overtime has declined significantly for five years as the chart below demonstrates.



The amount of overtime hours has declined from a peak of 29,729 hours in 1999-00 to 15,730 hours in 2004-05.

Recommendation: Continue to monitor overtime usage in the Field Services Division.

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Overall, the project team is not recommending an increase or a decrease in the level of authorized staffing for the Field Services Division.

8. FLEET, TREES AND LANDSCAPING

8. FLEET, TREES AND LANDSCAPING

This chapter of the report analyzes the staffing, operations and service levels of the Fleet, Trees and Landscaping Division.

1. THE FLEET SECTION HAS SEVERAL STRENGTHS CONSISTENT WITH BEST MANAGEMENT PRACTICES.

The Fleet Section is responsible for the repair and maintenance of the City's fleet of vehicles, motorized equipment and towed apparatus. Services include vehicle and equipment repair, preventive maintenance, welding, tire repair and replacement, vehicle replacement and specification development, transport as well as other related services. The Section operates Monday through Friday from 6 a.m. to 5 p.m. and is assigned 13 positions that includes: (1) Fleet Manager, (1) Senior Office Assistant, (2) Lead Equipment Mechanics, (8) Equipment Mechanics and (1) Equipment Mechanic Assistant.

In the analysis by the project team of fleet operations, several areas were identified where the Section performs well in relation to best management practices. The following is not an exhaustive list of those strengths, but highlights the important operational elements for which the Fleet Section deserves credit.

- The Fleet Section oversees a robust Internal Services Fund (fleet rental system) to rent vehicles to user departments. This includes annual re-calculations of fleet rental rates using appropriate operational variables, a well-described methodology on how rental rates are calculated, and use of data generated by the Section's equipment maintenance information system (EMIS), Fleet Focus.
- The Section has an appropriate and cost-effective outsource strategy including contracting glass, upholstery, body work, paint and some heavy-duty repairs or replacements.
- The Fleet Focus EMIS is, overall, well-designed and effectively used to help manage fleet operations through generation of work orders, capturing of relevant

maintenance and repair activities and costs, vehicle inventory, vehicle history, parts, fuel usage, etc. The GasBoy fuel system is interfaced with Fleet Focus.

- The group of Equipment Mechanics exceeds an industry standard of 60% fully-loaded wrench time—achieving 63% in calendar 2005—whereby all leave (vacation, sick, holidays, etc.) and non-maintenance activities are subtracted from annual work hours leaving time dedicated to maintenance and repair work on apparatus.
- The Fleet Section achieved the desired level of preventive maintenance workload relative to repair workload, dedicating 57% of the Section's work hours to preventive maintenance. Fleet management guidelines and best management practices suggest that preventive maintenance should represent at least one-half of a fleet's assigned workload.
- The Fleet Section has a very respectable vehicle turnaround time and thus services the customer well. Data suggest that the average turnaround time is 1.1 days with 91% of vehicle services completed in two days or less.

The next section begins to evaluate selected issues in this Division.

2. THE ALLOCATION OF STAFF SHOULD BE MODIFIED TO REDUCE FLEET OVERHEAD AND TO IMPROVE EFFICIENCY.

The analysis of the project team suggests that the Fleet Section has dedicated staff. Nevertheless, there are opportunities, particularly giving recent and pending retirements to re-visit the utilization of staff.

As noted above, the Equipment Mechanics, collectively, approximate 63% fully loaded wrench time. This is less than the recommended metric of 70%. The Fleet Manager should focus attention on increasing the billability of these Equipment Mechanics to 70% of available work hours.

This, however, does not address the issues and associated costs of managerial, supervisory, administrative support or other staff positions dedicated specifically to fleet maintenance operations. These overhead positions impact the direct cost of maintaining a fleet and should be minimized to the greatest extent practical. The following positions

can be classified as overhead positions as, for the most part, they are not involved in directly maintaining and repairing (i.e. wrench work) apparatus.

Position	Approximate Wrench-Time Dedicated to Fleet	Approximate "Support" Time Dedicated to Fleet
Division Superintendent (1)	0%	33%
Fleet Manager (1)	0%	100%
Lead Equipment Mechanic (2)	6%	94%
Senior Office Assistant (1)	0%	100%
Equipment Mech. Asst. (1)	10%	90%
Overhead FTEs Dedicated to:	.22 FTEs of 5.3	5.1 FTEs of 5.3

In sum, the assistance of 5.1 full-time equivalent (FTE) positions is being allocated to support eight equipment mechanic staff, an overhead ratio of 64%. Certainly overhead positions are required as clerical support is mandatory; managing, supervising, scheduling, budgeting, coordinating and responding to complaints is critical; and activities such as vehicle transport, shop and tool clean-up, etc., are fundamental requirements. Nevertheless, this proportion of overhead staff is significant and well outside most norms we have observed.

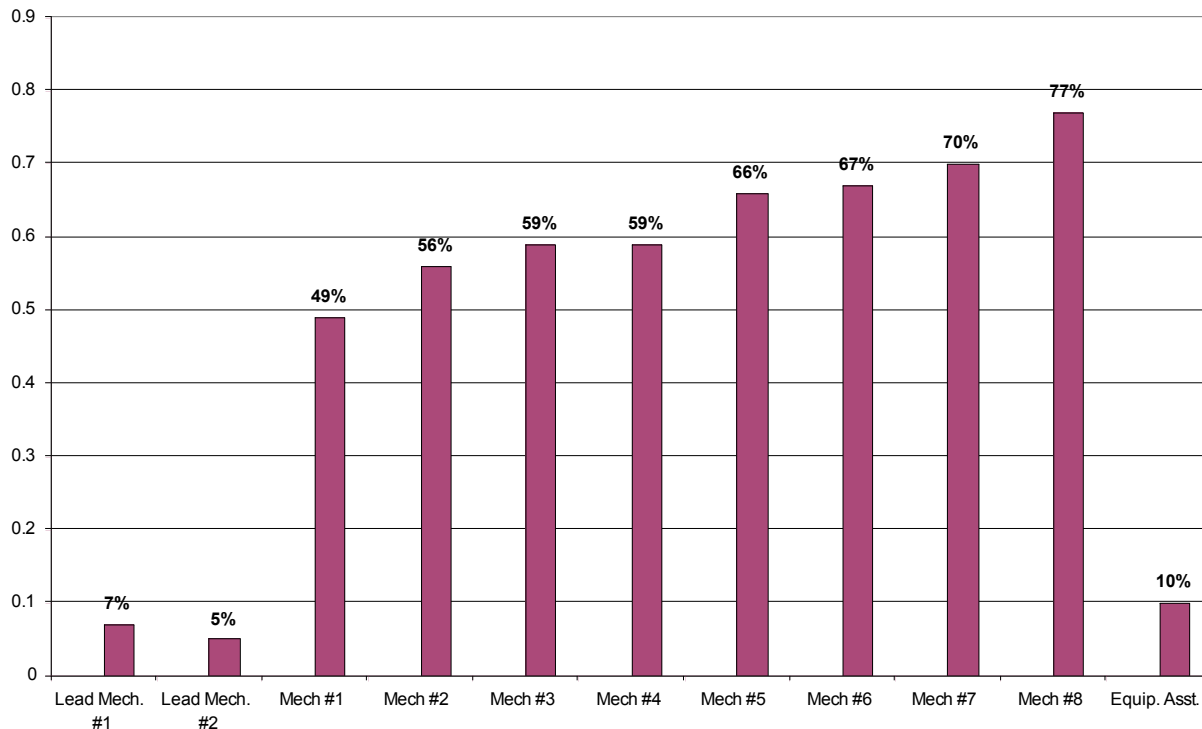
These positions also carry a cost of doing business, a cost that is apparently not thoroughly captured in the EMIS system. According to City records, the fully-burdened salary costs of an Equipment Mechanic is calculated at \$53.76 an hour, and the calculated hourly labor rate on work orders is \$74.15 per hour. Ideally, this labor rate should, at minimum, capture the full costs of all personnel dedicated to fleet maintenance operations including the costs of Equipment Mechanic "downtime" (i.e. non-wrench time). The City has done a good job in developing a mechanic hourly labor rate that captures downtime, yet it appears that none of the overhead positions' salary and benefits is similarly captured in the hourly labor rate. Labor rate calculations that include overhead positions portray an important issue as shown in the table below.

Overhead Position	Overhead %	Hours/Year (based on 2,080)	Fully- burdened Hourly Rate	Annual Cost	Cost per 2005 Work Order Hour
Superintendent	33%	687	\$80.90	\$55,530	\$5.31/hr
Fleet Manager	100%	2,080	\$80.90	\$168,272	\$16.08/hr
Lead Mech.	94% (x2)	3,910	\$60.21	\$235,445	\$22.50/hr
Sr. Office Asst.	100%	2,080	\$40.30	\$83,824	\$8.01/hr
Equip. Asst.	90%	1,872	\$45.92	\$85,962	\$8.21/hr
TOTAL:				\$629,033	\$60.11/hr

As a consequence of including overhead position costs into the Equipment Mechanic hourly labor rates calculations, the competitive hourly rate—with both private sector and public sector garages—of approximately \$74 per hour *increases dramatically to nearly \$135 per hour* for full fleet maintenance operations personnel cost recovery. It is thus clear that minimizing overhead positions in any fleet operation should be a critical operating philosophy.

In addition to re-visiting what staff positions are assigned to the Fleet Section, further efforts need to be made in how workload is distributed. Although, as stated, Equipment Mechanics as a group achieve fully loaded wrench time percentages, there are opportunities for individual staff to improve their performance. The chart below shows the distribution of wrench time by individual staff position:

Fully-loaded Wrench Time by Position



Highlights resulting from a review of the figure above include the following:

- Both Lead Equipment Mechanics and the Equipment Mechanic Assistant have only a minimal amount of wrench time, dedicating work to other functions including administration and supervision, shop clean-up, vehicle transporting and the like.
- Almost all of the mechanics personally perform under the 70% target for fully-loaded wrench time.

The data suggest that additional efforts can be made to improve work allocation assigned to various individuals to improve efficient and effective fleet operations. This, in conjunction with re-visiting how the Section is staffed with various overhead personnel, results in the following steps to consider:

(1) Overhead Staff Positions Should Be Reallocated, In Part, to Wrench-Turning Duties.

As demonstrated in the previous analysis, the number of overhead positions in the Fleet Section is high relative to most benchmarks, resulting in re-calculated hourly labor rates that are not cost-competitive with the private sector or best-in-class public sector garages. Consequently, the City should re-evaluate the organizational structure of the Fleet Section, particularly upon pending retirements, and consider the following:

- Two Lead Equipment Mechanics and a Fleet Manager are far too many management/administration staff for a fleet operation of the City's size. The present structure is administratively top-heavy and provides a very limited span of control for the supervisors overseeing subordinate staff. Both the Superintendent and Fleet Manager are not located in the garage facility and are consequently somewhat detached from day-to-day operations. Furthermore, Lead Mechanics overseeing only 4.5 staff (average) each and who are almost exclusively dedicated to administrative efforts, is now an atypical staffing pattern given best-in-class supervisor to staff ratios of 1:8 to 1:12.
- The Senior Office Assistant is dedicated and well-versed in the nuances of the Section's operations and the Fleet Focus EMIS. Nevertheless, based on interviews, the Assistant's capabilities, the number of paraprofessional positions located at the Public Works Yard, and other workload in the Division, this position does not need to be dedicated full-time to the Fleet Section.

Recommendation: The Lead Equipment Mechanics should be senior technical staff providing on-floor mentorship and leadership with not less than 50% of their duties and responsibilities related to wrench-time workload.

(2) The Equipment Mechanic Assistant Should Be Utilized More Effectively for Preventive Maintenance.

Workload should be appropriately distributed, and individual performance expectations established, such that all mechanical staff achieve or exceed the target of 60% fully-loaded wrench time. Failure to balance workload among staff reduces overall fleet operation effectiveness and can contribute to reduced morale as some staff are allowed to perform at less than a minimum standard that many of their colleagues are

achieving. Additionally, every opportunity should be afforded to the Equipment Mechanical Assistant to undertake wrench-time duties and responsibilities such as Preventive Maintenance A (e.g. oil change) tasks. Although it is understood the position performs several other necessary and important functions, re-engineering some business practices as described subsequently will allow for additional dedication to wrench-time efforts.

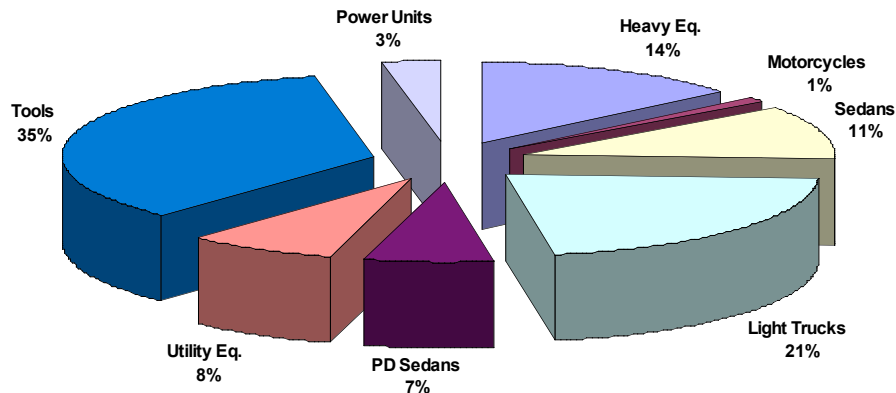
Recommendation: Include in individual annual performance evaluations a minimum target of 70% fully-loaded wrench time for all equipment mechanic staff. Supervise and manage to this expectation.

Recommendation: Include in the individual annual performance evaluation a minimum target of 30% fully loaded wrench time for the Equipment Mechanic Assistant.

3. THE FLEET INVENTORY SHOULD BE REDUCED.

Information analyzed based on records provided by the City indicate potential opportunities for the City to further revise the fleet inventory profile thereby impacting Fleet Section staffing requirements. The figure below shows the inventory by category of apparatus for which the Fleet Section is responsible. A brief description of the categories, created by the project team, is provided.

Fleet Inventory by Category



- **Heavy Equipment** – Units classified thusly represent many types of equipment that most often require special training/certification to operate, including backhoes, dump trucks, fire apparatus (e.g. pumper truck), aerial lifts, and the like. Nearly 80 units of this category are in the fleet inventory.
- **Motorcycles** – Police Motorcycles, generally used for traffic enforcement. The City presently has five (5) units.
- **Sedans** – Include various units from sub-compact to standard size operating on gasoline or alternative fuels and individually assigned or in a vehicle pool. Approximately 60 sedans are in the fleet inventory.
- **Light Trucks** – These includes compact pick-ups up to one-ton utility units and vans. The City has nearly 120 of these vehicles.
- **PD (Police Department) Sedans** – These represent the police cruisers and given the circumstances under which they are operated, represent one of the most maintenance-intensive apparatus and the most costly. The City has deployed over 35 police sedans.
- **Utility Equipment** – Largely includes single or dual-axle utility trailers with various equipment mounted within. Also includes forklifts, compressors, portable

welders, and the like. The City has nearly 45 pieces of these apparatus in inventory.

- **Tools** – The Fleet Section maintains various powered tools/rolling stock including chain saws, trimmers, mowers, small tractors, various landscape and forestry equipment, varied construction and maintenance equipment, and the like. The City has nearly 200 of these apparatus in the inventory.
- **Power Units** – These consist of auxiliary power units from 5-500 Kilowatts. The City possesses 17 of these units.

In sum, the City has nearly 550 units in the eight categories above assigned to the fleet inventory with nearly 300 classified as “traditional vehicles.” Another staffing benchmark utilized in the fleet industry for operational efficiency purposes is the ratio of number of mechanics to vehicles, with an efficient/effective ratio considered to be 1 mechanic to 40 vehicles, on average. Note that benchmarks must be reviewed in context and not overemphasized. This benchmark is just an additional performance measurement tool. A fleet of all safety equipment (police cruisers and fire apparatus) would require fewer vehicles per mechanic. Conversely, a fleet of all under-utilized sedans would require more vehicles per mechanic. The ratio presented is for the “average City fleet.” Given the eight Equipment Mechanics, whose time is largely represented by wrench turning workload, the ratio of mechanics to vehicles is 1:37, whereas if other maintained equipment is considered (e.g. utility equipment, tools) the ratio is 1:69. These ratios further demonstrate that Equipment Mechanics are generally productive; however, it also demonstrates that by downsizing the fleet, the Fleet Section staffing contingent can also be reduced.

Although the City has made dedicated efforts to manage its fleet inventory, there appear to be further opportunities for reductions. A review of the calendar 2005 mileage/hourly usage of various units in the fleet indicate vehicles that are

comparatively under-utilized when contrasted with the average mileage usage for vehicles in that category and when considering expected usage based on present useful life formulas and comparisons to other fleets. The table below shows representative data relative to fleet usage.

Vehicle Category/Usage Type	Calendar 2005 Average Usage	% of Vehicles Less Than Average Usage	% of Vehicles Less than 1-Standard Deviation of Average Usage
Sedans (mi.)	6,477	66%	7%
Light Trucks (mi.)	7,188	66%	7%
Heavy Equipment (hrs.)	457	55%	16%

The information contained above indicates the City should consider further opportunities for fleet reduction and consolidation based on usage patterns. A significant majority of lighter vehicles traveling approximately 500-600 miles per month is not excessive usage and demonstrates there are possibilities for additional pooling of vehicles, elimination of units, and/or further extension of useful life calculations. As it relates to optimum staffing patterns, elimination of just 50% of the vehicles traveling less than the average annual usage for the respective vehicle categories in the above table, would result in a fleet downsizing of approximately 80 units, an ability to eliminate two (2) mechanic positions, and the attendant costs savings in personnel, maintenance and operations.

The potential fiscal impacts of a well-designed and comprehensive fleet usage study cannot be underestimated. Elimination of vehicular assets from a City's fleet inventory can save a tremendous amount of money related to vehicle operations, maintenance, depreciation, and the attendant fleet staffing needed to maintain apparatus. The fleet usage study should incorporate multi-year use patterns; surveying of user departments and individual drivers; random site visits to observe the proportion

of time vehicles are idle/parked; review of assignment strategies (i.e. individual versus pool); potential downgrading from larger vehicle models to smaller (e.g. standard to compact) cost comparisons to monthly stipends or mileage for use of personal vehicles on City business; sharing of heavy apparatus with adjoining jurisdictions; use of vehicle rentals instead of ownership; etc.

Recommendation: The Fleet Manager should conduct a comprehensive fleet usage study with the aforementioned elements and report the results to the City Manager for potential implementation of fleet modification strategies.

4. THE REPLACEMENT CYCLE FOR STREET SWEEPERS SHOULD BE ADJUSTED.

The street sweeper inventory of four (4) units is overall effectively beyond its useful life given hours of operation on the units, year of the vehicles, maintenance difficulties and on-going costs. Over \$91,000 was spent in 2005 on these units of which 77% was repair costs. Total costs represented over 6% of fleet's maintenance and operating expenses.

Annual Cost Increase	
Recommendation	Annual Cost Impact
The replacement cycle for street sweepers should be reduced from 13 years to 8 years.	\$15,000
Total Annual Increase	\$15,000

Recommendation: The replacement cycle for street sweepers should be reduced from thirteen (13) years to eight (8) years.

5. SEVERAL FLEET OPERATIONS PRACTICES SHOULD BE MODIFIED.

During the study we noted fleet procedures that were not consistent with Best Management Practices. It should be noted that some of these protocols reasonably function in the City; however, when compared with Best Management Practices, there are opportunities for improvement if the resources and operational philosophy of the

City warrant implementation. These procedural issues are summarized below in the following sub-sections.

(1) The City Should Improve Job-related Information Made Available to Fleet Staff.

The Fleet Section does not have ready access to written, job-related policies and procedures. Although a vehicle usage policy has been developed and included in the City-wide administrative policies and procedures manual, there is no centralized and comprehensive policies and procedures manual relative to fleet operations. This shortcoming can impact the ability of the Section to perform on a consistent basis over time, and is particularly necessary as staff changes occur and new employees are hired. Given the City is expecting a large number of retirements in the near future, a comprehensive policy and procedures manual, for all operating units, would be extremely beneficial and an important component of effective succession planning.

There is a perception among staff that job-related training is minimized largely due to budgetary and time constraints. It is difficult to confirm or deny this observation as data suggest the eight Equipment Mechanics recorded nearly 540 hours of training time in calendar 2005 yet no monies were budgeted or expended for these activity codes in FY 2004/05. These hours of formal training would be excessive, but the type of activities being recorded as training is unknown. Time recorded might include weekly tailgates, all safety training, human resources required training (e.g. sexual harassment), and the like. Regardless, on-going professional training is an important business requirement, and both time and budget should be dedicated, as available, to this important practice.

Recommendation: The Division Superintendent and Fleet Manager should prepare a Fleet Section policies and procedures manual, utilizing outside consultation services as necessary, with an effort to complete a draft of this manual prior to pending retirements in calendar 2007.

Recommendation: The City should reconcile the perception of lack of training with the reality of the amount of training provided. Consideration should be given to creating a new activity code dedicated exclusively to professional training

(2) The City Should Re-visit the Process for the Sale of Surplus Fleet Equipment.

Although an analytical evaluation of the City's fleet sales process is beyond the scope of this study, interviews suggest opportunities for improvement. The City may not have obtained the appropriate residual value for the sale of used vehicles due, in part, to consistently using the same auctioneering services. Although residual value of sold vehicles is often not significant, seeking the greatest return on an asset is a typical best practice.

Recommendation: The City should review its policies and processes for the auctioneering and sale of used fleet apparatus with the Purchasing Manager and make revisions, as appropriate.

(3) The City Should Evaluate the Procedures Used for Transporting Vehicles and the Frequency of Preventive Maintenance.

The City presently has a very customer-centric philosophy whereby Fleet Section staff, with the exception of heavy fire apparatus, pickup most user vehicles from their assigned location and return them to the garage for servicing. These vehicles are delivered back to the user location upon service completion. More than 10% of all time recorded in 2005 to work orders was dedicating to the task of transporting vehicles. This is a very significant amount of time, takes away from mechanic core business duties and responsibilities, and is an extremely high level of service provision to the

vehicle user. Despite this service level it is not considered a best management practice. Furthermore, because of this City practice, we have included this time in the fully loaded wrench time calculations despite the fact that such transport is not considered a core mechanic function. If transport were eliminated from the wrench-time calculations, the Fleet Section would not be performing at appropriate wrench time standards. This level of customer service should be re-visited, and optional vehicle delivery strategies strongly considered such as the use of Police Cadets.

A review of the preventive maintenance program shows opportunities for improvement. Based on 2005 data, a reasonable portion of vehicles is receiving preventive maintenance before 3,000 miles of use. The 3,000-mile benchmark is a typical industry standard in both the private and public sector, and in some schools of thought, given current synthetic lubricants and newer engine technologies, is even considered more frequent than necessary. Consequently, the Fleet Section should re-evaluate the frequency by which preventive maintenance is scheduled and accomplished, thereby reducing non-critical workload to mechanic staff.

Recommendation: The City should reconsider the philosophy of Fleet Section staff transporting vehicles for servicing and rely on users to transport vehicles instead, checking out pool vehicles located at the City Yard in the interim while vehicles are being serviced.

Recommendation: The Fleet Section should re-evaluate the frequency of preventive maintenance to ensure vehicles are not over-maintained.

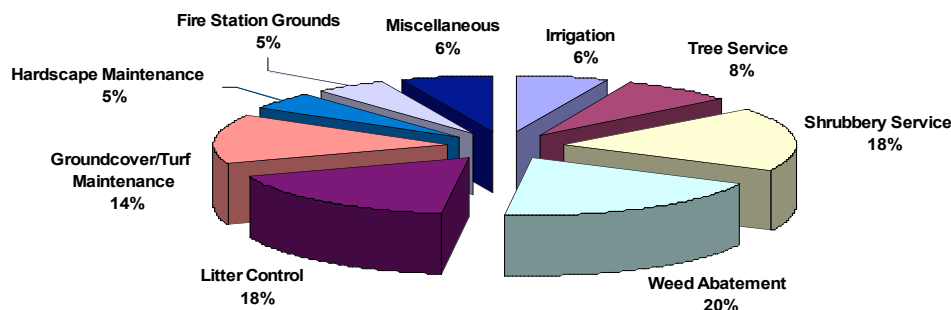
6. LANDSCAPE MAINTENANCE SHOULD BE OUTSOURCED.

The Landscape Section is supervised by an Urban Landscape Supervisor. The Section generally deploys four crews into three route areas and special tasks that including facilities, the southern part of the City, and the northern part of the City, and

overall weed abatement and litter removal. At the time of this study these crews consisted of: (1) Senior Public Works Leader, (3) Senior Utility Workers, (3) Utility Workers, and (5) Grounds Workers. Two full-time positions were not filled though temporary assistance such as seasonal laborers was, and is, brought in dependent upon budget and need.

The following figure shows the allocation of labor hours by these staff:

2005 - Landscape Maintenance Allocated Hours by Major Activity



The activities are defined as follows:

- **Irrigation** – This activity includes controller and head adjustments and irrigation repair on sprinklers, piping, and the like.
- **Tree Service** – Differentiated from Street Tree services based on the location of these trees in median strips and similar service areas, this entails pruning, replacement, and other urban forest activities.
- **Shrubbery Service** – This includes the pruning, shaping, removal, replacement and other attendant activities associated with shrubs.

- **Weed Abatement** – This activity includes the physical and chemical methods used to remove weeds from most service locations.
- **Litter Control** – The removal of trash and detritus from the assigned service areas.
- **Groundcover & Turf Maintenance** – Various activities undertaken to maintain various groundcover including mowing, trimming, physical and chemical edging, fertilizing, etc.
- **Hardscape Maintenance** – Sweeping, hardscape wash, periodic weed abatement and other activities associated with sidewalks, medians, bike lanes, and “pork chops.”
- **Fire Station Grounds** – A location-centric activity whereby all the above tasks are completed, as required, at the six fire station locales.
- **Miscellaneous** – Includes various other tasks such as training, special projects, streetscape route inspections, and the like.

As shown by the figure, the labor hours of these staff are well diversified and deployed for many tasks to accomplish the core-business duties and responsibilities assigned to the Section. Based on various sources of data provided by the Section and City, the following provides an overview of the inventory maintained by the Section:

Locations Maintained	Unit of Measure
Parking District Area/Medians	53.9 acres
Water Wells	9.9 acres
Fire Stations	3.3 acres
Water Pollution Control Plant Grounds	1 acre
Sound Walls	5.4 acres
Bike Lanes	28.5 miles
“Pork Chops” Hardscape	127 Count

The annual cost in fiscal year 2004-05 for the maintenance of these medians and landscaping in fiscal year 2004-05 amounted to \$1,306,390 (Program 216). This includes salaries, fringe benefits, services and supplies, utilities, miscellaneous expenditure totals, and internal service charges. The cost is presented in the table below.

Object	Expended YTD
Salaries and Benefits Total	\$949,671
Services and Supplies	\$95,870
Utilities	\$151,882
Miscellaneous Expenditures	\$3,535
Internal Service Charges	\$105,432
TOTAL	\$1,306,390

The cost per acre, including utilities, approximates \$17,774 (\$1,306,390 divided by 73.5 acres). Excluding utilities, the City's costs approximate \$15,707 per acre.

The City of Mountain View has outsourced the maintenance of its landscaped medians.

The City of Palo Alto has outsourced landscape maintenance of its landscaped medians, City facilities, and utility grounds. Its contractual cost to maintain 25.5 acres of medians, 26.4 acres of city facilities, and 10.9 acres of utility substations and well sites (or a total of 62.8 acres) amounted to \$247,883. The cost per acre for median maintenance, excluding utilities, approximates \$5,563 per acre or 35% that of the City of Sunnyvale. (It should be noted that the contractor's costs per acre were lower for City facilities and utility substations and well sites; for the purposes of this comparison, the consulting team utilized the higher cost per acre for medians since that comprises three-quarters of the acreage maintained.).

The specifications utilized by Palo Alto are performance-based both for the skills and experience of the contractor's staff and the tasks performed by the contractor. Examples of these performance-based specifications are provided in the exhibit at the end of this chapter. The service levels of the City of Sunnyvale would not be degraded if the City contracted for maintenance of its landscape medians.

This analysis is not intended to suggest that the Division's landscape median services are inefficient. It does suggest that the private sector is able to deliver these services for a lower unit cost than the Division.

The City should outsource landscape maintenance services presently provided by the Fleet, Trees, and Landscape Division. To manage the contract, the City should authorize a contract administrator. The estimated annual cost impact of the outsourcing of landscape maintenance services presently provided by the Fleet, Trees, and Landscape Division is presented in the table below.

The City should consider approaching the City of Palo Alto and/or Mountain View to determine these cities' willingness to issue a consolidated request for bids to enhance the competitiveness of the bids for these services.

As the table indicates, outsourcing would reduce annual costs by a net of approximately \$625,000 annually.

Annual Cost Increases		Annual Cost Decreases	
Recommendation	Annual Cost Impact	Recommendation	Annual Cost Impact
Utilize an Urban Landscape Supervisor as a contract administrator for the landscape maintenance contract.	\$115,000	Eliminate the staff allocated to roadside and median right-of-way services, related goods and services, miscellaneous expenditures, and internal service charges.	\$1,150,000
Utilize a contract for landscape maintenance.	\$410,000		
Total Annual Increase	\$525,000	Total Annual Decrease	\$1,150,000

Recommendation: The City should outsource landscape maintenance services presently provided by the Fleet, Trees, and Landscape Division.

Recommendation: The City should authorize a full-time contract administrator to manage the landscape maintenance contract.

Recommendation: The City should approach the City of Palo Alto and/or

Mountain View concerning a possible consolidated request for bids for landscape maintenance.

7. SCHEDULED BLOCK-BY-BLOCK TREE MAINTENANCE SHOULD BE OUTSOURCED.

The authorized staffing for tree maintenance consists of eleven (11) positions including (2) Senior Public Works Leaders, (2) Senior Utility Workers, (5) Utility Workers and (2) Grounds Workers.

The allocation of staff hours by these staff for fiscal year 2004-05 is presented in the table below.

Work Activity	Annual Staff Hours	% of Total
Scheduled structural pruning	10,705	59.5%
Service request	103	0.6%
Priority pruning	595	3.3%
Emergency pruning	173	1.0%
New tree planting	13	0.1%
Tree removal	1,146	6.4%
Tree watering	466	2.6%
Young tree training pruning	433	2.4%
Maintain tree nursery	89	0.5%
Respond to service requests	694	3.9%
Structural integrity survey	65	0.4%
Pruning standards survey	42	0.2%
Claims investigation	25	0.1%
Equipment maintenance / miscellaneous activities	1,012	5.6%
Program coordination: non-management	1,586	8.8%
Tree removal: permit investigation	301	1.7%
Staff training	550	3.1%
TOTAL	17,998	100%

Important points to note about the data in the table are presented below.

- This table excludes labor hours allocated to management administration and clerical support.
- Almost 60% of the labor hours were allocated to scheduled structural pruning. A total of 10,705 hours were allocated to this work activity.
- 6.4% of the labor hours were allocated to tree removal. A total of 1,146 labor hours were allocated to tree removals.

- 22% of the labor hours were allocated to overhead, including staff training, tree removal permit investigation, equipment maintenance/miscellaneous activities, responding to service requests, structural integrity survey, and pruning standards survey. The total labor hours allocated to these work activities was 3,974.

As shown by the figure, the tree crews dedicate the vast majority of their time to tree pruning: it amounts to 67% of their available work hours. The table below reflects the cost per unit for the major tasks performed by the tree maintenance crews on various representative tasks and the total amount of staff hours.

Maintenance Activity	Cost per Unit
Scheduled Structural Pruning	\$95.51
Service request (single) pruning	\$107.65
Priority pruning (on hours)	\$61.95
Emergency pruning (off hours)	\$153.03
Tree removal	\$202.68
Young tree training pruning	\$17.66
Program coordination: non-management	\$66.90
Equipment maintenance/miscellaneous activities	\$37.01
Staff training: safety and development	\$50.63
Tree watering	\$4.82

These activities comprise 82% of the total labor hours in fiscal year 2004-05. The total costs for tree maintenance services (Program 218) delivered by the Fleet, Trees, and Landscaping Division in fiscal year 2004-05 amounts to \$1,261,961.

The City's costs for the provision of in-house tree maintenance services are higher than that of private contractors. Menlo Park, for example, contracts with West Coast Arborists for tree maintenance services. The specifications utilized by Menlo Park provide for a quality level of service. The unit costs for Menlo Park, in comparison to the Fleet, Trees, and Landscaping Division are presented below.

- The costs of scheduled structural pruning by the Division amounts to \$95.51, while the unit cost in the Menlo Park contract amounts to \$53.90 or 56% that of the Division.
- The costs of service request pruning by the Division amounts to \$107.65, while the unit cost in the Menlo Park contract amounts to \$27.50 for a tree less than 6 inches diameter at stump height, \$66 for a tree less than 15 inches diameter at

stump height, \$110 for a tree less than 23 inches diameter at stump height, and \$385 for a tree in excess of 24 inches diameter at stump height.

- The costs of emergency response pruning by the Division amounts to \$153, while the unit cost in the Menlo Park contract amounts to \$220 per hour.
- The City of Menlo Park is maintaining a block-by-block tree trimming cycle of approximately nine years, while the Division maintains a cycle of five and one-half years.

Other neighboring cities utilize contractors for scheduled structural pruning, while maintaining an in-house capacity for emergency pruning, service requests, priority pruning, and young tree trimming.

The project team recommends that the City outsource scheduled block-by-block tree maintenance, but maintain an in-house three-person crew for response to service requests, emergency pruning, priority pruning, tree removal, young tree training pruning, and other non-scheduled tree maintenance activities. This crew should consist of a Senior Utility Leader, Utility Worker, and Grounds Worker. In addition, the City should utilize the other Senior Utility Worker position to manage the contract and also respond to service requests, conduct tree removal permit investigations, and supervise the three-person crew.

This analysis is not intended to suggest that the Division's tree maintenance is inefficient. It does suggest that the private sector is able to deliver these services for a lower unit cost than the Division.

The estimated annual cost impact of the outsourcing of scheduled tree maintenance services presently provided by the Fleet, Trees, and Landscape Division is presented in the table below. As the exhibit indicates, outsourcing would reduce annual costs by a net of approximately \$411,900 annually. The annual cost for contractual

services reflects scheduled tree pruning for 6,046 trees annually. This is the number of trees that were trimmed by City staff in fiscal year 2005.

Annual Cost Increases		Annual Cost Decreases	
Recommendation	Annual Cost Impact	Recommendation	Annual Cost Impact
Utilize a contract for scheduled tree rimming	\$325,900	Eliminate Urban Landscape Supervisor position, four Utility Worker positions, and a Grounds Worker position and related goods and services, miscellaneous expenditures, and internal service charges.	\$736,900
Total Annual Increase	\$325,900	Total Annual Decrease	\$736,900

Recommendation: The City should outsource scheduled tree trimming services presently provided by the Fleet, Trees, and Landscape Division.

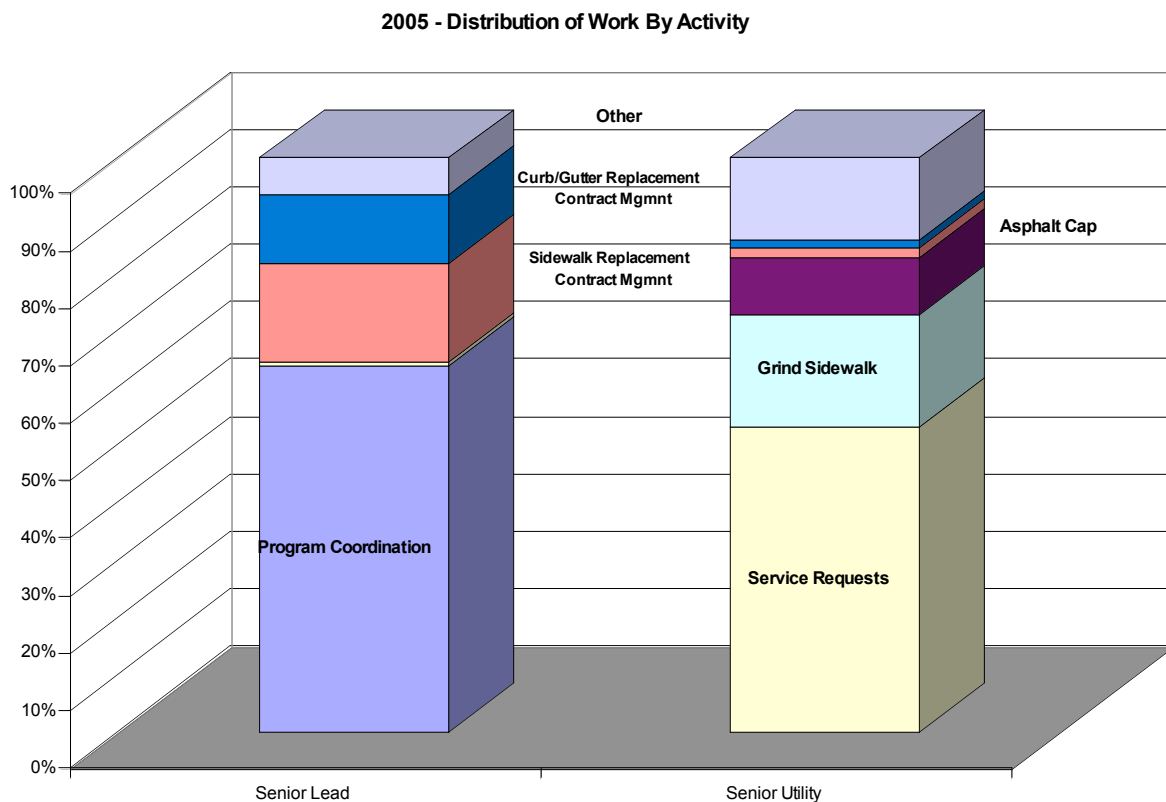
8. OPPORTUNITIES EXIST TO STREAMLINE SUPERVISORY STAFFING IN THE CONCRETE MAINTENANCE CREW.

The Concrete Maintenance Crew is assigned six (6) positions that includes (1) Senior Public Works Leader, (1) Senior Utility Worker, (1) Utility Worker, and (3) Grounds Workers. The allocation of staff hours by these staff for fiscal year 2004-05 is presented in the table below. This excludes managerial and clerical support.

Work Activity	Annual Staff Hours	% of Total
Temporary A/C repair to sidewalks	594	5.7%
Grind sidewalk displacement	2,849	27.5%
Remove parkway concrete	611	5.9%
Root prune sidewalks	1,545	14.9%
Install root control materials at sidewalk	370	3.6%
Root prune at curb and gutter	330	3.2%
Install root control materials at curb and gutter	366	3.5%
Alternative sidewalk installation	114	1.1%
Survey root mitigation sites	17	0.2%
Sidewalk replacement	364	3.5%
Curb and gutter replacement	267	2.6%
Investigate requests for service	1,029	9.9%
Investigate claims from Risk and Insurance	44	0.4%

Work Activity	Annual Staff Hours	% of Total
Program coordination – non-management	1,275	12.3%
Equipment maintenance – miscellaneous activities	155	1.5%
Staff training	425	4.1%
TOTAL	10,355	100%

The proportion of managerial and supervisory staff compared to field personnel exceeds best practice. The Concrete Maintenance Crew is supervised by a Senior Public Works Leader and by a Senior Utility Worker. The following figure shows the breakdown of time, by activity, for these two positions.



The following information highlights information presented in the figure:

- The Senior Public Works Leader has the bulk of his hours – nearly 65% – dedicated to the activity defined as “Program Coordination.” This is effectively an administrative and supervisory task and largely unrelated to in-field duties and responsibilities. The large remainder of time – nearly 30% – is spent conducting

contract/project management and inspection of the City's curb, gutter and sidewalk replacement program through a private vendor.

- The Senior Utility Worker spends the majority of his time (53%) investigating and responding to customer service requests. Other major activities include spending time identifying, investigating, and inspecting displacements for sidewalk grinding (20%) and displacements requiring an asphalt cap (10%).

This distribution of workload indicates potential opportunities to modify job duties and re-allocate activities among different staff. In our experience it is difficult to reconcile the apparent level of administrative and supervisory effort required to oversee a crew of four staff (excluding the Senior Public Works Leader and the Senior Utility Worker). Essentially two positions (Senior Public Works Leader and Senior Utility Worker) are directly involved in the administration and supervision of four positions dedicated to concrete maintenance activities. This structure can be defined as top-heavy.

The responsibility for supervising this section, with the proposed elimination of the Urban Landscape Supervisor position, should be assigned to the Public Works Supervisor in Street Operations, Field Services Division.

The Senior Utility Worker position should be eliminated. The annual fiscal impact of the elimination of this position is presented in the table below, reflecting salaries and fringe benefits at the top of the range. As the exhibit indicates, the elimination of the Senior Utility Worker position would decrease annual salary and fringe benefit costs by approximately \$93,700 annually.

Annual Cost Decrease	
Recommendation	Annual Cost Impact
Eliminate a Senior Utility Worker position	\$93,700
Total Annual Decrease	\$93,700

Recommendation: Eliminate a Senior Utility Worker position.

* * * * *

A comparison of existing versus proposed positions within the Fleet, Trees and Landscaping Division is presented in the table below. As the table indicates, the proposed decrease in positions in the Division would amount to twenty-four positions.

Class Title	Existing Number of Positions	Proposed Number of Positions
Superintendent of Trees and Landscape	1	0
Urban Landscape Supervisor	2	1
Fleet Manager	1	1
Automotive Shop Attendant	1	1
Equipment Mechanic	8	8
Lead Equipment Mechanic	2	2
Public Works Leader	1	0
Senior Park Utility Worker	4	0
Senior Public Works Leader	4	3
Senior Office Assistant	2	1
Groundsworker	11	4
Utility Worker	10	2
TOTAL	47	23

Exhibit 20 (1)

Examples of the Landscaped Median Maintenance Specifications Utilized by Palo Alto

1. **Staffing Levels.** A sufficient staffing level to successfully satisfy the landscape maintenance expectations within this agreement is required. The City of Palo Alto Parks and Golf Division highly recommends a minimum staffing level of 12 to 14 maintenance personnel on a daily basis to fully satisfy the requirements of this agreement.
2. **Safety.** Contractor agrees to perform all work outlined in the Agreement in such a manner as to meet all accepted standards for safe practices during the maintenance operation and to safely maintain stored equipment, machines, and materials or other hazards consequential or related to the work; and agrees additionally to accept the sole responsibility for complying with all City, County, State or other legal requirements including, but not limited to, full compliance with the terms of the applicable O.S.H.A. and CAL E.P.A. Safety Orders at all times so as to protect all person, including contractor employees, agents of the City, vendors, members of the public or others from foreseeable injury, or damage to their property. The Contractor shall be responsible for traffic control and safety regulations as related to any City, State, or County requirements while working on medians and/or roadside strips. The design and operation of work zone traffic controls must comply with U.S. Department of Transportation/Federal Highway Administration guidelines. Contractor shall cooperate fully with City in the investigation of any accident, injury or death occurring on city property, including a complete written report thereof to the Project Manager within twenty-four (24) hours following the occurrence. The Contractor's responsibility shall be continuous and not be limited to working hours or days.
3. **Public Image and Etiquette.** Contractor employees shall wear company uniforms, which consist of long pants and shirts with company name and individual's name on the shirt. The contractor's staff when needed will utilize rain gear, rain boots, safety shoes, and other safety equipment. All contracted employees while on the site shall exhibit a clean, neat professional appearance. Contractor's equipment and vehicles shall also be professional in appearance, exhibit the company name and phone number, and be well maintained for safe operation. All Contractors' vehicles must display a placard, legible from a distance of 10 feet, with the following language: Landscape Maintenance Contractor working for the City of Palo Alto Parks and Golf Division. For information contact: (650) 496-6962.
4. **Property Damage.** Any private property or city property damaged or altered in any way during the performance of the work under this contract shall be reported promptly to the City's representative, and shall be rectified in an approved manner back to its former condition, prior to damage, at the Contractor's expense.

Exhibit 20 (2)

5. **Project Hours of Work.** The Contractor shall conform his weekday operations to the hours between 7:00 a.m. and 5:00 p.m. during the life of the contract. The Contractor shall conform his operations to the hours of 9:00 a.m. to 3:00 p.m. to medians and roadside strips. Saturday work must be performed between 9:00 a.m. and 6:00 p.m.
6. **Pruning and Trimming.**
 - All pruning and trimming shall be done by qualified professional personnel using ISA recognized and approved standards and techniques.
 - Excessive pruning or stubbing back will not be permitted.
 - All pruning cuts shall be properly made: they shall be cleanly cut with no tearing of the bark.
 - The Contractor is responsible for replacing: at their cost, any damage to plant materials caused by excessive pruning, improper pruning techniques, poor equipment etc.
 - All dead or damaged branches shall be removed immediately.
 - Pruning and trimming of shrubs and ground cover shall be done at least six times a year, as needed, to achieve the following:
 - To cut back branches that are rubbing on walks, fences and impairing or posing a safety hazard to pedestrians, bicycles, or vehicles.
 - To maintain desired shape of plant material.
 - The Contractor is responsible for maintaining the first 15 feet of the tree measured from the root crown/flare.
 - Tree stakes shall be removed as trees mature. Tree ties will be adjusted at least annually to accommodate tree growth.
 - All trees should be maintained at a height that conforms to A.D.A. standards for safety (84" above ground level), and which removes hazards to persons, mowers, and property.
 - Flower beds and perennial beds shall be raked, cultivated, and pruned/dead-headed as needed, but no less than once per week.

Exhibit 20 (3)

- Ground cover along curbs must be kept within curb and height trimmed as needed.
- All ivy ground cover shall be mowed with a composting mower once a year in the winter. Most ivy ground cover areas have irrigation, primarily fixed risers. The Contractor must flag all irrigation components prior to ivy mowing. The Contractor is responsible for repairing any damage to irrigation system.

7. Turf Maintenance. The following turf maintenance guidelines apply to all turf areas included in this agreement. Turf shall be maintained areas in a healthy, safe, and aesthetically pleasing condition by performing the following operations and other work incidental thereto:

- **Mowing** - All turf areas are to be mowed typically once a week. An additional weekly mowing may be requested due to weather conditions, special events, and growth flush after fertilizing. Mower setting are to be at 1-1/2" to 2" in height, depending on turf variety. All clippings shall be removed when unsightly and requested by the Project Manager.
- **Aerification** - All turf areas are to be aerified twice a year. Core size shall be at least 3/4" in diameter and 3" - 4" in length. Cores need not be removed. Flag or mark irrigation system heads, valve boxes, and quick couplers. Contractor is responsible for repairing any damaged caused by aerification equipment.
- **Edging** - All turf edging shall be edged at least once per month. Examples of edges: along pathways, walkways, around shrubs, trees, sprinklers heads, valve boxes, mow bands, curbs, benches, light poles, or any other fixed object. Herbicide shall not be used as an edging tool. Care must be taken not to damage trees, shrubs, or any other fixed object with edging equipment. String trimmer damage to trees and roots will not be tolerated.
- **Gopher Control** - Contractor shall keep all turf areas free of gophers by using Macabee gopher traps or other approved devices. Holes caused by gophers shall be backfilled with soil approved by the city's representative.
- **Grub/Larvae Control** - contractor shall keep all turf areas free of grubs and larvae. Damage caused by grubs and larvae shall be re-seeded with an approved turf seed. Grub and larvae species including, but not limited to, Australian Sod Fly, Bermuda grass mite, Billbugs, Cutworms, Armyworms, Ground Pearls, Lawn moths, Sod webworms, White Grubs.
- **Turf shall be fertilized three times annually, using 6 pounds per 1,000 square feet** In fall IBDU slow release 24-4-12 or approved equal shall be used. In spring and summer, a 16- 6-8 fertilizer or approved equal shall be used.

Exhibit 20 (4)

- Safely hazards must be addressed immediately. Fill holes in turf areas immediately, regardless of cause, as they develop with sufficient soil to prevent tripping hazards.
 - Re-seed small bare areas, not to exceed 100 sq. feet per area, on a monthly basis using materials and methods approved by the Project Manager.
 - Turf Sweeping - The contractor must sweep turf areas at the request of the Project Manager. Sweeping will be requested to remove excess turf clippings or leaves. Requests will be more frequent during the fall season, after wind related events, and skipped mowing intervals by the Contractor or City Staff. This includes turf areas mowed by City Staff.

9. WATER POLLUTION CONTROL PLANT

9. WATER POLLUTION CONTROL PLANT

The Water Pollution Control Plant is at a critical juncture. The recently completed asset condition assessment analysis completed by Corollo Engineers indicated that much of the plant's assets have exceeded their useful life. The processes utilized by the plant are labor intensive. The City faces a number of capital intensive choices in the next several years. As this chapter suggests, these choices should be guided with the development of a master plan for the Water Pollution Control Plant.

The first section of this chapter summarizes the history and design of the plant.

1. WATER POLLUTION CONTROL PLANT HISTORY AND OVERALL PLANT PROCESS DESIGN.

The Water Pollution Control Plant was built in phases to meet the ever increasing discharge quality requirements.

- The initial plant was a primary plant that was built in 1956. The primary plant consisted of influent screens, engine driven influent pumps, pre-aeration/grit removal tanks, rectangular primary sedimentation basins and anaerobic digesters. The original influent screens have subsequently been replaced with in-channel grinders (Channel Monsters).
- The secondary oxidation ponds or facultative ponds were added in 1968. There are 400 acres of facultative (unaerated) lagoons with an original design depth of 4.25 feet. Over the years, the ponds have accumulated 1-2 feet of inorganic sludge, so the remaining depth is about 2-3 feet (although portions of the pond have levels of inorganic sludge that break the surface of the ponds). A recent estimate of the cost to dredge the ponds is approximately \$12-\$13 million. Because the oxidation ponds are facultative, they rely on the growth of algae to meet the oxygen demand of the wastewater. Algae concentrations as high as 75-100 mg/l. are common in facultative lagoons, and contribute to effluent suspended solids. As a result, the pond effluent does not meet the secondary suspended solids criteria of 30 mg/l. In order to meet new secondary treatment standards which were implemented in 1972, the plant added tertiary facilities in 1973.
- The tertiary facilities include plastic media trickling filters (called fixed growth reactors, or FGRs) for nitrification (oxidation of ammonia to nitrate), followed by

coagulation with polymer and dissolved air flotation tanks (AFTs) to remove the bulk of the algae and the solids that slough off of the trickling filters; and dual media filters to further remove solids. The filtered effluent is then disinfected with chlorine, and dechlorinated with sulfur dioxide. Under normal operating conditions, the effluent from the AFTs is in the range of 12-25 NTUs, and the effluent from the filters is in the range of 8-10 NTUs.

In the early 1990's California enacted Title 22 regulations with respect to production and use of reclaimed water. In 1999 the plant began to operate the tertiary facilities to produce reclaimed quality water at night. Title 22 requires effluent turbidity of less than 2.0 NTUs. As discussed below, in order to get turbidities of less than 2.0 NTUs, the polymer doses must be increased substantially and flows reduced substantially to best match demand and operational capabilities. Two of the existing chlorine contact tanks were modified to store Title 22 reclaimed water to meet the minimum contact time requirements. There is no capability to automatically reject water that does not meet Title 22 requirements; operators must make this determination and manually adjust flows to reject water not meeting requirements. A new reclaimed water pump station, with a capacity of 8 MGD was installed and the 2.0 million gallon San Lucar reclaimed water storage tank was added in 2002. The City is also continuing to expand the reclaimed water distribution system.

Primary sludge from the primary sedimentation tanks and a portion of the algae float from the AFTs is digested in anaerobic digesters. Currently about 10% to 20% of the algae float is digested, with the remaining portion being returned to the oxidation ponds. The plant's goal is to eventually digest the algae float, in order to lengthen the life of the ponds and produce more digester gas.

Digested sludge is dewatered from 2-3% solids to about 12-16% solids on slotted plastic tile drying beds; this is half that generated by other dewatering methods

such as sludge dewatering presses. After this initial drying step, the sludge cake is moved to an asphalt drying pad, for seasonal air/solar drying to 50-80% solids. The air dried sludge cake is then commercially hauled for beneficial reuse to Merced County. In FY 2004/2005, the plant hauled approximately 1,400 wet tons, at a cost of about \$47,000.

The plant was originally designed to treat food-processing waste. The food canneries closed in 1983. The plant has an average dry weather flow design capacity of 29.5 MGD, and the actual dry weather flows average about 15 MGD. The City is almost completely built-out, so future additional influent flow increases are not expected to be significant. However, from the Water Environment Foundation Manual of Practice 8, the treatment design capacity of a plant should include unit process redundancy. Redundancy generally means that each of the unit processes can have one or more basins out of service at average flow without adversely affecting effluent quality.

2. THE CITY SHOULD PREPARE A MASTER PLAN FOR THE WATER POLLUTION CONTROL PLANT.

The Water Pollution Control Plant faces a number of challenges in the near and the long-term.

The demand for reclaimed water is increasing year to year. Because of the need to reduce the plant flow during reclaimed water production, in order to meet the 2 NTU limit, increasing production of reclaimed water will reduce the overall plant capacity. For example, if the plant is operated at 12 hours per day in reclamation mode at 8 MGD, and 12 hours per day at the full design capacity of 29.5 MGD, the total daily production is about 19 million gallons. This is close to the actual current dry weather flow of about

15 MGD. Therefore, reclaimed water production in excess of about 4 million gallons per day will start to impact the overall plant capacity.

The City recently commissioned an “Asset Condition Assessment” to assess the condition of all significant structural and equipment assets. The report identifies a total of \$20 million in facilities with an economic remaining useful life of less than 10 years. Economic useful life is the time period in which the asset value is greater than the cost of repair. Economic useful life can be shorter than remaining useful life, if the cost to operate and maintain the facility is significantly higher than operation of a new facility.

Of the \$20 million projected replacement costs, about \$4.5 million is allocated to replacement of the primary effluent pipeline from the primary clarifiers to the oxidation ponds.

While the Asset Condition Assessment has examined the existing facilities, it has not examined other potential new facilities that could potentially save replacement costs and considerable future operating costs.

In addition, it is clear that the plant processes are labor intensive as a result of the obsolescent design. Examples of aspects of this obsolescent design are presented below. **These examples are not recommendations for alteration to the present processes utilized by the plant. Those alterations should only occur as a result of the development of a proposed plant master plan. These examples are intended as illustrative – processes that are labor intensive that a master plan could suggest be altered to enhance the cost effectiveness of the operation of the plant.**

(1) Sludge Dewatering.

The most obvious high labor activity is the sludge dewatering process. Use of the slotted plastic drying beds involves manually spreading the digested sludge on the beds by hand moving the distribution hose to get an even distribution across the bed. The sludge is then allowed to air dry for about 3 days, to get to about 12% solids content. After 3 days, the sludge is scraped off of the bed using two front-end loaders. One loader pushes the sludge off the bed, and another catches the falling sludge and transports it to an asphalt pad, for further drying. After the sludge is scraped off of the drying beds, they must be hand washed with a high-pressure hose, to remove residual sludge in the tile slots, in preparation for the next use. The sludge that is transported to the asphalt pad is accumulated in the winter (November to May), and is spread out and harrowed for further drying from June through October. When the sludge achieves about 60% to 80% solids, it is loaded into haul trucks for commercial land spreading. The labor required to dry each bed includes about 2.5 to 3.0 hours to spread the sludge, 2 hours to scrape each bed and 3 hours to wash each bed, for a total of about 8 hours per bed. Each drying bed is filled every 4 days, which includes 3 days of drying and one day to fill and clean. Two full time operators (5 days per week) are required to pour and clean drying beds, and to move the sludge to the asphalt pad. Additional labor is required in the summer to turn sludge on the asphalt pad for air drying.

Many plants of this capacity utilize some form of mechanical dewatering, such as belt filter presses. These facilities can achieve about 20% to 25% solid sludge, which would reduce the volume of sludge required to be air dried by about one-half. It is estimated that a complete belt press dewatering facility would require a half-time

operator, 5 days per week. The only operational requirements are during startup and shutdown with occasional visual checks.

The Environmental Protection Agency identified the following advantages and disadvantages of a belt filter press.

Advantages	Disadvantages
<ul style="list-style-type: none">• Staffing requirements are low, especially if the equipment is large enough to process the solids in one shift. This is the case, for example, at the Napa Sanitation District.• Maintenance is relatively simple and can usually be completed by a wastewater treatment plant maintenance crew. Replacing the belt is the major maintenance cost.• Belt presses can be started and shut down quickly compared to centrifuges, which require up to an hour to build up speed.	<ul style="list-style-type: none">• Odors may be a problem, but can be controlled with good ventilation systems and chemicals, such as potassium permanganate, to neutralize odor-causing compounds. Some manufacturers offer fully enclosed equipment to minimize odors and reduce vapors in the operating room air.• Belt presses require more operator attention if the feed solids vary in their solids concentration or organic matter. This should not be a problem if the belt presses are fed from well-mixed digesters.• Wastewater solids with higher concentrations of oil and grease can result in blinding the belt filter and lower solids content cake.• Wastewater solids must be screened and/or ground to minimize the risk of sharp objects damaging the belt.• Belt washing at the end of each shift, or more frequently, can be time consuming and require large amounts of water. An automatic belt washing system and the use of effluent can minimize these costs.

Operations savings by implementing a mechanical dewatering facility would be about 12 staff-hours a day, 260 days a year, or about 3,120 man-hours per year.

(2) Equipment Ragging.

The plant currently uses a grinder (Channel Monsters) at the headworks to grind rags and other fibrous debris in the raw sewage. The grinders were a replacement for the earlier 1" opening, hand-raked bar screens. The grinders pass some rags, other fibers that have been finely ground tend to reformulate at any obstruction in the flow stream. This has been a problem at many plants across the country, especially with the increased use of disposable paper products. Another common problem with the use of

grinders is the passing of ground plastic products, which end up in biosolids products. Ragging is causing several maintenance-related problems in this plant. The first problem is an accumulation of rags and fibers on the drive sprockets of the chain and flight sludge collector mechanisms in the primary clarifiers. Rags are accumulating between the sprockets and the walls, where they eventually cause the shear pins to break from the increased driving force required.

A second problem with ragging is that they accumulate in a mat on the surface of the anaerobic digesters. This interferes with the gas mixing system, and clogs the supernatant pipe. Ragging will likely also be a problem with the proposed new pump/nozzle mix system. To help with this problem, the plant has recently installed grinders on the waste sludge pipes leading to the digesters.

The operators believe that about 2 man-days per week of maintenance is involved with ragging issues. This includes draining and washing out the primary clarifiers as a preventative maintenance task, as well as dealing with clogs at the digesters. Also, the grinders themselves have been a high maintenance item.

One common approach to ragging problems is to utilize mechanically raked fine screens, with openings in the range of 1/4- to 1/2-inches. This, in turn, requires a way to deal with the increased quantity of screenings, including a high percentage of objectionable organic material. Newer screenings washer / compactors are now commonly used to wash organics out of the screened rags, and to compact the screenings to a dryness that allows for easy handling as solid waste.

It is estimated that maintenance of such a screening facility would average about 1/2 day per week, and would eliminate the excessive maintenance at the primary

clarifiers and digesters. The potential savings is about 12 man-hours per week; or about 624 man-hours per year.

(3) Recycled (Reclaimed) Water Production.

Increasing production of reclaimed water is decreasing the overall plant capacity, because the flows must be reduced during reclaimed water production in order to meet recycled water quality standards. In addition, reclaimed water production is a very complicated and labor intensive operation, because it requires a lot of operational changes be made each day to switch between operating for secondary effluent compliance and operating for Title 22 compliance, and vice versa. The primary reason that these operational changes are necessary is that the plant was not designed to produce reclaimed water. The primary operational changes required to produce reclaimed water include:

- Lower the flow through the tertiary plant to 8 MGD, by storing water in the oxidation ponds.
- Switch to operation of one air flotation tank, and adjust polymer and chlorine doses accordingly.
- Drain two filters, then switch operation using these two filters only.
- Monitor the drop in effluent turbidity. The process takes about 1.5 hours.
- When filter effluent reaches 2.0 NTUs, increase chlorine feed and divert reclaimed water to empty chlorine contact tanks no.1 & 2. Fill chlorine contact tanks.
- Monitor filling of chlorine contact tanks and chlorine feed to insure minimum 5 mg/l residual and 90 minute contact time is met.
- Starts flow to recycle water pumps, start sodium bisulfite dechlorination feed.
- Monitor system performance during recycle water production by tracking effluent turbidity, chlorine residuals and detention times.

The preceding discussion is not intended to be a comprehensive list of all 80 individual steps necessary to produce recycled water, but rather to demonstrate that it is a very complicated, control and monitoring intensive procedure; despite the fact that the plant has made the changes necessary to automate portions of the process. This includes installation of automated gates for the chlorine contact tanks, automated supply to the recycled water pump station, automated gates on the air flotation tanks, automated chemical feed system; as well as numerous PLC programming changes.

Quantifying the additional labor required to switch the plant back and forth daily for recycled water production is complicated by the fact that the operators are doing additional tasks, while monitoring this operation. However, the operators believe that the equivalent of one operator is required for a full shift (8 hours) to set up and monitor recycle water production, and a second operator is required for a full shift to revert back to secondary effluent and cleanup. Recycled water is produced daily during the summer, and approximately weekly during the winter.

The annual labor devoted to this operation is then estimated to be 180 days x 16 hours/day = 2,880 hours - summer + 26 weeks x 16 hours / day or 416 hours - winter 3,296 hours / year.

(4) SCADA System

The existing Supervisory Control and Data Acquisition (SCADA) system consists of “islands” of automation in various parts of the plant. The system is over 90% used for monitoring and less than 10% used for control.

The largest portion of the plant that is semi-automated is the chemical feed systems at the tertiary / recycle facilities. The majority of the systems in the plant use

Opto 22 programmable controllers and software, and are linked with a fiber-optic network. This system is about 10 years old, and is supported by the vendor from their home office in Temecula, California.

Much of the existing SCADA system was installed by the maintenance crews themselves, and in particular, one individual. There is no documentation or “as-built” information, so when this individual retires maintenance of the system is in jeopardy. Others should be cross-trained in SCADA operation, and the system should be documented.

* * * * *

The preceding paragraphs indicate that there are a number of issues that need to be addressed if the City is to cost effectively operate the Water Pollution Control Plant. While the Asset Condition Assessment has examined the existing facilities, it has not examined other potential new facilities and alternative treatment alternatives that could potentially save replacement costs and considerable future operating costs. The City should contract with a consulting engineering firm to prepare a master plan for the Water Pollution Control Plant. The one-time fiscal impact of the cost of preparing this master plan for the Water Pollution Control Plant is presented in the table below. As the exhibit indicates, the preparation of the master plan is estimated to cost approximately \$450,000 in one-time costs.

One-Time Cost Increase	
Recommendation	Annual Cost Impact
Contract for the preparation of a master plan for the Water Pollution Control Plant	\$450,000
Total One-Time Increase	\$450,000

The benefits of upgrading the Water Pollution Control Plant are a number of efficiencies that would reduce the labor requirements. These benefits are clear in comparing the staffing allocated to the Water Pollution Control Plant to the other wastewater treatment plants included in the comparative survey.

- **Operations Staffing.** The project team collected the number of authorized full-time positions for operations staffing (which include supervisors, senior operators, operators, etc.), as follows:

	Sunnyvale	Hayward	Palo Alto	San Mateo
Operations	26	14	24	18

As shown above, Sunnyvale is authorized 26 positions for operations. In comparison, Hayward is allocated 14 positions, Palo Alto 24 positions, and San Mateo 18 positions.

- **Maintenance Staffing.** The project team collected the number of authorized full-time positions for plant maintenance (which include supervisors, mechanics, electricians, etc.), as follows:

	Sunnyvale	Hayward	Palo Alto	San Mateo
Maintenance	9	8	12	6

Sunnyvale is authorized 9 positions for maintenance of its water pollution control plant. In comparison, Hayward is authorized 8 maintenance positions, Palo Alto 12 positions, and San Mateo 6 positions.

- **Lab Staffing.** The project team collected the number of authorized full-time positions for lab personnel (which include chemists, lab technicians, etc.), as follows:

	Sunnyvale	Hayward	Palo Alto	San Mateo
Lab	11	4	8	3

Sunnyvale is authorized 11 positions authorized for the laboratory for its water pollution control plant. In comparison, Hayward has 4 positions, Palo Alto has 8 positions, and San Mateo has 3 positions. San Mateo is not responsible for a water utility.

- **Pre-Treatment.** The project team collected the number of authorized full-time positions for pre-treatment personnel (which include industrial waste inspectors, technicians, etc.), as follows:

	Sunnyvale	Hayward	Palo Alto	San Mateo
Pre-Treatment	8	4.5	6	1

Plant comparisons, like any comparison to other organizations, must be treated with caution. No plant is alike, and each plant faces different operating conditions. In this instance, Hayward and San Mateo are deep-water dischargers, while Palo Alto and Sunnyvale are shallow water dischargers.

However, overall, these comparisons, even to Palo Alto, would indicate that staffing at the Water Pollution Control Plant could be reduced by approximately five (5) positions in comparison to Palo Alto. This reduction is **not** currently possible given the existing nature of the obsolete and labor-intensive processes in use at the Water Pollution Control Plant. The annual fiscal impact of the elimination of approximately five (5) positions would approximate \$0.5 million in annual cost savings. Eliminating these positions would require (1) the development of a master plan for the water pollution control plant, and (2) capital outlay to address the significant deficiencies in the plant design.

3. THE FINANCE DEPARTMENT AND THE PUBLIC WORKS DEPARTMENT SHOULD DEVELOP A FINANCIAL PLAN AND SCHEDULE FOR THE REPLACEMENT OF FAILING INFRASTRUCTURE AT THE WATER POLLUTION CONTROL PLANT.

While the City should move forward quickly to prepare a master plan for the Water Pollution Control Plant, the preparation of this master plan should not delay the replacement of obsolete or failing infrastructure at the plant. These include the sedimentation basins, digesters, and air flotation tanks. The Asset Condition

Assessment clearly identified these assets as failing. Examples of the findings regarding these assets, as portrayed in the Asset Condition Assessment, are presented below.

- The Primary Effluent Channel and the Primary Sedimentation Basins are in poor condition. These structures are severely deteriorated in areas including rust jacking in the support beams, exposed rebar, and spalling concrete on the structure walls.
- The concrete surface deterioration measurements revealed varying degrees of surface deterioration in the Primary Grit and Sedimentation Basins, as well as the Primary Effluent Channel. The Effluent Channel walls were visibly more severely damaged than the roof of the channel. Additionally, the reinforcing steel is exposed and has been substantially corroded. These visual observations were substantiated with the pH stains of the same area, which show that deterioration extends inward to a depth of one-half to one inch in the Sedimentation Basins and up to two inches or more in the interior walls of the Primary Effluent Channel.
- The concrete assets at the Water Pollution Control Plant in the worst condition are listed below:
 - Primary Sedimentation Basins.
 - Primary Effluent Channel.
 - Primary Effluent Pipeline (Reinforced Concrete Pipe).
 - Air Flotation Tank Weir Channels.
- Localized areas in the Primary Sedimentation Basins show severe degradation, including exposed and corroding reinforcing steel. Many of the concrete surfaces are rough from abrasion, and protective coating, where in place, is flaking. Exposed aggregate and hairline cracks are also evident in many of the basins.
- Corrosion deterioration was prevalent in the Primary Effluent Pipeline to the Oxidation Ponds. The 48-inch reinforced concrete pipe along the bank of the ponds is corroding. Rehabilitation repairs will need to be considered in the near future for the Primary Effluent Pipe due to the sole reliance on this asset.
- Many of the assets associated with the Primary Grit Basins, Primary Sedimentation Basins, and Air Flotation Tanks are currently in poor condition. The assets in the worst condition are as follows: Primary Effluent Channel, Primary Effluent Pipeline, Algae Float Pump Station, and the Primary Control Building Pump Control Panel. It is recommended that these assets, and the other high risk assets be repaired or replaced within the next ten years.

A number of assets were determined to have no useful life remaining. These include the primary effluent channel, the primary effluent pipeline, the algae float vault, and some of the primary building electrical assets.

Recommendation: The Finance Department and the Public Works Department should develop a financial plan and schedule replacement or repair of those assets at the Water Pollution Control Plant that are failing or have little remaining useful life.

4. THE NUMBER OF SUPPORT STAFF AT THE PLANT SHOULD BE REDUCED.

The Water Pollution Control Plant is authorized seven support staff. This includes an Administrative Analyst, two Administrative Aides, a Senior Office Assistant, and three Staff Office Assistants.

In conducting the comparative survey of other wastewater treatment plants, the project team documented the number of clerical staff. Not one of these other plants were allocated the extent of support staff at the Water Pollution Control Plant. The allocation of support staff at each of these plants is presented below.

- **Hayward.** The Hayward plant is allocated a Senior Secretary position. This Senior Secretary provides support to three managers and two supervisors. The services provided at the plant that are supported by the Senior Secretary include operations, maintenance, and the laboratory. There are a total of twenty-nine staff allocated to the plant.
- **Palo Alto.** The Palo Alto plant is allocated a Secretary and an Office Specialist. These two staff provides support to four managers and four supervisors. The services supported by the two clerical staff include operations, laboratory, maintenance, and engineering. There are a total of fifty-two staff including two engineering staff allocated to the plant.
- **San Mateo.** The San Mateo plant is allocated a Secretary. This Secretary provides support to a manager and six supervisors. The services provided at the plant that are supported by this Secretary include operations, maintenance, and the laboratory. There are a total of twenty-nine staff allocated to the plant.

Many of the positions allocated to the Water Pollution Control Plant are focused on specific and limited duties that would not appear to provide sufficient ongoing workload. For example:

- One of the two Administrative Aide positions is designated as the Environmental Outreach Coordinator with responsibility for such duties as water conservation and pollution prevention outreach to community including schools, businesses, hotels as required by two NPDES permits.
- One of the three Staff Office Assistants is designated as the receptionist.
- Another of the three Staff Office Assistants is designated as the purchasing specialist.
- The third Staff Office Assistant provides support to the Laboratory and Industrial Waste Pre-Treatment Program.
- The Senior Office Assistant assists with receptionist duties, handles personnel related functions, handles payroll, and is responsible for two monthly reports.
- The second Administrative Aide functions as the office manager and supervises the Senior Office Assistant, and three Staff Office Assistants. The position performs other duties as well such as budget analysis and reporting, maintaining a sewer replacement schedule, audits cell phone usage, etc.
- The Administrative Analyst recommends procedures and processes, performs regulatory reporting, attends intergovernmental meetings, and compiles plant plans.

The roles and responsibilities allocated to these staff are presented in the exhibit following this page.

These roles are too specialized and would not appear to generate sufficient workload to warrant the number of support staff. In addition, none of the other wastewater treatment plants included in the comparative survey had comparable levels of support staffing.

Exhibit 21 (1)

**Roles and Responsibilities
of the Support Staff at the
Water Pollution Control Plant**

Position	No. of Authorized Positions	Roles and responsibilities
Administrative Analyst	1	<ul style="list-style-type: none"> • Recommends procedures and processes for and oversees implementation of the stormwater permit citywide. • Performs WPCP and stormwater regulatory reporting and documentation to various entities including Regional Board, State, etc. • Attends relevant environmental intergovernmental group meetings, as required. • Compiles Plant Plans, as requested. • Reviews regulatory requirements from a variety of regulatory agencies, including the EPA, CalOSHA, the Federal Register, the Regional Water Quality Control Board, the local CUPA, and the Bay Area Air Quality Management District, among others, and recommends compliance strategies and procedures, both for the plant and in some cases for the City.
Administrative Aide	2	<ul style="list-style-type: none"> • Position performing as Office Manager supervises one (1) Sr. Office Assistant and three (3) Staff Office Assistants and conducts other duties such as: <ul style="list-style-type: none"> - Budget analysis and reporting of information to Division's managers. - Maintains Sewer Replacement Schedule "Rental (depreciation) Rates" and collects data for annual Sewer Rate submittals. - Audit cell phone and Division phone monthly bills. - Schedules and coordinates various meetings including ad-hoc, safety, Capital Improvement Program, etc., and frequently acts as Division representative on inter-department committees. - Manage various projects specific to the WPCP such as Office Remodels, File Management System creation, IT Upgrades, coordinate ergonomic evaluations, prepare CCI (Community Condition Indicator measures / statistics). • Position performing as Environmental Outreach Coordinator performs: <ul style="list-style-type: none"> - Water Conservation and pollution prevention outreach to community, including schools, businesses, hotels as required by two NPDES permits. - Development and administration of utility bill inserts. - The work performed by the Admin. Aide for the Environmental Division is mandated in the city's two NPDES permits, the first for plant discharge and the second for storm water discharge.

Exhibit 21 (2)

Position	No of Authorized Positions	Roles and responsibilities
Sr. Office Assistant	1	<ul style="list-style-type: none"> Operates at WPCP front desk and assists with receptionist duties including greeting visitors, answering phones, operating radio and paging systems. Schedules training and conference rooms. Handles personnel-related functions and serves as Personnel Representative for the WPCP to include processing all personnel related documents such as PAF's, Accident Reports, Workers Comp Claims, separation & retirement forms, address changes, WPCP key issuance and out-of-class forms as well as maintaining the WPCP Operator certificates and Personnel files. Handles all payroll-related operations to include documents such as timecard collection and QA/QC, special schedules, jury duty notices, special awards and leave requests. Responsible for two monthly reports, including State Monthly Report and Water Division report, including associated Water Division data entry.
Staff Office Assistant	3	<ul style="list-style-type: none"> Office Assistants assigned to WPCP are cross-trained but generally perform specific roles. One Assistant primarily acts as front desk receptionist: <ul style="list-style-type: none"> Answers phones, dispatches radio calls, routes mail and serves front desk customers. Conducts data entry such as daily nitrification reports, daily operation data sheets, and POPs and Maintenance PMs into MAXIMO software, as needed. Orders office supplies, as requested. One Assistant primarily acts as a purchasing specialist: <ul style="list-style-type: none"> Prepares purchase requisitions for WPCP purchases; handle and track blanket and one-time purchase orders and field purchase orders; reconciles individual purchasing card statements; prepares receiving reports to release payment and conducts follow up on invoice discrepancies/problems. Maintains petty cash and reconciles account each period. Processes membership renewals and training class registrations and maintains database for WPCP; prepares check requisitions for training, publications, certificates, etc., and coordinates travel requests and reconciles travel expense reports. One (1) Assistant primarily acts in the capacity of Lab & Pre-treatment Section Support: <ul style="list-style-type: none"> Acts as Industrial Waste answer point for incoming calls, responds to questions and routes appropriately. Maintains and updates Industrial Waste and Lab computer database files including lab results data, Ph tapes, etc. Assists with correspondence, report generation, permit packages and maintains lab and pre-treatment files to ensure compliance with relevant rules and regulations.

The Water Pollution Control Plant also has a robust level of management staffing with the Environmental Division Manager, Water Pollution Control Maintenance and Facility Manager, Water Pollution Control Operations Manager, and the Lab and Pre-Treatment Manager.

Three of these support positions should be eliminated. The annual fiscal impact of the elimination of these three (3) positions is presented in the table below reflecting salaries and fringe benefits at the top of the range. As the table indicates, the elimination of the three positions would decrease annual salary and fringe benefit costs by approximately \$265,400 annually.

Annual Cost Decrease	
Recommendation	Annual Cost Impact
Eliminate the Administrative Analyst position.	\$109,000
Eliminate two Staff Office Assistant positions	\$156,400
Total Annual Decrease	\$265,400

Recommendation: Reduce the number of support positions allocated to the Water Pollution Control Plant by three positions.

5. MAXIMO SHOULD BE UTILIZED AS THE BASIS FOR A MAINTENANCE MANAGEMENT SYSTEM AS PLANNED.

The Water Pollution Control Plant has already made a significant investment in the development of an automated maintenance management system through its purchase and implementation of MAXIMO. This system is not being effectively utilized. Two previous efforts to effectively utilize the system have failed.

The automated maintenance management system should be developed, as planned by the management of the plant, to enable the management of the plant to manage the maintenance and repair of the plant.

There are a number of steps that need to be accomplished by the Water Pollution Control Plant before the Division can effectively utilize MAXIMO. These steps are presented below.

(1) The Inventory of Equipment the Plant Maintains Needs to Be Quality Controlled.

There are 7,200 pieces of equipment in the system. Approximately 400 pieces of equipment do not belong in the system – the equipment has been taken out of service. At the same time, other equipment has been placed in service but not entered into the system such as tertiary plant, a lot of the electrical system, some of the SCADA, etc.

Recommendation: The equipment in the plant that is maintained by Plant Operators and Plant Maintenance staff should be inventoried and entered into MAXIMO.

(2) The Bar Code Capacity of the System Should Be Utilized.

The bar code feature in MAXIMO is not being used to scan the equipment and record maintenance and repair events.

Recommendation: Bar code the equipment in the plant.

Recommendation: The bar coding capability within MAXIMO should be utilized to record all field maintenance events for specific pieces of equipment.

(3) The System Should Be Utilized to Record All of the Labor Allocated to Maintenance and Repair of Plant Equipment.

While staff of the plant are recording their labor hours on work orders, the staff are not recording all of their labor hours. Plant maintenance staff, for example, are recording only 77% of their available work hours on work orders.

Recommendation: All of the available labor hours of Plant Maintenance staff should be recorded on work orders.

(4) Job Plans Need to Be Developed.

Job plans, describing preventive maintenance procedures, are formally established criteria for determining the need for work, required quality of work, the resources necessary to achieve quality and expected rate of productivity, etc. Maintenance standards are developed for each maintenance activity.

Each job plan should include, at a minimum, six components:

- A brief description of the specific work involved;
- The frequency with which the work should be performed (or the level of service);
- The crew size required for the job;
- The equipment, material, and tools needed;
- The performance expectations for each job or average daily productivity; and
- The recommended procedures for completing the job.

Recommendation: Job plans should be developed for all preventive maintenance procedures.

(5) An Annual Work Plan Needs to Be Developed.

An annual work plan needs to be developed within the automated work order system that will not only guide the Division in prioritizing and performing specific tasks, but will provide the supervisors within the Division with a document with which to hold their staff accountable for results.

The annual work plan estimates the kind and amount of work to be done in the upcoming fiscal year. The Water Pollution Control Maintenance and Facility Manager should prepare the annual work plan as part of the budgetary preparation process. The development of an annual work program takes into consideration two major questions:

- What amount of work is needed to provide the desired levels of service to their customers?
- What required levels of staff, equipment, and materials will be needed to provide that level of service and at what cost?

The annual work plan is prepared once a year and serves as a planning document that established levels of service for the upcoming fiscal year in terms of the specific work activities to be performed, the service levels to be provided, and the allocation of staff in the provision of these services. It provides a clear indication of the relationship between funding and service levels. It also serves as a valuable tool to model trade-offs between different funding levels and the level of service that can be provided.

Recommendation: The Water Pollution Control Plant should prepare an annual work plan for maintenance and repair for the plant, including preventive maintenance and preventive maintenance operating procedures and equipment replacement and modifications.

(6) All of the Stores Inventory Needs to Be Entered into MAXIMO.

There are approximately 1,500 items in the inventory in MAXIMO. There should be 6,000 items in the inventory.

Recommendation: All of the items in the stores that are utilized for preventive maintenance and repair should be entered into MAXIMO.

(7) The Frequencies and Processes of Preventive Maintenance Should Be Evaluated.

Preventive Maintenance and Preventive Operating Procedures cycles and processes have not been re-evaluated in several years resulting in under or over-maintained equipment and the attendant misallocation of personnel resources. These frequencies should be re-evaluated and compared to manufacturer recommendations.

Recommendation: The Preventive Maintenance and Preventive Operating Procedures frequencies and processes should be re-evaluated.

(8) MAXIMO Should be Linked to SCADA.

At present, staff at the plant has to hand collect data (such as hours motors have operated). The plant should establish a live linkage between MAXIMO and SCADA so that this information can be automatically collected.

Recommendation: MAXIMO should be linked to the Water Pollution Control Plant SCADA.

6. THE WATER POLLUTION CONTROL PLANT SHOULD CONSIDER, IN CONSULTATION WITH PLANT OPERATORS, TWELVE (12) HOUR SHIFTS.

The nature of wastewater treatment plant operations demands twenty-four hour, 7-day-a-week, 365 days a year coverage. There are many different and varying work schedules used across the nation for wastewater treatment plants.

The scheduling system used by the Water Pollution Control Plant for plant operators is unusual. There are five (5) teams, and two (2) teams function as floating crews working different shifts each week. This can and has resulted in plant operators assigned to the relief crew working “double backs” in which the plant operator works, for example, 6:30 a.m. to 4:30 p.m. and then returns that same day to work from 10:30 p.m. to 6:30 a.m. In a 24-hour period, the plant operator would have worked twenty (20) hours. In addition, during a seven (7) day period, a plant operator assigned to the relief crew could work a mix of day shifts, swing shifts, and graveyard shifts depending on the leave of the three non-relief crews.

Of the three-wastewater treatment plants included in the comparative survey, two utilized a 12-hour shift, and the other was beginning to experiment with a 12-hour shift. The work schedule utilized by these three plants are presented below.

- San Mateo uses 12-hour shifts with plant operators rotating every four months;
- Palo Alto uses 12-hour shifts with plant operators rotating every three months; and
- The Senior Operators at Hayward have begun to experiment with 12-hour shifts, while the Plant Operators have chosen to retain a 5-day a week 8-hour shift schedule. Hayward does utilize 12-hour shifts to provide operator coverage of the plant on weekends.

The 12-hour shift is utilized extensively in police departments and a significant amount of research has been conducted regarding the impacts of a 12-hour shift. A number of research products are available regarding 12-hour shifts from agencies that have studied shift work, staffing, and compressed workweeks.

The findings of this research indicate that a 12-hour shift has positive and negative impacts. These impacts are summarized below.

- Positive impacts on productivity and the self-reported attitudes of patrol officers were found, and the quality of policing provided to citizens did not decline.
- Among commonly cited advantages of the 12-hour shift were improvement in work output, employee morale, customer and employee relations, and easier recruitment, and corresponding reductions in absenteeism, turnover, tardiness, overtime, and operating expenses.
- Employees indicated that the advantages reportedly outweigh any disadvantages including a larger block of usable leisure time, less commuting time, and greater opportunities for secondary employment.
- In anonymous surveys regarding the 12-hour shift, respondents expressed positive attitudes towards working the three-day work week. In general, most respondents reported that the three-day work schedule increased their daily productivity, created a more favorable attitude toward work, and felt encouraged to do their best. These surveys indicated that the compressed work schedule had no negative effects on the patrol officers' attitudes towards their fellow officers, their work or the Department as an organization.
- Productivity measures for both pre- and post-implementation periods produced mixed results. First, with regard to extra employment opportunities, patrol officers in the compressed workweek were working roughly the same number of extra off-duty jobs per month (1.3 compared to 1.1) as they did in the year prior to the

policy change. This finding suggested that patrol officers are not using the additional time off to work at more off-duty jobs, but were using this time for personal and family activities. Measures found that patrol officers made slightly more felony bookings under the compressed workweek structure than under the traditional workweek, but slightly fewer misdemeanor bookings,

- Rather than fatigue, the most cited negative issue was the perception by officers of poor communication at shift change when returning to duty after four days off. This perception demonstrated the need for improved systematic briefings for officers returning to duty after four days off-duty. Police Departments have begun to address this challenge by using “electronic briefing” where officers get an actual printout or view screen ability to review the previous day’s or shift’s activity.

A possible schedule for a 12-hour shift would be two 12-hour shifts with an A and B team for 6:00 a.m. to 6:00 p.m. (days) and an A and B team for 6:00 p.m. to 6:00 a.m. (nights). A possible schedule is presented in the table below.

Team	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday	Sunday
Days A Team	On	On	Off	Off	On	On	On
Days B Team	Off	Off	On	On	Off	Off	Off
Nights A Team	On	On	Off	Off	On	On	On
Nights B Team	Off	Off	On	On	Off	Off	Off

The teams would work 5 days one week, and 2 days the next. The teams would never work more than 3 days in a row. A total of 7 12-hour days would be worked in 2 weeks for a total of 84 hours worked each pay period.

However, any change in schedule for plant operators should involve the plant operators themselves. Extensive employee participation in the schedule selection and change process is critical to its success.

Recommendation: The Water Pollution Control Plant should consider 12-hour shifts for plant operators in consultation with plant operators.

* * * * *

A comparison of existing versus proposed positions within the Water Pollution and Control Plant is presented in the table below. As the table indicates, the proposed decrease would amount to three positions.

Class Title	Existing Number of Positions	Proposed Number of Positions
Environmental Division Manager	1	1
WPCP Supervisor	1	1
WPCP Maintenance and Facility Manager	1	1
WPCP Operations Manager	1	1
Administrative Aide	2	2
Administrative Analyst	1	0
Senior Environmental Chemist	2	2
Senior Industrial Waste Inspector	1	1
Industrial Waste Inspector	4	4
Environmental Chemist II	4	4
Laboratory/Field technician	5	5
Plant Mechanic	6	6
Senior Plant Mechanic	1	1
Senior WPCP Operator	5	5
WPCP Operator	18	18
Senior Office Assistant	1	1
Senior Storekeeper	1	1
Staff Office Assistant	3	1
Utility Worker	1	1
WPCP Operator in Training	1	1
TOTAL	60	57

10. SOLID WASTE

10. SOLID WASTE

The City has been a leader in recycling services in this State. This is evident in the choices that the City has made to reduce its operating costs for solid waste collection and recycling. The most important choice was to establish a regional materials recycling facility (MRF) sharing the expenses of operating this facility with Palo Alto and Mountain View. In 2004-05, the total expenditures, net of revenue, totaled \$15,160,323. Sunnyvale paid 49% of this cost while Mountain View paid 27.1% and Palo Alto paid 23.9%. These two cities paid \$8.036 million of the operational costs for the MRF.

The City is one of few in the nation that owns its own MRF and contracts for its operation. Nationally, 65% of processing capacity is privately owned and operated, 20% is publicly owned and operated, and 15% is publicly owned and privately operated.

The City was the first in the State to adopt a Source Reduction and Recycling Element to its General Plan; the City adopted the element in 1991.

The City has increased its diversion rate from 18% in 1990 to 56% in 2005.

However, the diversion rate has largely been static over the past six years.

The City Council has a pending Zero Waste study issue. Many policy issues that are discussed in the Solid Waste Sub-element and the State-required Source Reduction and Recycling Element (both of which are Council-adopted documents) are contingent measures to be used only if the City fails to achieve 50% diversion.

1. IF THE CITY DOES NOT SUBSTANTIVELY EXPAND ITS RECYCLING GOALS AND PROGRAM, ONE OF THE TWO POSITIONS ALLOCATED TO RECYCLING EDUCATION SHOULD BE ELIMINATED.

The Solid Waste Division allocates two positions to a number of tasks including recycling education. The specific hours allocated among the many work activities performed by these two positions are presented below.

Activity	Admin. Aide Hours (budgeted)	FTE (if 1850 hours = 1 FTE)
Single Family Waste Reduction/Recycling	880	0.48
Multi-Family Waste Reduction/Recycling	656	0.35
City, Schools Waste Reduction/Recycling	818	0.44
Business Waste Reduction/Recycling	805	.044
Research, Respond to Waste Reduction/Recycling Laws, Regulations, etc.,	206	0.11
Total	3,365	1.82

One of these positions provides public education services, while the other provides commercial recycling services. The specific responsibilities of these two positions are portrayed below.

- One position performs as a public education specialist conducting duties such as:
 - Creation of recycling and solid waste program flyers, mass mailings, website content and other publications for distribution to general public;
 - Promotion and presentation of home compost program classes;
 - Coordination of involvement in special events such as Earth Day;
 - Coordination with City's refuse collection contractor on development and execution of annual publications plan; and

- Coordination with County and regional joint outreach programs regarding messages, media, etc.
- The other position, performing as commercial recycling specialist, conducting such duties as:
 - Planning, troubleshooting and promoting recycling services provided at City facilities, schools, and institutions;
 - Outreach to commercial and industrial business customers to increase their diversion of waste through source reduction and recycling and to increase their use of recycled products;
 - Through Special Event Permit process, coordinates recycling and solid waste services provided to events;
 - Oversees operations of cardboard collection service provided by Specialty (hauling contractor);
 - Interfaces with the County Green Business Program; and
 - Conducts special studies (e.g. CO² Emissions Reduction Study Issue).

The City of Sunnyvale has surpassed the requirements of Assembly Bill 939, known as the Integrated Waste Management Act. This act was passed because of the increase in waste stream and the purported decrease in landfill capacity. AB 939 mandated a reduction of waste being disposed: jurisdictions were required to meet diversion goals of 25% by 1995 and 50% by the year 2000.

The City has made multiple efforts to enhance its recycling program including:

- Distribution of stacking bins to enhance the existing curbside recycling program for single-family residential housing in 1991;
- Initiation of the City-wide garage sale in 1991;
- Collection of cardboard from businesses;
- The start of a commercial recycling information and referral service in 1992;
- The commencement of backyard compost training and bin distribution in 1993;

- The beginning of the collection of yard waste from single family homes in 1994;
- The construction and operation of the SMaRT materials recovery facility in 1994;
- The long-term lease of landfill area for asphalt and concrete recycling in 1995; and
- The beginning of the collection of recyclables from multi-family residents in 1996.

While the City has successfully met the requirements of Assembly Bill 939, the tonnage diverted through the City's recycling program has been largely static over the past six years. The tonnage diverted has ranged from a low of 25,442 tons in 1999-00 to a high of 27,091 tons in 2003-04. The tons collected in 2004-05 were 5% more than the tonnage collected in 1999-00 (see the table below).

Source of Diversion	1999-00	2000-01	2001-02	2002-03	2003-04	2004-05
Single family curbside	6,914	6,780	6,944	7,438	7,616	7,149
Multi-family collections	2,275	2,175	2,068	1,896	1,796	1,628
Single family yard waste collection	13,050	12,819	13,725	14,748	14,598	14,847
Commercial cardboard collection	3,085	3,452	2,885	2,845	3,060	3,048
Other	118	136	68	27	22	52
Tonnage	25,443	25,362	25,690	26,954	27,092	26,724
Change (+/-)	NA	-0.3%	1.3%	4.9%	0.5%	-1.4%

Single-family residences generate 82% of the tonnage of solid waste that is recycled by the City. Multi-family dwellings generate 6%, and commercial businesses generate 11%. While single-family households generated 7,149 tons of recycled materials in 2004-05 (excluding yard waste), multi-family dwellings generated 1,628 tons or 23% the diversion of single-family residences. Yet there are somewhat more multi-family dwellings in Sunnyvale than single-family dwellings (excluding mobile homes). In addition, business generates twice as much waste as households, but 3,048 tons of cardboard was collected from businesses in 2004-05.

The City is spending somewhat more for its recycling program than the national average. On average, cities spend approximately \$1 to \$1.25 per capita per year in

recycling education. Sunnyvale is spending approximately \$1.56 per capita or 25% to 56% more than this national average. If the Solid Waste Division matched this national average, it would allocate approximately 1.3 to 1.6 staff to recycling. This would indicate that the City of Sunnyvale would need more than one position for recycling to meet these per capita averages, but not two full-time positions.

Recommendation: If the City does not substantively expand its recycling program and goals, the position allocated to commercial recycling education should be eliminated.

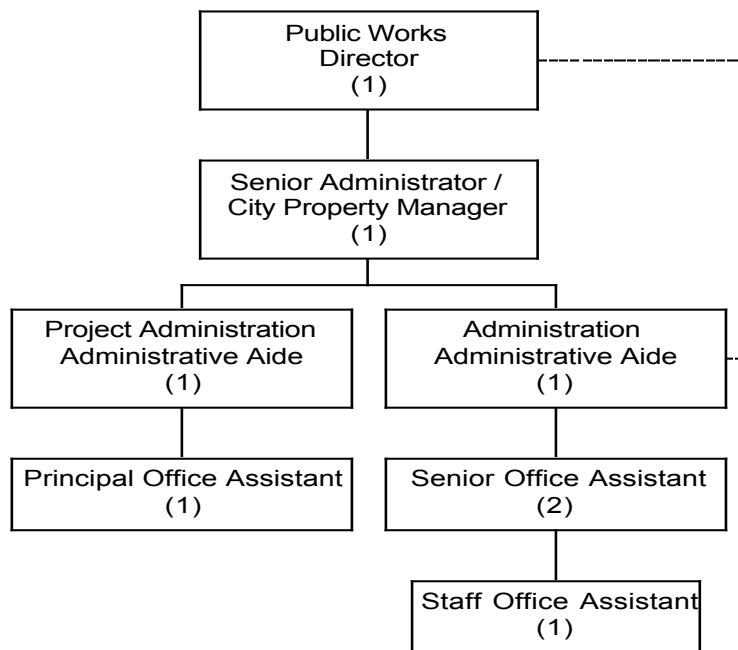
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Overall, the project team is not recommending an increase or a decrease in the level of authorized staffing for the Solid Waste Division.

11. ADMINISTRATION

11. ADMINISTRATION

This chapter presents an analysis of the Administration Division. The Administration Division is responsible for the overall management of the Public Works Department including property management. The Senior Administrator/Property Manager is responsible for the acquisition, lease and sale of City-owned properties. The organization of this Division is presented in the chart below, which also includes the number of authorized positions for each classification.



The six support staff provides support to a number of divisions. This includes the Engineering Division (14 positions), the Traffic and Transportation Division (7 positions), the Solid Waste Division (9 positions) and the Administration Division (2 positions). One Administrative Aide and one Principal Assistant actually serve in more of a technical capacity in support of the design and construction sections of Engineering. The remaining three positions support the administration, engineering, traffic and solid waste

technical staff in the areas of customer service, records management and purchasing/accounting. Altogether, these six support staff provide support to a total of thirty-two (32) positions.

1. THE DEPARTMENT SHOULD DEVELOP AN INFORMATION TECHNOLOGY STRATEGIC PLAN.

The near explosive expansion of technology, the advent of PDA technology and applications, and increasing demands for technology in the field to support field operations – all part of the information revolution – intensify the need to look at a full array of information technologies (data, voice, image) and the needs of the Public Works Department over the next several years.

The existing information technology strategic plan developed by the Information Technology Department for the City as a whole outlines a number of strategies, but does develop specific details regarding how the Public Works Department should address the numerous information technology challenges that it faces such as the use of MAXIMO at the Water Pollution Control Plant, the acquisition of a COTS maintenance management system for the Field Services Division, the expanded development of GIS, the development and updating of computer models for the water distribution systems and the wastewater collection system, etc.

These are all reasons to develop an information technology strategic plan: to focus scarce resources where they will have the greatest and most beneficial impact. The information technology (IT) strategic plan should have a three-year horizon, but should be updated every fiscal year.

The Department should utilize the following approach in developing their information strategic plan.

- **Briefly describe the major business challenges and how the Department plans to use information technology (IT) to contribute to overcome these challenges.** These include such challenges as scarce staff resources, the absence of preventive maintenance, pressures to reduce unit costs, etc.
- **Describe the primary business objectives for the next three years (or for that time frame for which they are formally established).** This serves as the point of reference for IT strategies and tactics required in the Departmental IT plans.
- **Describe the Department's IT strategies to support the business functions of the Department.** An IT strategy is a statement of direction, approach, and/or method as to how the Department will apply IT to achieve its business functions.
- **Describe the Department's IT standards.** The Department should describe the IT standards that it will utilize as the basis for its IT strategies such as standardizing on modern Structural Query Language (SQL) relational DBMS.
- **Describe all Department IT projects which will have an estimated development and implementation cost (not operations) of \$25,000 or more and that will be submitted to the City Council for approval to begin in, or continue into, the next three fiscal year(s).** A project is defined as an expenditure of resources to build and implement an IT based product or service or the capability to provide a IT based product or service. Examples of such activities involve software applications, IT equipment, IT training and planning. Include all IT projects meeting this threshold regardless of source of funds or funding category.
- **The Department should develop a plan for IT expenditures requirements over the three-year plan.** The annual budget should account for the total cost of Departmental IT ownership. The budget and the Department's IT plans should include the following costs:
 - Current and on-going hardware acquisition and maintenance;
 - Infrastructure acquisition and maintenance;
 - Software acquisition and maintenance; and
 - Staff training.

In developing this information technology strategic plan, the Department should take the following steps:

- The Department should establish a technology committee consisting of five to seven staff that includes representation of managers from all divisions. The technology committee should conduct an assessment to identify department and division-level technology needs, as well as barriers to non-use.
- Based on the needs assessment, the technology committee should recommend Departmental technology priorities, review and make recommendations on major information systems projects for the Department, and make recommendations for, and monitor the implementation of, the Department technology plan.

Recommendation: The Public Works Department should develop an information technology strategic plan with a three-year time horizon, and update this strategic plan annually.

Recommendation: The Public Works Department should establish a technology committee consisting of five to seven staff that includes a representation of managers from all divisions.

2. THE ROLE OF THE CITY PROPERTY MANAGER/SENIOR ADMINISTRATOR SHOULD BE CLARIFIED.

The City Property Manager/Senior Administrator fulfills a number of essential roles for the Public Works Department, including supporting the Public Works Director and representing the Department in areas such as finance/budget, health and safety, floodplain management, disadvantaged businesses and records management. The position is also responsible for property management duties including the following:

- Negotiating with property owners, real estate professionals, and other having an interest in real estate proposed to be purchased, sold, or leased by the City;
- Supervising and reviewing appraisals to establish value for specific City purchases and sales;
- Preparing deeds, contracts, easements, escrow instructions and other documents necessary to purchase, lease, or sell real property;
- Managing City rental units, including rent setting, enforcement of terms and conditions of agreement, coordinating property maintenance, etc.;
- Advising other departments on various types of real estate transactions and issues; and

- Gathering real property related statistical data and compile reports, as necessary.

However, the City Property Manager/Senior Administrator does not manage all of the City's property. City-owned property in the downtown area is managed by Redevelopment. The Housing Division manages some rental units, as does the Parks and Recreation Department and the Solid Waste Division.

The responsibility for managing all of the City's property should be clearly placed with the City Property Manager/Senior Administrator. This clarification should be made in a written policy.

In addition, the City Property Manager/Senior Administrator should work with the Finance Department to develop standard real property contracts and a system to track each property.

Recommendation: The responsibility for managing all of the City's property should be assigned to the City Property Manager/Senior Administrator, and this responsibility should be clarified in a formal city-wide policy.

Recommendation: The City Property Manager/Senior Administrator should work with the Finance Department to develop standard real property contracts and a system to track each property.

3. THE PUBLIC WORKS DEPARTMENT SHOULD DEVELOP, AS PLANNED, A FORMAL SUCCESSION PLANNING STRATEGY.

The City of Sunnyvale faces a likely wave of retirements in July 2007 as a result of changes to the City's retirement system. The estimated number of employees that would retire in the Public Works Department ranges as high as 50%. The retirement of one half of its workforce will pose significant challenges in the replacement of these valuable, experienced employees.

The development of a succession planning strategy would address this challenge, particularly for essential positions, such as plant mechanics, equipment mechanics, and engineers, to ensure that there are highly qualified people in all positions, or that strategies have been developed to bridge between the departure of the incumbent and the hiring of his or her replacement.

There are a number of keys to the successful succession planning by the Public Works Department.

- **Realize the retirement wave is coming.** While some staff that could retire may remain after July 2007, the Department should not plan on it. The Department should identify those employees that will be eligible to retire in July 2007 as the potential pool of retirements.
- **Map out the key positions for the Department that possess hard-to-replace knowledge, skills, abilities and aptitudes that are vital to the Public Works Department.** Not all positions are hard-to-replace or vital. The Department should conduct a realistic assessment of the key skill positions that will be extremely difficult to replace based upon previous recruitments or should identify those programs in which a significant proportion of employees could potentially retire.
- **Identify who has these skills and where they will come from in the future.** The Department should consider overfilling some critical positions to provide a transition.
- **Consider encouraging key employees to delay retirements.** The Department, upon completion of the assessment of the critical positions, should meet with employees to discuss their retirement plans and identify whether these employees would be willing to delay retirement (and under what circumstances).
- **Offer part-time schedules to retirees.** One of the ways the Department could deal with the talent drain issue is to have retirees work 10 or 20 hours a week. This should be part of the same discussion with employees regarding possible delay in retirement.
- **Assess training needs.** There is likely a pool of potential employees within the Department that could promote into these vital positions with the right training. The Department should begin now to identify those potential employees, identify potential training needs, and begin the training of those employees in advance of July 2007.

- **Develop recruitment plans for these vital positions.** The challenge will require aggressive recruitment – more than just issuing vacancy announcements. The Department should work with the Human Resources Department to develop recruitment plans for these vital positions so that recruitment including outreach activities can be initiated in advance of July 2007.

The Department faces a significant challenge in 2007 if those potential candidates for retirement actually retire.

Recommendation: The Public Works Department should work with the Human Resources Department to develop a succession plan.

4. THE DEPARTMENT SHOULD EVALUATE OPPORTUNITIES TO STREAMLINE SIGNATURE AUTHORITY FOR CITY FORMS.

The exhibit following this page presents the signature authority for the Public Works Department for various City forms. As the exhibit indicates, in some instances the extent of approvals required for City forms is extensive. For example:

- A construction payment form requires the signature of the inspector, the senior inspector, the senior engineer, the administration manager, and the assistant director if the amount exceeds \$50,000 or represents a politically sensitive project;
- A project completion notice requires the approval of the inspector, the senior inspector, the senior engineer, the assistant city engineer, and the director; and
- A one-year inspection report requires the approval of the inspector, the senior inspector, the senior engineer, and the assistant city engineer.

The Public Works Department should evaluate the signature authority required for these forms to identify opportunities to streamline approval authority. The Department should delegate authority to program managers as much as possible, such as senior engineers for construction progress payments, and hold these managers accountable.

Recommendation: The Public Works Department should evaluate signature authority for City forms, and streamline that authority by delegating authority and responsibility to program managers as much as possible.

Exhibit 21 (1)

Public Works Department
Signature Authority for City Forms

Document Name	Employee /Initiator	Inspector	Sr. Inspector	Sr. Engineer	Supv.	Mgr.	Admin. Mgr.	Asst. City Engr.	Asst. Dir.	Director
Finance Dept Forms										
Construction Payment Form		1	2	3			4		5*	
Consultant Payment Form				1			2	3	4*	
Preauthorization Form				1				2		3
Contract Change Orders										1
One Year Inspection Report		1	2	3				4		
Project Completion Notice		1	2	3				4		5
Purchase Requisition-General	1					2				3**
Check Requisition	1					2				3**
Travel Authorization	1					2				For Mgrs
Petty Cash Form	1					2	For Mgrs			
Invoice Request	1					2				
Statement of Travel Expense	1					2				For Mgrs
Weekly Timecard	1				2	3				
Accounting Corrections	1					2	3			
Receiving Reports	1					2				
Human Resources Forms										
Personnel Action Form					1	2				3
Recruitment Request Form					1	2				3
Personnel Separation Form					1	2				3

Exhibit 21 (2)

Public Works Department
Signature Authority for City Forms

Accident/Injury Review Form	1				2	3				4
Leave Request Form	1					2				
Employee POA	1					2				3
Manager POA						1				2
Employee POR	1					2				3
Manager POR						1				2
Employee Suggestion Award						1				2
Parks and Rec Forms										
Building Svcs Work Order	1					2				
New Equip/Vehicle Request						1				2
Information Tech Forms										
IMS Service Request						1				
Printshop Request	1					2***				
Miscellaneous Forms										
Request for Legal Services	1									
Office Supplies Order Form	1					2***				

* Assistant Director signs this document when the requested dollar amount exceeds \$50,000 or if payment is going into the contingency amount or is politically sensitive.

**Director signs this document when the requested dollar amount exceeds \$20,000.

***Manager signs if amount exceeds \$500 or special order items involved.

****Admin Aides or Admin Mgr will conduct financial audits prior to payment.

5. THE CITY SHOULD ENABLE APPROVAL OF INVOICES ONLINE USING THE CITY'S AUTOMATED FINANCIAL SYSTEM.

The City has and continues to invest significant amounts of funds in its automated financial system. Wherever possible, the City should seek to leverage that investment to streamline business processes.

City staff can approve purchase requisitions online. However, the City has not enabled the approval of invoices online. There are a number of benefits in moving towards approval of invoices online.

- **Enhanced Efficiency.** The ability to process invoices online would reduce the extent of manual processing, duplicate data entry, development of duplicate financial records, and enhance the efficiency of staff.
- **Quicker Close.** Invoices require at least two approvals and then require accounts payable to process the approved invoices for processing. The invoice can be delayed and accounts payable is thus unable to process the transaction. This creates confusion at closing because the City may not have an accurate count of outstanding invoice liabilities. Incomplete accruals may understate expenses and thus overstate available expenditure authority.
- **Reduced Invoicing Errors.** Duplicate payments can be the result of the time required to process the accounts payable process. If a city is slow to process invoices, it can get invoiced twice by vendors and pay both without realizing it.

The Public Works Department should work with the Finance Department to enable approval of invoices online using the City's automated financial system.

6. THE PUBLIC WORKS DEPARTMENT SHOULD EVALUATE THE EXTENT AND QUALITY OF DEPARTMENTAL PERFORMANCE MEASURES, ACTIVITIES, AND SERVICE DELIVERY PLANS.

The City of Sunnyvale has a long history of the application of goals, objectives and performance measures and their integration with the City's budget and financial system. It has been a model for other cities throughout the country and the world. The City has continually refined this system. The system enhances accountability and the transparency of the services it delivers to its residents.

However, there is a necessary balance between the amount of time required to develop, report and monitor these measures and the amount of staff effort required. In the past year, the Public Works Department has significantly expanded the extent of service delivery plans (SDP) and activities as indicated in the table below.

Prog. #	Program Name	Measures	#SDPs	#Activities
115	Transportation and Traffic Services	11	5	31
117	City Streetlight System	8	6	21
118	Pavement Operations	14	8	66
216	Roadside Median ROW Services	12	3	48
217	Concrete Maintenance	9	5	20
218	Street Tree Services	11	4	26
254	Parking Distr. Landscaping	8	1	21
255	Parking Distr. Parking Lots	6	4	17
302	PW Mgmt & Support Services	6	2	4
303	City Property Management	7	5	9
306	Engineering Services	7	3	21
307	Capital Project Administration	9	3	12
313	Water Supply & Distribution	10	8	54
323	Solid Waste Management	9	3	19
324	SMaRT Station	7	1	7
344	Wastewater Management	17	6	71
345	Sanitary Sewer Collection System	13	6	39
343	Stormwater Collection System	8	5	27
763	Vehicles & Motorized Equipment	9	3	16
19	Department Totals	181	81	529
13	Old Department Totals	233	40	366
6	Difference	-52	41	163
46%		-22%	103%	45%

As the table indicates, the Department expanded the number of SDP's by 103%, and the number of activities by 45% in the 2006-07 budget. The amount of time required to develop and report this data is not insignificant according to the middle managers that the project team interviewed. The project team questions the value of 71 activities and 39 activities for the sanitary sewer collection system, and 48 activities for roadside median and right of way services. A review of these measures for these programs appears to include a number of meaningless or low value activities, SDP's.

In addition, recent performance audits of these performance measures by the Finance Department raises a number of issues regarding the performance measures.

These issues include the following:

- Some programs are recording and calculating reported results through the manual transmission of data from paper source documents into Excel spreadsheets. Some programs are still tracking information manually with paper documents only.
- Measures tend to be transient. Some measures use a 3-year average as a target, but recent audits have shown that many of these measures change or are deleted before a 3-year average has been established.
- Calculation and filing systems in many cases do not allow the auditor from the Finance Department to reproduce results. In many programs, original source documents were tallied onto spreadsheets and then dispersed and filed by individual vendors or grouped by location. This process made reproducing and/or verifying reported results problematic.

The Public Works Department has an important management resource in the City Property Manager/Senior Administrator. It should utilize this resource to work with program managers in the Public Works Department to refine the performance measures and to establish systems to enhance the reliability of the data collected.

Recommendation: The Public Works Department should evaluate the extent and quality of measures, activities, and SDP's.

Recommendation: The City Property Manager/Senior Administrator should work with program managers to refine performance measures and establish systems to enhance the reliability of the performance measurement data collected.

7. THE DEPARTMENT SHOULD DEVELOP A TRAINING PLAN FOR ITS EMPLOYEES BASED UPON A NEEDS ASSESSMENT.

Development and execution of a well-conceived training plan is the cornerstone upon which a successful training program rests. A training plan exists on at least two levels:

- **Department-wide** – encompassing the entire Department and covering a relatively elastic time period of several years (this is a reflection of a strategic plan or overall set of goals).
- **Division-specific** – describing divisions within the Department and covering a discrete fiscal or calendar time frame (this is a reflection of concrete, measurable goals and objectives).

In developing a training plan, the Department is linking the skill development of its employees to its own performance measures and outcomes and an assessment of its strengths and weaknesses in terms of its ability to achieve those outcomes. The Department should strive to achieve the best practices presented below.

The Department provides a comprehensive staff development program to achieve and maintain high levels of productivity and employee performance.
<p>The Department:</p> <ul style="list-style-type: none"> • Conducts orientation programs for all new employees, and includes information on Departmental procedures, performance expectations and evaluations, training and career opportunities, and personnel policies regarding such issues as absences, leave approval and tardiness; and • Has a Department-wide training program and maintains training records on each staff member.
The Department has solicited and used input from supervisors and employees hired within the last three years to establish, revise, or affirm its new employee orientation programs, including content and approach.
The Department has mentoring programs, as appropriate, for new employees.
The Department plans training programs based on Department-wide needs assessment that includes input from employees and their supervisors at least every other year.
The Department provides a comprehensive staff development program to achieve and maintain high levels of productivity and employee performance.
The Department establishes and implements formal staff development plans to provide on-going training for employees. The responsibility for training classes for employees may be delegated to a division within the Department (i.e., Fleet Management employees may be trained by the Fleet Management), but that unit provides the Departmental Advisor with copies of annual plans, training schedules, and attendance rosters.
The Department has procedures to evaluate individual in-service training activities, including employee feedback, and to evaluate the extent to which annual training efforts have met identified long-term training objectives.
The Department provides a comprehensive staff development program for managers and supervisors.
All managers and supervisors have completed (or anticipate completing within the current fiscal year) management and supervisory training programs.
The Department has a process for identifying employees with the potential for employment in managerial and/or supervisory positions, and for providing training to them prior to appointment to a managerial and/or supervisory position.
The training program for new managers includes a mentoring component.

Recommendation: The Public Works Department should develop a Department-wide training plan based upon a needs assessment of its employees.

Recommendation: The City Property Manager/Senior Administrator should be assigned responsibility for providing training and technical support to the Department's managers in the development of the training plan.

12. PLAN OF ORGANIZATION

12. PLAN OF ORGANIZATION

This section of the report analyzes the plan of organization for the Public Works Department. Previous chapters analyzed the plans of organization for the divisions when these revisions only affected the division. This chapter analyzes organizational issues that transcend divisional boundaries. To evaluate the plan of organization, the project team conducted the following analytical tasks:

- Determined the specific responsibilities of each managerial and supervisory position within the Department, and evaluated each in the context of assigned responsibilities and organization;
- Evaluated the extent to which the organizational structure of the Department and the services it delivers are organized around the clients it serves and the competencies of its staff;
- Reviewed the number of managerial and supervisory layers within the Department and opportunities to flatten the organization.

The first section describes the organizational principles utilized in this analysis.

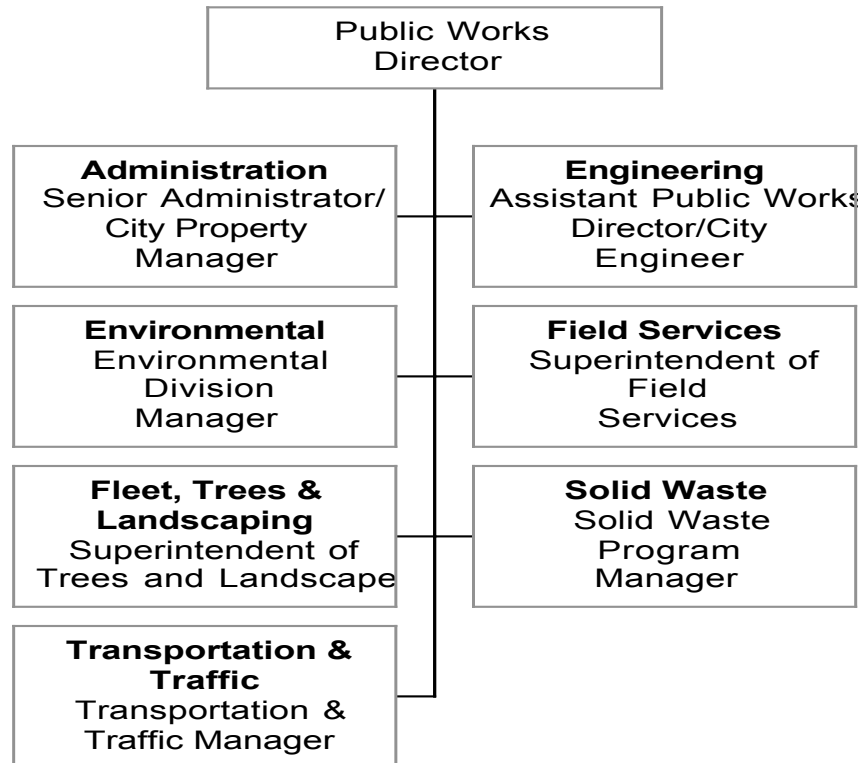
1. **THE CURRENT PLAN OF ORGANIZATION FOR THE DELIVERY OF MAINTENANCE SERVICES IMPEDES EFFECTIVE SERVICE DELIVERY AND MANAGEMENT ACCOUNTABILITY.**

Well-managed organizations are designed to deliver services to customers and to maximize management control over service delivery. Several measures can be utilized to evaluate the effectiveness of an organizational structure in meeting these objectives. The project team evaluated the organization of maintenance services on the following factors:

- **Maintenance services are organized on a ‘form follows function’ basis** with a clear, distinct and comprehensive sense of purpose or mission for each functional area. Functions are grouped consistent with their periodic interaction, common planning and scheduling systems, delivery of services which are linked in some way, etc., resulting in functional cohesion.

- **The organizational structure fosters accountability.** The organizational structure fosters accountability among management and supervisory staff. The accountability is effectively delegated from middle management to first line supervisors to enable the assignment of the responsibility for accomplishing goals, objectives, and performance at the most appropriate level.
- **The plan of organization enhances communication and coordination.** The number of handoffs/exchanges required among different units or staff providing service to the public or internal clients is minimized. The structure enhances shared knowledge and understanding among units and staff. The channels of communication are clear and consistent.
- **Staff resources are utilized efficiently.** The plan of organization minimizes administrative overhead. Workload can be distributed/shared to maximize the productivity of staff through peaks and valleys and offer cross-functional capabilities (e.g., to balance workload of tree maintenance and concrete maintenance, etc.). Processes can be standardized to enhance the efficiency and customer responsiveness of services (e.g., the development review process).
- **The potential of human capital is enabled.** The plan of organization enhances career development opportunities, training and recruitment and retention.
- **The quality and responsiveness of services provided to customers is improved.** The plan of organization enables staff to provide better service to the public in terms of cycle times, user friendliness, performance management, quality control, and consistency of the application of policies and procedures.
- **Each unit in the Public Works Department has been placed within the Public Works Department in accordance with its importance in achieving Department-wide goals.** Divisions have not been placed too high in the organizational structure or too low relative to their importance.
- **The span of control for any manager or supervisor does not exceed the number which can be feasibly and effectively supervised.** The trend is to widen span of control. In the last decade, the introduction of information technology spurred the trend toward wider spans of control.
- **The number of layers of management does not result in a tall, narrow configuration for the Public Works Department.** Organizations with many layers are associated with centralized decision-making. Flatter organizations tend to have decentralized decision-making, as authority for making decisions is given to the front line employees.

The current administrative plan of organization is presented below.



The paragraphs below provide an evaluation of the organizational structure of the Department.

- **The span of control for the Public Works Director is appropriate.** The Public Works Director supervises seven staff. The span of control is not too broad or too narrow.
- **The staff allocated to infrastructure maintenance have been assigned to two different divisions.** One of these positions – Fleet, Trees, and Landscaping – is responsible for some aspects of the City's infrastructure including sidewalks, street trees, and landscaped medians. The other division – Field Services – is responsible for other aspects of the City's infrastructure including water distribution system, wastewater collection system, street network, stormwater collection system, etc.
- **The class titles utilized for middle managers and first line supervisors in maintenance services confuse their accountabilities.** Currently, the Department uses a class title of Public Works Supervisor for the middle manager that reports to the Superintendent of Field Services, and Urban Landscape Supervisor for the middle manager that reports to the Superintendent of Trees and Landscape, and Senior Public Works Leader for the first line supervisor that reports to the Public Works Supervisor or the Urban Landscape Supervisor.

The organizational analysis of Public Works Department indicates that the Department is well organized much like its peers, but that minor adjustments are necessary.

2. THE MANAGEMENT AND SUPERVISORY CLASSIFICATION STRUCTURE OF THE FIELD SERVICES DIVISION AND THE FLEET, TREES, AND LANDSCAPE DIVISION SHOULD BE MODIFIED.

Currently, the Field Services Division uses a class title of Public Works Supervisor for the middle manager that reports to the Superintendent of Field Services, and Senior Public Works Leader for the first line supervisor that reports to the Public Works Supervisor. The Fleet, Trees, and Landscape Division uses an Urban Landscape Supervisor for the middle manager that reports to the Superintendent of Trees and Landscape, and Senior Public Works Leader for the first line supervisor that reports to the Public Works Supervisor.

The Public Works Supervisors and Urban Landscape Supervisors are middle managers, not first line supervisors. This classification is part of the management employee group as identified in the City's salary plan. The classification description for the classifications states that:

- Under general direction from the Superintendent, Public Works Supervisors and Urban Landscape Supervisors manage one or more of the programs in the Division.
- This is a management level classification in which the incumbent plans, organizes, directs, and coordinates the activities of one or more programs within the Division.

The Senior Public Works Leaders are first line supervisors. The classification description for the classification states that:

- Supervises the activities of lead personnel, field crews and individuals in the maintenance and repair of public utilities including, but not restricted to, streets, traffic signs and markings, streetlights, storm drains, sewers and water systems.
- Incumbents in this classification receive assignments from the managerial classification of Public Works Supervisor. They supervise members of the lower-rated classifications of Public Works Leader, and/or Water Meter Repair Leader and other classifications assigned to the Department of Public Works. They require a greater degree of technical knowledge than those in the lower classification, and are called upon to exercise greater degrees of responsibility and judgment.
- Supervises, monitors and coordinates the activities of crew engaged in maintenance, construction, or repair of streets, traffic signs and markings, streetlights, sewers and storm drains, water distribution systems, water metering systems, and other similar public works facilities.

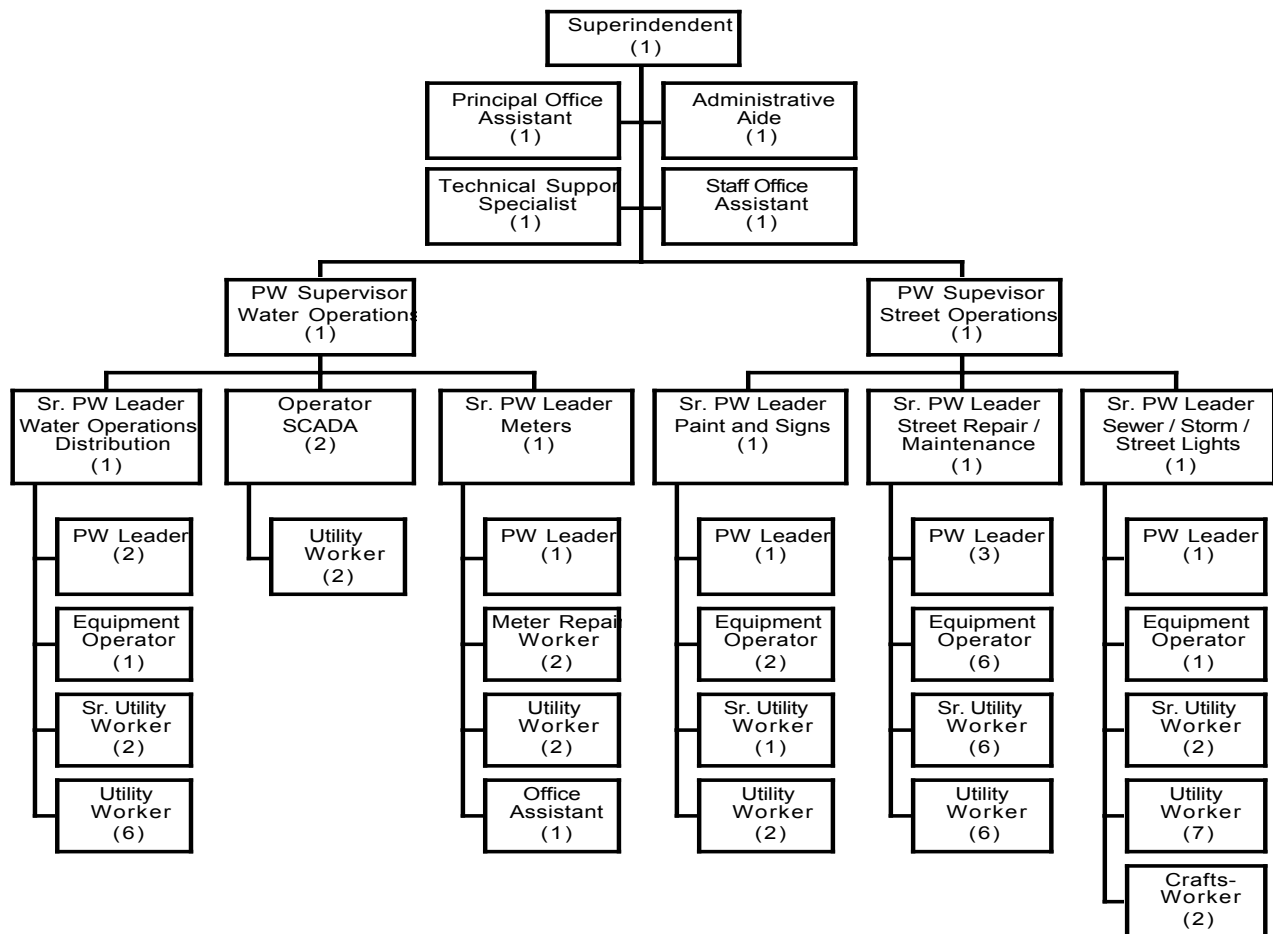
The class titles should be modified. A salary adjustment is not recommended as the City already recognizes that these are middle management and first line supervisory positions.

Recommendation: The class title of Public Works Supervisors should be modified to Public Works Managers.

Recommendation: The class title of Senior Public Works Leaders should be modified to Public Works Supervisors.

3. THE PLAN OF ORGANIZATION FOR THE FIELD SERVICES DIVISION SHOULD BE MODIFIED.

The present administrative plan of organization for the Field Services Division is presented below.



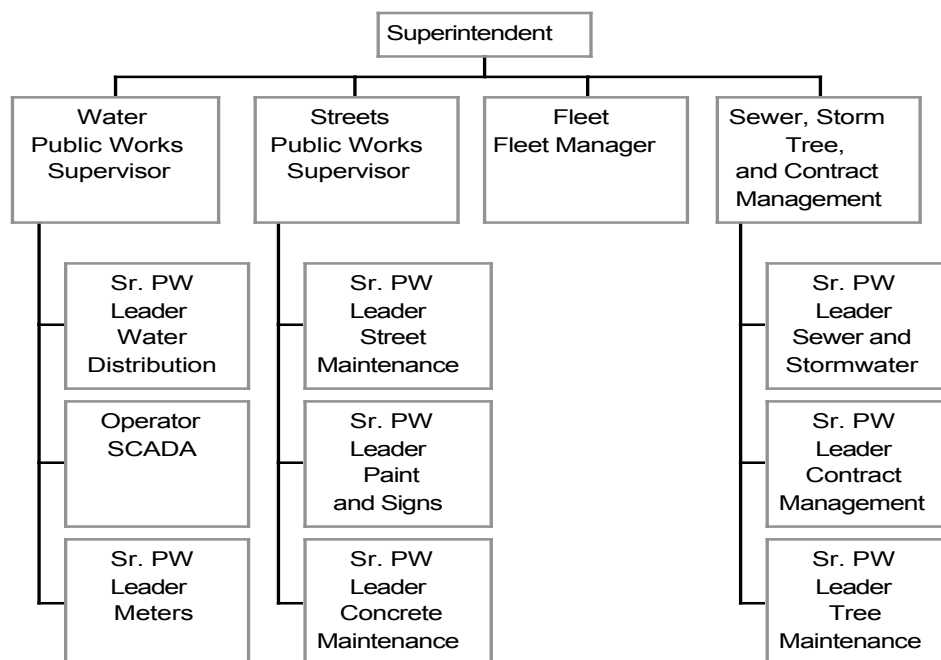
There are several positive features to this plan of organization. These include the following:

- All of the water distribution and supply system staff are assigned to one Public Works Supervisor. This clarifies accountability at the middle management level.
- The Division has sufficient support staff. In addition to the three support staff that report to the Superintendent, an additional support staff is allocated to the Meter Shop. The Division is also allocated a Technical Support Specialist to provide information technology support and pavement management system support.

There are challenges with this plan of organization. The Public Works Supervisor assigned to streets is responsible for managing the maintenance and repair of streets, the wastewater collection system, the storm water collection system, signs, striping and

legends, and the street light system. In addition, as has been discussed in a previous chapter, the project team is recommending a number of changes to the service delivery approach for landscape maintenance and for street tree maintenance that would add to the managerial and supervisory workload of the Field Services Division.

A third Public Works Supervisor position should be authorized to more equitably allocate managerial workload within the Division. The proposed plan of organization for the Field Services Division is presented below.



This proposed plan of organization would require the addition of a third Public Works Supervisor position for the Field Services Division. The annual cost for the addition of this third position is presented in the table below.

Annual Cost Increase	
Recommendation	Annual Cost Impact
Add a Public Works Supervisor position.	\$138,500
Total Annual Increase	\$138,500

4. THE FLEET, TREES, AND LANDSCAPING DIVISION SHOULD BE CONSOLIDATED WITH THE FIELD SERVICES DIVISION.

The Superintendent of Trees and Landscape manages three functions: Trees and Concrete, Landscaping, and Fleet. These three functions contain 46 positions (excluding the Superintendent and the Office Assistant). The recommendations contained within this chapter would outsource landscaping services and reduce staffing by a net of fourteen positions, outsource scheduled tree maintenance and reduce staffing by seven positions, and eliminate the Senior Utility Worker position in Concrete Maintenance. A total of twenty-four positions would remain (excluding the Superintendent and the Office Assistant): thirteen of these positions would be within Fleet Services. This compares to the Field Services Division with seventy-two positions.

It was previously recommended that responsibility for supervision of Concrete Maintenance, Landscape Maintenance, and Tree Maintenance be assigned to a Public Works Supervisor, Field Services Division.

The Superintendent of Trees and Landscape position and the Office Assistant position should be eliminated. The annual fiscal impact of the elimination of these two positions is presented in the table below reflecting salaries and fringe benefits at the top of the range. As the exhibit indicates, the elimination of the two positions would decrease annual salary and fringe benefit costs by approximately \$263,000 annually.

Annual Cost Decrease	
Recommendation	Annual Cost Impact
Eliminate the Superintendent of Trees and Landscape position and the Office Assistant position	\$263,000
Total Annual Decrease	\$263,000