CITY OF SEATTLE

FLEETS AND FACILITIES DEPARTMENT

COMPETITIVENESS ANALYSIS AND RECOMMENDATONS FOR FLEET MANAGEMENT BEST PRACTICES

MARCH 2005

MERCURY
FLEET MANAGEMENT CONSULTING

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INTRODUCTION

This report presents the results of our review of the operations of the Fleet Services Division (hereafter FSD) of the City of Seattle's Fleets and Facilities Department. Our review focused on two primary issues. First, we assessed the "competitiveness" of FSD's costs and service levels. Second, we assessed the extent to which FSD's internal business processes follow recognized industry best management practices - defined as those adopted by best in class fleet organizations.

We would like to express our sincere appreciation to FSD's management and staff for the professionalism and courtesy that they extended to us during this review. We hope that the recommendations contained in this report will be useful to FSD as it seeks to continually improve its service levels and cost performance.

Motor vehicles and equipment are vital to the day-to-day operations and service-delivery activities of the City. In fact, the City could not function without them. In some cases a vehicle is an integral part of delivering a public service, as with transit operations and residential garbage collection. In other cases vehicles and equipment are essential tools, such as a backhoe used by a street maintenance crew or a patrol car by a police officer. But in many cases, the critical role of vehicles and equipment are less apparent, but no less important. The supervisor who needs to inspect the progress of a field crew; the plumber who needs his tools and equipment nearby at job sites; or the department manager who needs transportation to an important meeting. Each of these represents a need for a vehicle or piece of equipment that must be fulfilled. Meeting these needs results in a relatively large fleet of vehicles and equipment in even the smallest of cities and counties.

In Seattle, FSD is responsible for meeting the fleet service requirements of City departments. The City's two major utilities, Seattle City Light and Seattle Public Utilities, also own their vehicles rather than lease them from FSD as is the norm for other departments (SPU does lease cars and light trucks from FSD). The grand total budget for the City's fleet program last fiscal year was approximately $45 million, as summarized in the following table:

FY 2004 FSD Budget By Business Unit

Unit	Operating Budget	Revenue	Net Inc/(Loss)
Div Mgmt	$ 45,037	$ 45,013	$ (24)
Fleet Admin	$ 73	$ -	$ (73)
Vehicle Leasing	$23,177,431	$23,177,431	$ -
Motor Pool	$ 584,715	$ 584,698	$ (17)
Maintenance	$ 9,789,335	$ 9,490,402	$ (298,933)
Warehousing	$ 6,803,559	$ 7,434,595	$ 631,036
Fuel	$ 4,424,718	$ 4,429,673	$ 4,955
TOTALS	$44,824,868	$45,161,812	$ 336,944

A breakdown of FSD's budget by major line item is provided in the following table:

FSD FY 2004 Line Item Budget

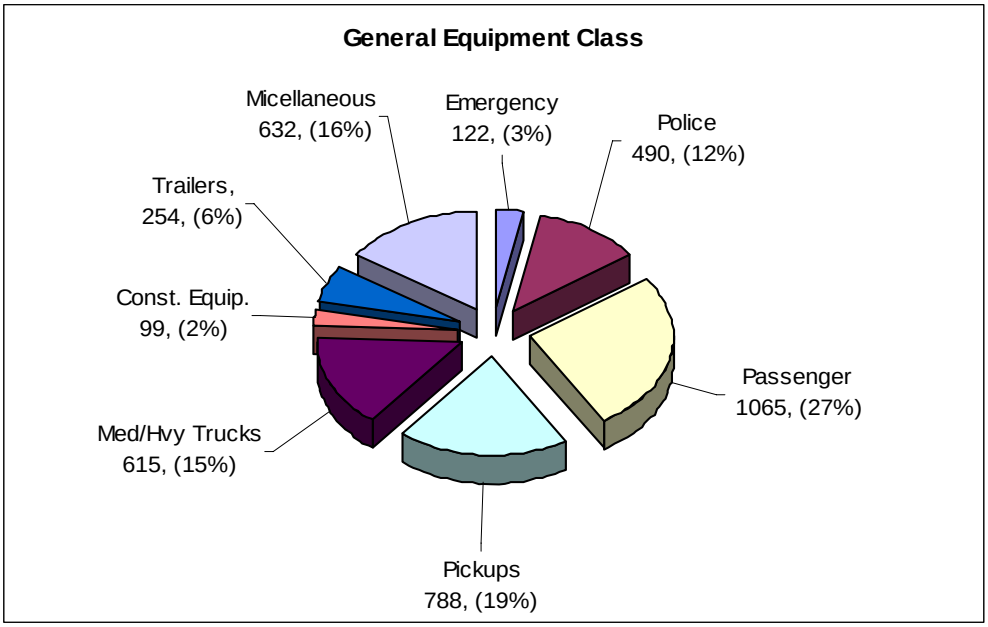
Expense	Amount
Salaries and Benefits	$ 9,195,775
Depreciation	$10,147,566
Other Services	$ 1,618,802
Internal Charges	$10,566,572
Overhead Expense	$ 1,223,769
Resale Expense	$ 9,080,759
Debt Service	$ 29,251
Asset Reserve	$ 2,962,373
TOTAL	$44,824,867

FSD has 137 authorized full time personnel, which are organized into the following functional units:

FSD Organizational Chart

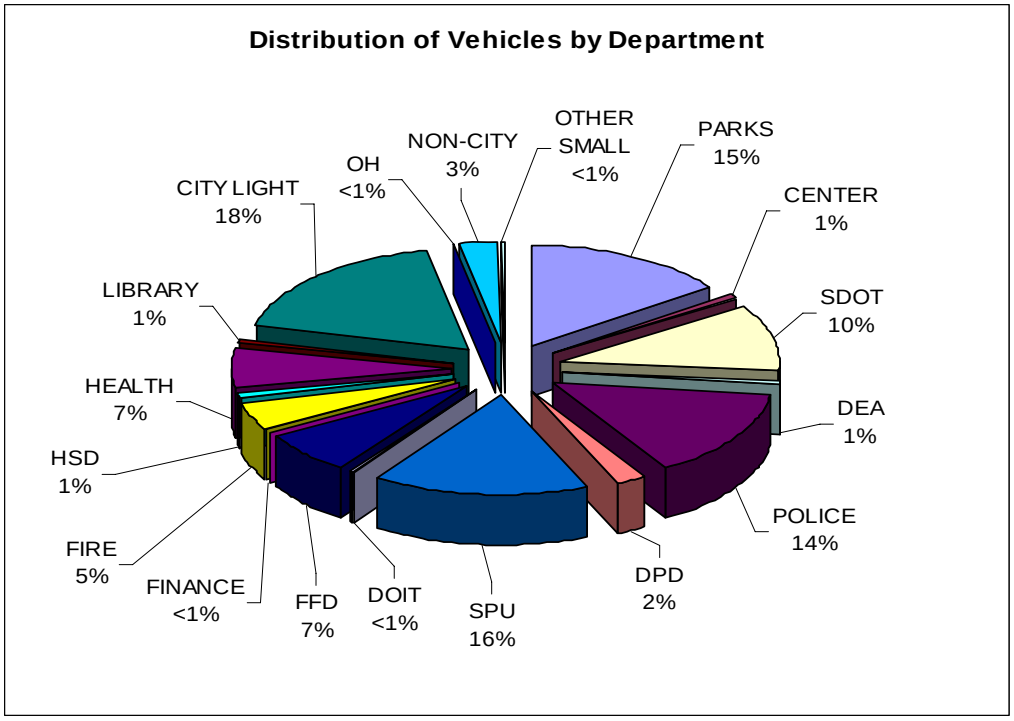
Functional Unit	Authorized Positions
Managers and other administrative	11
Clerical and support	7
Trades worker supervisors	15
Parts positions	12
Mechanics and other trades workers	92[1]
TOTAL	137

There are just over 4,000 vehicles and pieces of equipment active in the City's fleet. A breakdown of the fleet owned by the City by type of unit is illustrated in the following chart.



The current replacement cost of the fleet (i.e., the amount the City would have to pay in today's dollars to replace every vehicle and piece of equipment in the fleet) is approximately $157 million. This includes $105 million for the vehicles leased by FSD to City Departments and an estimated $52 million for vehicles owned by City Light and SPU. *A breakdown of the active fleet, by department, is provided in the following chart:*

[1] Includes positions that do not perform routine maintenance services such as those in the body shop, machine shop, and cap shop.


Distribution of Vehicles by Department
OTHER SMALL <1%
PARKS 15%
NON-CITY 3%
OH <1%
CITY LIGHT 18%
CENTER 1%
LIBRARY 1%
SDOT 10%
HEALTH 7%
DEA 1%
HSD 1%
POLICE 14%
FIRE 5%
DPD 2%
FINANCE <1%
FFD 7%
DOIT <1%
SPU 16%

COMPETITIVENESS ASSESSMENT

Competitiveness Defined

The issue of competitiveness has become very important to public sector fleet managers in recent years. With each downturn in the economy elected officials interest in privatizing services as a possible means of saving money increases. Add to this the well publicized successes that the Federal Government and some private companies have had with outsourcing activities that are considered to not be "core competencies" and it is not surprising that public sector fleet managers are under increased pressure to demonstrate that they are providing competitive services.

In our opinion, the competitiveness of a fleet organization has two major components: is it cost competitive? And, is it providing a competitive level of service? Fleet services are important support activities for a City. Nearly every function performed by a City requires a vehicle or other piece of motorized equipment. As a result, the consequences of poor fleet management activities can have a dramatic negative impact on the delivery of services to the public. Therefore, low costs alone do not result in competitive fleet services.

The best fleet service organizations have developed programs that provide a high level of quality and customer focused services at a market competitive cost. The following illustrates the four basic service and cost profiles for fleet organizations:

Uncompetitive Services	Competitive Services	Uncompetitive Services	Competitive Services
→ → →	→ → →	→ → →	→ → →
Uncompetitive Cost	**Uncompetitive Cost**	**Competitive Cost**	**Competitive Cost**

The left portion of the illustration in red represents a program that is badly in need of restructuring. The middle two conditions depicted in yellow represent programs that are competitive in certain respects, but require some reengineering in order to reach the highest level of performance. The right hand section of the illustration in green portrays a competitive fleet management program.

We use a technique known as Vehicle Equivalent Unit (VEU) analysis to benchmark fleet organization costs and staffing levels. This technique allows us to compare fleets of dissimilar size and composition. With this technique each piece of equipment is equated to the average amount of maintenance effort that is required to keep a typical sedan in a fleet in good repair. The amount of this maintenance effort is expressed as one vehicle equivalent (VE). Each general class of vehicles is then assigned a vehicle equivalency that expresses the service effort required to maintain that vehicle class as a multiple of fleet sedans.

For example, the typical police patrol car equates to 2.5 vehicle equivalents meaning that it takes about two and one-half times as much maintenance effort per year to maintain the average police patrol car as it does to maintain the average fleet sedan. By reducing a fleet down to its equivalent in terms of sedans, we are able to make reasonable comparisons with other municipal fleet operations.

Analysis of FSD's Costs

For Seattle, we have determined that the just over 4,000 vehicles being maintained by FSD represent 7,343 VEUs. A list of vehicles with VEU assignments is included in the appendix to this report. Maintenance and repair costs, which are the combination of FSD's expenditures for its maintenance and warehousing business units, total about $16 million. In our analysis, however, we attempt to isolate normal maintenance and repair costs from those associated with non-routine activities. These activities – often referred to in the industry as non-target costs, which are treated as time and materials charges as opposed to fixed costs in fleet outsourcing contracts – are associated with customer driven decisions and actions such as repair of accident damage, modifications, and costs to prepare vehicles for service. Costs associated with non-vehicle work (such as welding and machine shop work to repair of bridge guardrails) are also excluded. The table below summarizes FSD's 2004 maintenance and repair costs:

FSD 2004 M&R Costs By Cost Category

Category	Labor	Parts	Commercial	Total	% of Total
2004 Total M&R Costs	$ 9,474,698	$ 5,163,079	$ 1,361,479	$ 15,999,256	100%
Non-target Costs	$ (2,148,639)	$ (1,410,773)	$ (335,532)	$ (3,894,945)	24%
Non-Vehicle Costs	$ (350,537)	$ (180,418)	$ (18,354)	$ (549,309)	3%
2004 Regular M&R Costs	$ 6,975,522	$ 3,571,888	$ 1,007,593	$ 11,555,002	73%

Through our work on dozens of fleet outsourcing projects we have established 85 percent/15 percent as a good benchmark for the split between target (i.e. routine) and non-target (i.e. customer driven) maintenance and repair costs. As can be seen in the table above, however, FSD's target cost percentage is only 73 percent. This reflects the organization's decision to perform a number of non-routine activities in-house rather than with private contractors. These activities include preparing new vehicles for service ($1.3 million), repair of accident and other damage ($1.3 million), and modifications to in-service vehicles ($650,000). A complete summary of FSD's non-routine M&R expenditures is included in the Appendix to this report.

Given the number of staff devoted to non-target work (approximately 20) and the high percentage of expenditures relative to routine work, we encourage FSD to conduct an analysis of each activity that it has elected to perform in-house versus outsource. This analysis should not be limited to a comparison of unit prices (e.g. comparison of a single accident repair vendor price quote to actual in-house repair costs). Rather, factors such

as annual shop productivity, peaks and valleys in workload, support and tooling costs, and avoidable overhead costs should also be considered.

We understand that FSD's decision to perform many non-routine services in-house is driven by its poor experience with the timeliness and quality of services provided by private sector vendors. Our experience is that such problems are normally caused by flaws in purchasing and contracting practices rather than by poor vendors. Selection of vendors based on a request for proposals process rather than by low bid, inclusion of performance standards in contract terms, and use of financial incentives/liquidated damages should result in an acceptable level of services so that the use of vendors can be assessed based on cost and other factors.

FSD should also assess the impact of the diffusion of management focus caused by its decision to engage in a number of activities that many fleet organizations outsource. That is, FSD should consider if it has become a "jack of all trades but the master of none" as opposed to an expert in the maintenance activities that are essential to supporting a large and diverse fleet – that is, preventive maintenance, diagnosis and triage, and quick services that keep the maximum number of vehicles on the road each business day.

The following table provides the results of our analysis of FSD's routine M&R costs.

Fleet M&R Cost Benchmarks

Cost Factor	Benchmark[2]	FSD[3]
M&R Labor cost per VEU	$ 500 - $ 600	$950
Parts cost per VEU	$ 200 - $ 300	$486
Sublet cost per VEU	$ 100 - $ 200	$138
Total M&R cost per VEU	$ 800 - $1,000	$1,574

The reason that we use a range of costs in our competitiveness assessments is to account for varying conditions that are difficult to quantify in a VEU analysis. These conditions include a fleet's operating environment, utilization levels, the age of the fleet, and the local market for labor, parts, and vendor services. With a generally favorable operating environment, somewhat higher than average fleet age[4], relatively high priced vendor and parts services, and a higher priced labor market in King County as opposed

[2] Benchmarks developed in general from work with hundreds of fleet clients and specifically from analysis of bids received by cities and counties from outside contractors who provide total fleet maintenance services.

3 Includes a 27% reduction in costs for repair of accident damage, capital improvements, and other non-routine maintenance costs. Data based on actual FSD experience.

[4] See page 26 for a discussion of fleet age.

to other parts of the country, we believe that $1,000 per VEU is an appropriate competitive cost benchmark for FSD.

As can be seen, FSD's costs per VEU exceed our benchmark by nearly sixty percent. The primary driver of this higher cost is labor costs, although parts costs also exceed our benchmark. The main components of labor costs are the number of mechanics, the number of supervisors and other support staff, compensation levels, and allocated overhead and indirect costs. We found overhead costs to be reasonable and compensation levels to be commensurate with the local market. However, as discussed below, staffing levels exceed our benchmarks many types of positions.

Analysis of FSD's Staffing

To benchmark mechanic staffing levels, we again employ Vehicle Equivalent Unit analysis. Our experience is that one VE is equal to 12 to 15 labor hours per year and that mechanics generally can be expected to produce 1,500 hours of wrench turning time each year. Consequently, each technician can be assigned from 100 to 125 VEUs (1,500 divided by 12 equals 125). Given the age, composition, operating environment, and utilization of the City's fleet, we believe that the mid-point of our benchmark range (13.5 hours per VE and 112.5 VEUs per technician) are appropriate benchmarks for FSD. With 92 mechanic (i.e. billable wrench turning) positions, the ratio of mechanics to VEUs is 1 to 98. Our analysis of FSD's fleet staffing requirements is shown in the following table:

Mechanic Staffing Analysis

Labor Component	Hours	FTE Positions
Available direct hours at 1,500 hours per year	112,500	75
Required hours at 7,343 VEUs and 13.5 hours per VEU	99,131	66
Capacity excess / (shortage)	13,369	9

We have also developed benchmark ratios for other types of positions such as managers and administrators, mechanic supervisors, and parts positions. The following table details these benchmarks in comparison to FSD's staffing levels:

Ratio of Support Positions to Mechanics

Staffing Component	Benchmark	FSD
Ratio of shop supervisors to trades workers	1:10	1:6
Ratio of parts personnel to other trades workers	1:10	1:8
Ratio of managers, administrators, clerical support positions to all trades workers	1:8	1:6

While FSD exceeds our benchmark ratios for supervisors and parts staff, one reason for this is that most shops are operating a second shift. However, each specialty shop (e.g. paint and body, machine shop, capital shop) having its own supervisor also contributes to the substandard ratio. It should also be noted that two clerical staff were hired under a program to promote opportunities for people with barriers to employment.

FSD also exceeds our staffing benchmark for mechanics and other trades workers. FSD's staffing levels are also the major driver of the organization's uncompetitive costs.

Comparison to Other Cities

In order to provide another perspective on the competitiveness of FSD's maintenance costs and staffing levels we gathered comparative statistics for a number of peer cities. The following table shows the significant results for the survey:

Measurement/Practice	El Paso TX	Colorado Springs CO	Portland OR	Charlotte NC	Seattle WA
Population (2000 Census)	564,000	387,666	529,000	541,000	564,000
Square Miles	248	186.0	125	265	142.5
#City Employees	5,000	4,175	5,236FT 2,604PT	6,066	10,454
Total fleet size maintained	2,356	4,000	2,587	4,408	4,065
# Fleet Maintenance Sites	3	8	7	4	4
#Authorized FTEs	79	76	82	84	137
#Maint Supervisors	5	8	5	11	15
#Mechanics/Trades workers	55	49	61	50	92
#Parts Personnel	7	10	6	9	12
#Managers/Admin	4	6	8	9	11
#Support/Clerical Personnel	8	3	1	5	7
Maintenance & Repair Costs	$7.5M	$9.7M	11.5M	$10.2M	$15.9M

While one must be careful making comparisons based on such high level information, a number of interesting statistics can be derived from the survey, as shown in the following table:

Comparative Statistics	El Paso, TX	Colorado Springs, CO	Portland, OR	Charlotte, NC	Seattle, WA
Population per square mile	2,274	2,084	4,232	2,042	3,958
Employees per square mile	20	22	63	23	73
Vehicles per City employee	0.47	0.96	0.33	0.73	0.39
Vehicles per fleet staff	29.82	52.63	31.55	52.48	29.67
Vehicles per maintenance trades worker	42.84	81.63	42.41	88.16	44.18
Maintenance and parts costs per vehicle	$ 3,183	$ 2,425	$ 4,445	$ 2,314	$ 3,919

Charlotte and Colorado Springs have the lowest cost per vehicle. They also have the highest ratios of vehicles to fleet staff and vehicles to maintenance trades workers – indicating a high level of staff productivity. FSD has the second highest average cost per vehicle, the lowest ratio of fleet staff to vehicles, and a ratio of vehicles to trades workers only half that of Charlotte and Colorado Springs.

As discussed previously, one factor in FSD's performance against peer organizations is that the organization performs a number of functions in-house that are normally outsourced. Moreover, we have worked with other organizations that have had much worse performance (cost per VEU around $2,500). Still, given the degree of difference between FSD and best in class peers, it is clear that the organization has room for improvement in the areas of productivity, efficiency, and cost performance.

Analysis of FSD's Service Levels

In the area of service levels, FSD's performance is uncertain because common industry benchmarks are not tracked. The table below provides a summary of service level benchmarks and FSD's performance, where available:

Service Level Benchmarks

Key Performance Indicator	Target	FSD's Performance
Percent of fleet due for replacement	<10%	18%[5]
Fleet Availability	95%	Not Tracked
Repair Turnaround Time	--	--
Services completed within one day	80%	Not Tracked
Services completed within three days	90%	Not Tracked
Scheduled Services	50 - 66%	Not Tracked
PM Compliance	95%	78%
Repeat Repairs	<1%	<1%
Mechanic Productivity (billable hours)	70%	69%[6]
Mechanic Efficiency (percentage of jobs completed within time standards)	90%	Not Tracked
Percent of maintenance and repair costs outsourced to commercial vendors	10 – 15%	6.2%
Annual parts inventory turnover rate	3 to 5	Less than 1
Parts demand fill rate	80%	Not Tracked
Fleet Rates Hourly Labor Rate Parts Markup Fuel Markup per Gal Sublet Markup	 Market 25 – 35% $08 - $.10 5 – 10%	 $74[7] 23%[8] $.17 20%

Since a number of fleet program performance measures that are common in the industry are currently not tracked, we were not able to draw definitive conclusions regarding the level of services that FSD is providing to its customers. However, based on our observations and discussions with SPU staff we believe that FSD is, in many respects, providing a competitive level of services to its customers. A number of issues, however, emerged from our analysis of service levels:

[5] 454 units exceed established replacement criteria.
[6] FSD counts paid employee breaks as billable time and this produces a productive rate of 73%. However, this time should be counted as non-productive which would lower the productive rate to 69%.
[7] At 69% mechanic productivity. Since projected maintenance costs are exceeding budget by a considerable degree, the actual labor rate is likely much higher.
[8] Since actual parts sales are considerably lower than budgeted this year, the effective parts markup is much higher than 23%.

1. In the Watershed area customers have complained about long repair turn around times, slow service, and unacceptable equipment downtime. As discussed in a later section of this report, we believe that the main cause of this situation is that FSD has not assigned enough mechanics to meet work load demands in this area.
2. Virtually every customer group also indicated a desire to have better access to management reports and performance and cost information. This issue is also discussed in another section of this report.
3. Compliance with preventive maintenance schedules is also well below industry standards and is a cause for concern. An under maintained fleet costs more to operate and is also less reliable than fleets that are maintained on time. However, meeting high levels of PM compliance is a shared responsibility between a fleet maintenance organization and its customers. Therefore, without additional analysis we are unable to conclude that FSD's preventive maintenance practices are deficient and are the sole cause the substandard PM compliance performance.

Conclusions

We found FSD's managers and staff to be dedicated and knowledgeable fleet professionals who understand the important role that they play in optimizing the mobility and, therefore, the productivity of their customers. FSD has, we believe, designed their program activities and business practices with the goal of providing a high level of customer focused services. Even though there is a lack of quantitative data and statistics to verify FSD's performance, it is our opinion that FSD is, on the whole and with some exceptions, providing a competitive level of fleet services to its customers. While we are basing this conclusion primarily on anecdotal evidence such as our interviews with City staff and our observations of fleet service activities on a handful of days, we feel fairly confident in the accuracy of our findings in this area. That said, there remain a number of opportunities for FSD to effect changes that will enhance service levels.

We have developed the following recommendations to assist FSD improve the competitiveness of its fleet services:

- Implement a performance measurement system so that achievements and service levels can be documented, trends tracked over time, and the value that FSD provides to its customers clearly communicated. This issue is discussed in more detail in a later section of this report;
- Establish detailed, customized, updated service level agreements with major customer groups to replace the high level, generic, and outdated agreements established a number of years ago with SPU and City Light;

- Create a Fleet Advisory Board to give major customers (e.g. City Light, DOT, Fire, Parks, Police, and SPU) more of a role in managing the City's fleet program (we understand that this effort is already in progress);
- Develop web based report templates that customers can access in order to obtain management information regarding their fleet operations; and
- Increase staffing levels by reassigning mechanics to the Watershed area and/or increase vendor support to improve maintenance turn around times.

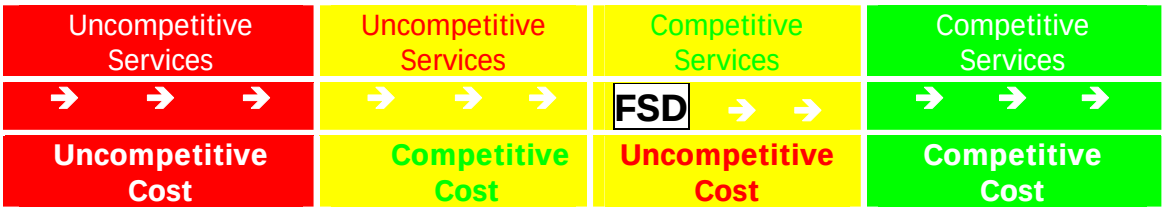
FSD's maintenance and repair costs and staffing levels are not competitive with best in class peer fleet organizations or with private contractors who perform maintenance services for cities and counties. It is not entirely clear to what degree this is due to structural issues within the City (such as collective bargaining agreements, civil service rules, decisions by elected officials to pursue an aggressive environmental agenda and have a "green fleet", etc.) or management choices by FSD (such as decisions not to outsource functions, a reluctance to hold employees accountable to productivity standards, etc.). FSD certainly also has some significant impediments that impact its ability to meet best in class levels of cost performance including an older fleet, cramped facilities, and an inadequate cost charge-back methodology. These issues are discussed in greater detail in the Best Practices Section of this report.

We have developed the following recommendations to assist FSD improve the competitiveness of its staffing levels and cost performance:

- Reduce staffing levels to the valleys rather the peaks in workload demands by:
  - ✓ Increasing the amount of work outsourced to commercial vendors to 15% of annual M&R costs;
  - ✓ Increasing the use of overtime from the current budgeted 1.7% of salary costs to 4% - 5%.
- Improve production levels by implementing a staff productivity improvement program that has the following components:
  - ✓ Track actual repair times by having mechanics enter real time information into Fleet Focus FA rather than batching time records at the end of the day;
  - ✓ Establish billable hour goals for each staff person and monitor performance on a weekly basis;
  - ✓ Establish time standards for common repair tasks and track performance on a weekly basis.
- Implement a service based (i.e. direct charge) cost charge-back system for all customers to improve cost recognition and control;
- Develop a long-range fleet replacement plan and a financing mechanism (such as reserve fund) to finance the timely replacement of fleet assets;

- Conduct a facility space needs assessment; and
- Benchmark cost performance with at least three peer organizations on an annual basis. Benchmarking partners should be chosen based on their fleet size and composition, scope of operations, and have an average cost per vehicle of around $3,000. We recommend Charlotte, Sacramento, and Colorado Springs.

Revisiting the competitiveness matrix that we introduced at the beginning of this section of our report, we would characterize FSD as being in the yellow area of the matrix, as shown below:



More important than where FSD is today is the direction in which they are heading. FSD has work to do to convince all customer groups in SPU that they are receiving a competitive level of services. Better communication, more transparency in billing and cost reporting that will come with a direct charge methodology, effective performance measurement, and improvements in certain business practices will be required before we could conclude unreservedly that FSD is providing industry standard service levels. However, we firmly believe that FSD has the capacity and the motivation to take the steps required to meet its customers' service expectations.

Improving cost performance will be a much more difficult undertaking and will require investments from City Council, changes in financial policies, difficult choices regarding staffing levels, and a number of operational changes within FSD. Implementation of the recommendations that we have made will enable FSD to develop an industry leading fleet management program that will compare favorably with any in the country. Doing nothing will perpetuate the status quo and exacerbate customer service issues.

BEST PRACTICES ASSESSMENT

1. ORGANIZATION AND GENERAL MANAGEMENT PRACTICES

Summary of Industry Best Practices

A clear best practice for fleet management programs, and a dominant trend over the past twenty years or so, is the consolidation of fleet management functions into one centralized service organization. Traditionally, it was believed that the effectiveness or responsiveness of a fleet management organization is highly correlated to its proximity to the fleet users it served. The result of this belief was the creation of numerous independent fleet management programs within an organization, each serving the purported unique needs of its own group of customers relying on its presumably specialized skills and knowledge.

Increasingly, however, it has come to be recognized that many if not most fleet user needs can be met more cost effectively through a consolidated approach to fleet management. The trend in the fleet industry clearly is toward more rather than less consolidation of fleet management functions; most organizations of the City of Seattle's size have developed a centralized fleet management program.

The move toward consolidation can be traced to the increasing cost and complexity of fleet management endeavors over the last 20 years or so and a simultaneous increase in emphasis on governmental efficiency – particularly in the face of competition from contract providers of fleet management services. During this period, developments in such areas as computerization, personnel management and professional development, risk management, regulation of environmental protection and occupational safety and health, and automotive technology have changed the definition of "effective" fleet management, making it prohibitively expensive for many independent fleet management organizations to keep up. In short, the complexity of fleet management today produces significant economies of scale that often can be captured only through collective effort.

Thus, the key objective in examining the mission and organization of fleet management functions is to determine what type of structure will yield net improvements in service effectiveness and/or cost control for the City as a whole, always keeping in mind that fleet customer service considerations should take precedence over cost reduction and other considerations because it is customer needs that dictate the need for fleet management endeavors in the first place.

The performance of any fleet maintenance program also is affected by the number of personnel who are employed to deliver services and the manner in which they are organized and deployed to accomplish their mission. Organization structures should reflect reasonable spans of control and channels of communication which are consistent with formally defined authority and responsibilities. Staffing levels should be consistent

with the amount of workload and effort required to produce desired services in a productive, efficient, and effective manner.

Summary of Current Program Status

Industry Best Management Practice	Current Program Status	Opportunities for Improvement
Fleet organization is administratively centralized to capture economies of scale.	FSD maintains nearly all of the City's vehicles and equipment. SPU maintains solid waste vehicles directly through contract vendors.	FSD and SPU explore the feasibility of FSD assuming responsibility of maintaining solid waste vehicles.
Organization allows for functional decentralization in order to meet unique customer needs.	Yes. Separate shops exist for Fire, Seattle City Light, and a small facility for SPU.	
A formal business plan has been prepared to identify resource priorities, challenges, risks, key performance indicators, and competitive issues – and to develop goals and action plans to address problem areas.	A very high level plan has been developed as part of the budget process.	Develop formal business plan that identifies the Fleet Division's mission, objectives, and actions to be taken. Assign responsibilities and completion dates to action items.
Fleet asset management receives appropriate organizational priority.	Yes. Separate section and staff exits for fleet administration.	
Policies and procedures are well documented.	FSD has a well defined shop manual that covers all areas of internal operations. City policies cover use of vehicles and administrative matters	FSD should consider developing an electronic manual (web based desk reference) that explains business activities and provides consolidated policy guidance to customers.
A formal skills assessment and training plan has been developed to keep employees current with changes in the fleet management industry.	While the Division does have a training coordinator, no formal training plan exists. Training hours have increased from 500 in 2002 to 1,900 in 2004.	Develop formal training program that includes at least 20 hours of training for each employee. Provide incentives to technicians for obtaining predetermined industry accepted certifications such as ASE certifications.
Staffing levels are reasonable given work load demands and compare favorably with established ratios.	Staffing levels do not meet benchmarks.	Develop and implement strategies to reduce staffing levels over time through attrition. Improve shop

Industry Best Management Practice	Current Program Status	Opportunities for Improvement
		production and increase use of vendors and overtime.

Summary of Findings and Recommendations

- The overall organization of the City's fleet management program is appropriate with most services organizationally centralized.
- SPU and FSD should explore the feasibility of centralization of solid waste vehicle maintenance services. An incremental approach should be employed and begin with the FSD and SPU cooperating on development of comprehensive maintenance procedures and service levels for the solid waste fleet. SPU may be best served by soliciting proposals for maintenance of its solid waste fleet from FFD and private contractors. This would provide SPU with assurances that it receives the highest level of services at the best price available. This action would also provide FSD with an opportunity to transition part of its operation to more of a private sector model where it has a contractual relationship with an important customer.
- FSD appears to be over staffed in relation to its program responsibilities and workload demands. Staff ratios and other key metrics for FSD do not meet best in class levels. FSD should develop a productivity enhancement program by establishing billable hour goals for each employee in concert with time standards for common repair tasks. FSD should also critically examine all specialized repair activities currently performed in-house for the feasibility of outsourcing these services to private contractors.
- FSD should develop a formal strategic business plan and update the document on an annual basis. The plan should provide a general description of the fleet management program; explain the purpose and goals of major program activities; present the rationale behind resource allocations and priorities; describe significant achievements, challenges and barriers to success; and set forth key performance indicators to measure achievement of goals. Such a plan can add significant value by stimulating a critical examination of how and why FSD manages its business, aligning staff behind clearly stated goals and objectives, and educating customers. A sample plan is provided in the Appendix to this report.
- FSD should develop a formal staff training plan and update the document on an annual basis. The plan should include a minimum of 20 hours of technical training for each trades worker (many organizations mandate 40 hours) and be geared towards assisting staff obtain ASE certification. .
- FSD should develop a consolidated fleet program policy guide and place it on the City's intranet.

2. FLEET FUNDING AND FINANCIAL MANAGEMENT

Summary of Industry Best Practices

FSD operates as an Internal Service Fund (ISF) within the City. These types of funds are used by state and local governments to account for the financing of goods and services provided by one department or agency to other departments or agencies, and to other government jurisdictions, on a cost-reimbursement basis. The use of Internal Service Funds has the following advantages:

- The ability to identify and accumulate the total cost of a support activity, including the depreciation of capital assets;
- Facilitates costing and pricing of support services;
- Allows for the accumulation of funds for equipment replacement; and
- Allows the allocation of General Fund overhead costs to the Internal Service Funds for redistribution to the benefiting programs.

The design and management of ISFs and charge-back systems should comply with the guidelines of the Federal Office of Management and Budget (OMB) Circular A-87. OMB A-87 establishes principles and standards for determining costs for federal awards carried out through grants, cost reimbursement contracts, and other agreements with state and local governments. The purpose of OMB A-87 is to provide a uniform approach for determining allowable costs incurred by local governments. To the extent that the City of Seattle receives any federal funding, either directly or on a pass-through basis, the guidelines of OMB A-87 must be followed – at least for calculating the fleet service costs that are charged to federally subsidized programs. Even where no federal funding is involved, many cities have adopted OMB A-87 guidelines as the de facto standard for the design of charge-back systems and the management of internal service funds.

Basic principles articulated in this circular require that charge-back-funded organizations (they need not be classified as internal service funds) operate on a break-even basis; recover only allowable costs from federally funded customer organizations; make adjustments for under and over recovery of costs (preferably through adjustments to future billing rates); bill all users at the same rate for similar services; utilize billing units which represent services provided or benefits received; and not improperly utilize revenues generated by one type of service to finance the delivery of another type of service (e.g. capital charge-back rate revenue does not subsidize operating costs, or visa-versa) .

A properly designed charge-back system improves the consumption and provision of fleet resources by 1) illustrating linkages between the behavior of vehicle users and the costs of the vehicles and related services they consume; and 2) encouraging fleet users

to hold fleet management organizations accountable for the quality and costs of the goods and services the latter provide. Such systems also promote equitable treatment of fleet users. Since users pay only for the resources they consume, there is no cross-subsidization of fleet costs under a properly designed and implemented charge-back system. One of the implications of this benefit is that fee-supported departments and programs pay the full cost of the fleet resources they consume and do not receive any subsidies from the general fund.

In a properly designed charge-back system rates should differentiate among the goods and services provided insofar as the costs of their provision are significantly different. The rates should be developed empirically based on the fleet organization's actual costs of providing the various services such as maintenance and repair, fuel, parts, and sublet services.

Summary of Current Program Status

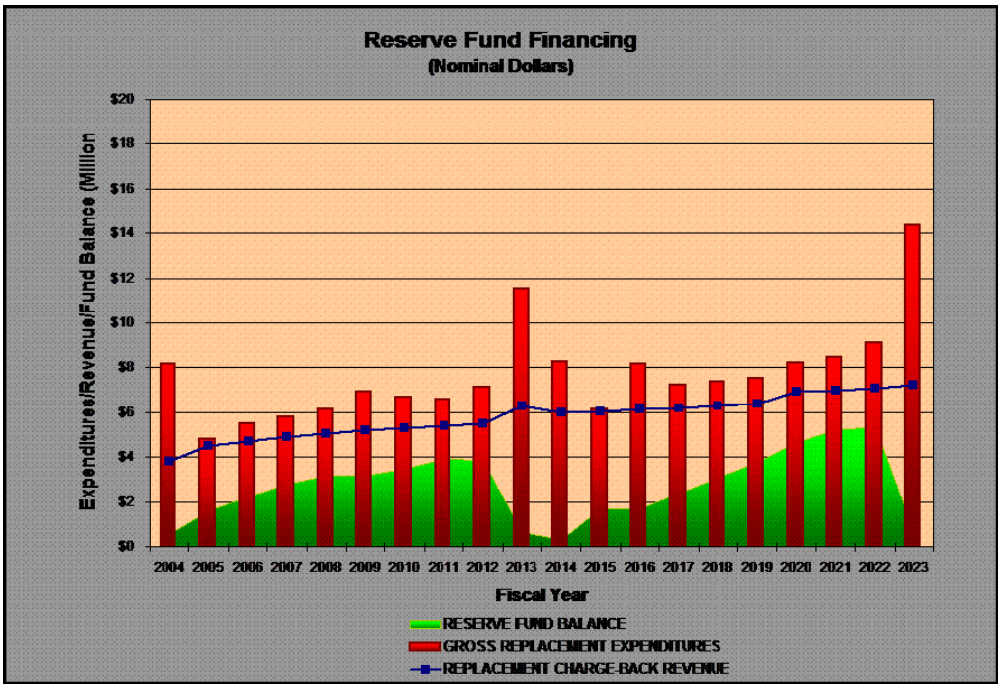
Industry Best Management Practice	Current Program Status	Opportunities for Improvement
An ISF is in place for the fleet program.	Yes	Separating Fleet and Facilities programs into individual ISFs would improve financial accountability.
Operating and capital costs are segregated and accounted for separately within the ISF.	A single budget has been established for the Fleet Services Division.	Separating capital and operating costs/revenues would improve financial accountability.
A replacement reserve or sinking fund is used to insure the timely replacement of fleet assets.	No reserve fund. Vehicle replacement purchases are funded exclusively from annual charge back rate cash flows.	Development of a replacement reserve fund for fleet assets would enable better replacement planning and improved financial accountability.
A cost charge back system is in place.	Yes. SPU, City Light and some other customers charged based on service rates, most are charged on time or usage rates.	Implement service based charge-back rates that reflect the actual costs of providing the various goods and services provided by the division.
Charge-back rates promote cost recognition and control.	Only for service based rates.	Same as above.
Charge back rates are empirically calculated and updated on at least an annual basis.	FSD was unable to provide us with detailed rate model calculations.	Rates should be updated on an annual basis. The methodology and actual calculations should be shared with customers.

Summary of Findings and Recommendations

- The majority of cities in the country have established separate Internal Service Funds for support service activities. Combining two major support services into one fund dilutes the inherent benefits of an ISF and does not, in our view, provide any offsetting benefits. We recommend that FSD establish a separate ISF for its facilities and fleet management programs. This action would improve customer confidence by clearly demonstrating that fleet charge back revenues are used exclusively to fund fleet service activities. It would also promote better management of the fleet program by directly linking financial results to program activities.

- FSD currently has $9 million in reserve for the replacement of fleet assets. The majority of this amount ($7.6 million) represents vehicles that have been fully amortized but not yet replaced. Some of these vehicles are in the process of being replaced now and bid specifications are actively under development. However, many of these vehicles are not being replaced because customer departments are unwilling to pay the higher lease payment that would come with putting a new vehicle in service (i.e. they would have to start making a new car payment). We believe that this illustrates a major flaw in FSD's cost charge-back methodology, as discussed in a later paragraph within this section of the report. We also recommend that FSD "clean up" the replacement reserve by establishing a policy that vehicles are either replaced in accordance with established guidelines (within reasonable timeframes) or the accumulated cash for replacing a vehicle is returned to the customer agency (or to the City's General Fund) to fund other capital needs.

- The remainder of the current reserve ($1.4 million) represents revenue from the replacement surcharge (inflation factor) that FSD applies to all lease rates. FSD reports that it controls the amount of reserve required to fund future vehicle replacements by manipulating this surcharge (up or down as dictated by cash flow requirements). We believe that FSD should precisely quantify the amount of cash required to fund future year vehicle replacements by establishing a replacement planning model that covers at least one replacement for each asset in the fleet (15 years or so). The balance in reserve should be calculated to act as a shock absorber to fund any spikes in future year replacement funding requirements, as illustrated in the chart below:



As can be seen, the fund balance ebbs and flows in order to reduce the inherent volatility in year-to-year fleet replacement funding requirements. This allows a fleet services organization to keep its leasing charge back rates smooth and predicable.

- We also believe that FFD should establish a separate accounting process for the reserve fund in order to provide customers with assurance that lease rates are appropriate and that revenue will be used exclusively for funding the future replacement of vehicles.

- FSD's cost charge-back rate methodology for most customers combines vehicle lease and maintenance costs into one monthly charge. Charges for vehicles include depreciation, inflation, overhead, and a credit for the time value of money (this credit is applied because FSD uses the interest earnings from its ISF to fund general operations rather than to lower rates). Charges for maintenance are based on class averages developed for each department. Fuel costs are charged separately on the basis of actual costs. Since City Light owns all of its own vehicles, FSD charges service based rates to this customer. SPU pays service based rates for the trucks and equipment that it owns, and monthly rates for units that it leases from FSD. Both utilities pay a monthly overhead fee for each vehicle they own (and, therefore, which are not subject to monthly lease fees) to pay their share of FSD's acquisition and disposal service costs.

  We believe that FSD should implement service based rates for all City departments – not just SPU and City Light. As discussed in the introduction to this section of the

report, service based rates have a number of significant advantages over other rate methodologies including simplicity, clarity, and promotion of cost recognition for both FSD and its customers. In such a system customers would be charged a monthly lease rate that recovers asset depreciation (plus a replacement surcharge to cover the impacts of inflation); a fleet management fee (to cover the cost of asset management, vehicle engineering, licensing/titling activities, etc); a fully burdened labor rate, markups on parts and commercial vendor services, and an hourly/daily charge for motor pool services. Under such a system, customers would not have an incentive to hold on to older vehicles in order to avoid making a new car payment because they would be exposed to spikes in repair bills that come with operating older vehicles. Since most customers pay only for the average cost of a vehicle class under the current system, they are not confronted with the pain of paying large repair bills. In fact, they do not see the repair bills at all and so, we believe, are under the false impression that high repair bills are "free". At best the may understand that high repair bills will eventually cause an increase in a vehicle class operating rate. However, if they are astute, they also realize that they will only have to pay a portion of the high repair bills for vehicles that they operate because these costs will be spread over all rate payers. In other words, operators of new vehicles greatly subsidize operators of older vehicles under the current cost charge-back methodology and this produces counterproductive behavior by fleet users.

- FSD provided us with a narrative description of their rate methodology and operating statements that show income and expenses. However, we were not provided with a detailed rate model. Such a model should begin with the Fleet Division's overall budget and show all assumptions, calculations, and resulting cost allocations to the division's various lines of business (low orgs). Monthly statements should also show actual costs and units of service provided (such as labor hours charged to work orders, gallons of fuel sold, etc.) so that FSD would have a detailed picture of the accuracy of its charge back rates and adequacy of its billing and financial management processes. We strongly recommend that FSD develop such a model and share it with customers. Sample screen shots from a detailed rate model that we have prepared for another client are provide in the Appendix to this report.

  Given the absence of a detailed rate model we were unable to conduct an in-depth review of FSD's rate methodology. We did note a few issues as described below:

  - ✓ FSD has developed separate labor rates for journey level staff (i.e. Mechanics) and semi-skilled staff (i.e. Equipment Servicers). We understand that this action was taken to make comparisons between FSD's costs of performing preventive maintenance services with oil change vendors such as Jiffy Lube more accurate. From the perspective of charge-back rates, this action has no value and complicates the rate development and tracking process. While it is true that such vendors enjoy a much lower cost of labor than does FSD, we believe that comparing the cost of oil changes on a transaction cost basis is inappropriate. FSD should resist such comparisons as invalid given the fundamental difference between the purpose of a retail oil

change on a private vehicle and a fleet PM service (which is akin to a visit to a doctor for a physical exam). Rather than manipulate rates in an attempt to improve its performance in such a comparison, FSD should educate decision makers and its customers regarding the value that it provides through a thorough fleet PM program.

- ✓ We were provided with a narrative description of the labor rate calculation methodology for 2004 ("Labor Chargeable Hours") that shows a labor rate of $68.91 per hour. We were also provided with a document entitled "Fleets and Facilities 2003-2004 Budget Manual Rates". This document shows labor rates as $54 for Equipment Servicers and $69.75 for all others. Absent a detailed rate model we were unable to reconcile the differences between these two documents.
- ✓ The labor rate methodology includes paid work breaks of one-half hour per day for each chargeable position as productive time. This action increases the number of billable hours in the labor rate calculation by just over 10,000 labor hours per year resulting in a labor rate that is about $6 per hour lower than it otherwise would be. We understand from FSD that this practice was adopted to make its labor rate more comparable with private sector vendors who normally charge breaks to their customers (our experience is that this is not universally true). Treating non-productive time as billable creates a false picture of FSD's competitiveness and productivity. We recommend that this practice be discontinued.
- ✓ The labor rate methodology relies on averages and assumptions (e.g. 3 weeks of vacation for each chargeable staff position) rather than an analysis of detailed historical time records (from the City's payroll records and FSD's FA fleet management system). As such, FSD's rates are not as accurate and defensible as they otherwise could be.
- ✓ FSD has separate markups for tires and for other commodities. We understand that this was done to improve the accuracy of comparisons of FSD's tire costs to outside vendors. The rationale used is that tires are purchased off of State contracts and so FSD's level of effort (and cost) for making tire purchases is lower than for other commodities). While this may be true, it is also certainly true for many other commodities that FSD purchases from State and other standing contracts. As with the discussion of PM services above, we believe that FSD should not manipulate rates in an attempt to appear more competitive. This is a slippery slope that taken to its illogical extreme could lead to an unworkably complicated charge-back system.

- A comparison of FSD's current service based rates to market comparables is shown in the following table:

FSD Line of Business	Current Rate	Market rates
Maintenance Labor	$54 per hour for Equipment Servicers and $69.75 per hour for Mechanics	Market (around $80 per hour in Seattle)
Parts Markup	23% for parts 12% for tires	25 to 35% NA
Commercial Repair Markup	20%	5 to 10%
Fuel Markup	$.163 per gallon for self service fuel $.41 per gallon for full service tanker fuel	$.08 to .10 per gallon $.50 to $.75 per gallon

Some of FSD's rates appear to be high and may be subsidizing other rates. The unattended fuel rate is particularly high and we suspect that a commercial fuel provider could come close to matching FSD's current price for fuel (after taxes are deducted from the pump price). We recommend that FSD conduct an in-depth rate study (including development of the detailed rate model previously mentioned) to verify costs and revenues for each line of business.

From the Operating Statement documents that we were provided we note that revenues for some organizations were not budgeted to cover costs. We also note form the November expenditure report that the maintenance unit was overspending its budget and the parts unit was selling significantly less parts (in dollar terms) than anticipated in the rate calculation methodology. The discrepancy between budgeted and actual performance for these organizations has resulted in cross subsidization among the various lines of business and means that current rates are inaccurate.

- We were also told that FSD no longer makes adjustments to account for over or under recovery of rates at the end of each year. This action is required (at least on a gross basis for the entire Fleet Services Division if not for each rate/cost pool) under the directions of OMB A-87. In making adjustments FSD has two choices available to it – provide customers with a rebate for over-charges or a bill for under charges during the thirteenth accounting period, or set rates to over or under-recover the appropriate amount during the following fiscal year. We recommend that FSD provide its customers with a reconciliation of costs and revenues for each year as well as plans for making appropriate adjustments.

3. VEHICLE REPLACEMENT AND ACQUISITION

Summary of Industry Best Practices

Vehicles and equipment are replaced at various times depending on the type of vehicle and the nature and intensity of their use. Timely replacement is important for controlling vehicle availability, safety, reliability, and efficiency. Replacement guidelines are used to project and plan for future fleet replacement requirements and to trigger assessments of the need to replace individual vehicles whose age and/or life-to-date usage is approaching established guidelines. Replacement guidelines should be developed based on empirical analysis of the relationship between vehicle age and/or cumulative usage and vehicle ownership and operating costs.

Replacement planning is the projection of future replacement dates and costs for each vehicle and piece of equipment in the fleet. Its purpose is to identify long-term spending needs and associated budgetary requirements. Replacement decision making, on the other hand, is the process of deciding when to replace individual vehicles and pieces of equipment. Although replacement guidelines usually trigger an assessment of the need to replace a particular vehicle, some assets will need to replaced earlier than expected (for instance, due to unusual wear and tear or recurring mechanical problems) and some units will be cost effective to operate beyond the age or usage threshold suggested by replacement guidelines.

In most fleet operations, vehicle replacement practices are dictated primarily by the availability of replacement funds rather than by objectives such as minimizing vehicle life-cycle costs. Consequently, the comparison of projected annual fleet replacement costs with historical replacement spending levels provides a good indication of the adequacy of fleet replacement practices – as opposed to guidelines or goals. Inadequate replacement spending not only increases the age and operating costs of a fleet, but results in the accumulation of replacement needs which, if left unattended, can become so large that significant fleet downsizing is unavoidable.

Fleet replacement funding plays a critical role in controlling fleet operating costs, safety, and reliability. Timely fleet replacement is important because vehicles and equipment become less efficient, safe, and reliable to operate as they get older. Component systems and parts slowly deteriorate and/or fail suddenly. These factors serve to increase the costs of operating and, especially, of maintaining and repairing older vehicles and equipment.

The amount of funds made available to support the replacement of a fleet of a given size and composition dictates how often vehicles can be replaced. As in the case of operating funds, there are two ways that capital funds can be provided to support the acquisition of replacement vehicles: lump-sum amounts can be appropriated to the fleet management organization or to fleet user departments on an ad hoc basis to pay for the purchase of replacement assets, or capital costs can be amortized over the lives of the vehicles in the fleet either by means of third-party financing mechanisms such as loans, bonds, or master lease agreements, or through the use of a charge-back system in

which vehicle replacement (e.g., monthly lease) charges are paid by user departments and deposited in a reserve fund which then defrays all replacement expenditures.

Summary of Current Program Status

Industry Best Management Practice	Current Program Status	Potential Improvements
Vehicle replacement cycles are reasonable and in accord with standard industry practice.	FSD attempts to match replacement cycles to customer preferences for depreciation and retention periods. On balance, cycles fall within accepted industry practice.	
Fleet replacement funding has been sufficient to replace the fleet in accordance with stated vehicle replacement criteria.	FSD reports that the current annual process has enabled the fleet to be replaced at an adequate pace.	The average replacement cycle for the vehicles in FSD's lease program is 7.1 years. The average age of these vehicles is 4.6 years, implying an actual replacement cycle of 9.2 years. 454 units currently exceed established life cycles. The percentage of units exceeding replacement criteria (18%) is higher than our benchmark of < 10%.
A multiple year fleet replacement plan has been developed to identify future peak year funding requirements so that this can be dealt with in a planned manner.	FSD maintains a 5 year forecast for general fleet vehicles and a 20 year plan for fire trucks.	A 15 year plan for all vehicles would improve FSD's ability to forecast fleet replacement funding requirements and to deal with any potential spikes.
The organization has assessed alternative financing alternatives and has established either a replacement reserve account (i.e. a sinking fund) or lease purchase agreements to finance fleet replacement needs.	FSD uses cash from current year income to purchase vehicles and equipment.	Explore the benefits of financing vehicle and equipment purchases with a sinking fund or low interest loans to improve vehicle replacement timing.
Focus is on matching vehicle design to meet specific customer job requirements and customers are given ample input into the specification process.	Specifications are developed by FSD with input from the user departments.	The specification process is sound. However, we recommend that performance requirements (such as minimum load carrying ability for dump trucks) be included to avoid potential problems

Industry Best Management Practice	Current Program Status	Potential Improvements
		with equipment delivered being able to perform its intended mission. We have included an article on performance based specifications in the Appendix to this report.
Non-technical requirements such as parts lists, repair manuals, diagnostic tools, and training are included in vehicle specifications.	Manuals are required as part of vehicle and equipment specifications if needed.	Expand the use of electronic manuals and on-line information resources.
Cooperative purchasing agreements are used in order to take advantage of volume pricing.	Some vehicles are purchased off of the State of Washington's annual vehicle bid.	
Multiple year bids are routinely used in order to reduce purchasing administrative costs and to standardize the fleet.	Multiple year bids are used for a number of equipment types. A RFP process is also used for some types of vehicles.	

Summary of Findings and Recommendations

- FSD's approach of using cash to fund the purchase of replacement fleet vehicles is, in our experience, the most difficult method to insure the timely replacement of fleet assets. Moreover, the current methodology is not enabling FSD to keep up with fleet funding requirements – as indicated by our analysis of the age of the fleet and the number of vehicles currently exceeding established replacement criteria. The City should explore creation of a replacement reserve and/or debt financing (such as bonds or Certificates of Participation) as a way to provide funding to replace fleet assets at the most advantageous time in their life-cycle.

4. VEHICLE DISPOSAL

Summary of Industry Best Practices

Once vehicles have completed their duty tour, the procedures undertaken to remove the vehicle permanently from service and the methods used to dispose of the unit should aim to maximize vehicle residual value, avoid the unauthorized retention and use of assets that have been replaced, and ensure that replacement parts that no longer are needed are removed from inventory.

Summary of Current Program Status

Industry Best Management Practice	Current Program Status	Opportunities for Improvement
A policy exists requiring that vehicles that are replaced are removed from service and not kept by users.	Vehicles are removed from service as replacement units are put into service. Vehicles are disposed through auctions which are held 8 times per year.	
Efforts are taken to maximize the residual value of used vehicles.	Normal cleaning and prep occur for vehicles being sent to auction.	
A professional auctioneer is used to organize, market, and conduct sales.	Yes	
Sales are conducted frequently, at least on a semiannual basis.	Yes	

5. FLEET MAINTENANCE

Summary of Industry Best Practices

All vehicles and other pieces of motorized equipment require maintenance and repair during their life. Since a fleet service organization's primary mission is to maximize the availability of vehicles so that its customers can productively do their jobs, the focus of maintenance management for such organizations needs to be in developing practices that minimize unscheduled incidents of repair and that return vehicles requiring repair to service in as little time as possible. The performance of any fleet maintenance program is also affected by the number of personnel who are employed to deliver services and the manner in which they are organized and deployed to accomplish their mission. Organization structures should reflect reasonable spans of control and channels of communication which are consistent with formally defined authority and responsibilities. Staffing levels should be consistent with the amount of effort required to produce desired services in a productive, efficient, and effective manner. Work orders should be used to document all maintenance and repair services provided to a vehicle. Procedures also are needed to monitor the progress and, where necessary, to expedite the completion of work. These include protocols for passing work from one shift to the next, from one technician or shop to another, and from an in-house garage to a vendor. Procedures also are needed for following up on repairs whose completion by a mechanic or vendor is excessively slow and on parts whose delivery is overdue. The service writer or other individual opening a work order should estimate the time and services required to complete a work order, by reference to appropriate flat-rate manuals or in-house time and task standards, to estimate the cost of the repair. Work authorization procedures should ensure that appropriate controls are in place over the services and costs provided by a vendor. Such controls are particularly important as

vehicles approach their planned replacement dates. In order to ensure the cost-effective utilization of in-house maintenance resources and to minimize maintenance and repair turn-around time and downtime, processes should be in place for scheduling work into a shop in advance and for performing minor repairs while the driver/operator waits. Service hours and scheduling processes should be flexible enough to accommodate vehicle users' work schedules, but also should seek to maintain a steady flow of work to mechanics and avoid peaks and valleys associated with unplanned service demands.

Procedures should be in place to distribute work to mechanics so as to promote high levels of mechanic productivity, efficiency, and effectiveness and to minimize repair turn-around time; and to assign the work to a specific mechanic based on an assessment of mechanics' availability and skills. Additionally, priority systems are often used to identify vehicles that are to be moved ahead in the repair queue based on their importance to the organization. Vendors may be relied upon to perform fleet maintenance and repair services for a variety of reasons, including managing in-house work backlogs; avoiding costly investments in facility construction, tooling, training, and staffing; to meet low volumes of service demand in remote areas or for specialty repairs; and to achieve a degree of flexibility (e.g., in terms of locations, hours of service, etc.) in the provision of services that is not possible with civil service system constraints and sizable investments in fixed fleet maintenance infrastructure. The cost-effective use of vendors requires, however, that procedures be followed for 1) determining the comparative cost effectiveness of performing a service in house or using a vendor; 2) managing and controlling vendor performance relative to individual service orders and ongoing service levels (in the case of contract providers of services); and 3) capturing all relevant information on vendor-performed services so as to maintain a complete record of vehicle maintenance history and costs and provide for timely user billing via a charge-back system.

Repair quality assurance procedures are used to ensure that requested services are performed properly. When repairs are not completed correctly, the vehicles are often returned resulting in "comeback" repairs. When they occur comebacks are costly and annoying, so they need to be tracked and followed up on. It is important that comebacks be identified and handled properly for several reasons:

- In all likelihood, the vehicle user is not pleased that the vehicle has had to be returned to the shop;
- The comeback may have occurred because the initial defect report failed to clearly describe the problem. If this is the situation, a review of the original service request with the service writer and/or operator may be in order;
- The mechanic may have improperly diagnosed and/or performed the repair and therefore, some retraining may be needed; and
- The parts used may have been defective and some follow-up with the supplier may be needed.

One of the best strategies in managing comebacks is avoiding them all together. This usually involves some form of post-repair review process. Quality checks can range from simple road-tests, to quality checklists, and to complete observation of the repair. No matter what procedure is used, good quality programs are integral to insuring customer satisfaction. It is impossible for maintenance managers to be all places at all times and, therefore, to assess the appropriateness of maintenance activity and performance solely on the basis of subjective judgment, first-hand observation, and second-hand information. The development and analysis of management information enables managers, supervisors, and trades workers to develop insights into aspects of their performance and opportunities for improvement therein that might otherwise not even be detected. Accurate, complete, detailed, and timely collection of maintenance activity and cost data through work orders is the foundation on which maintenance performance measurement and improvement processes rest.

The centerpiece of any vehicle maintenance program is its preventative maintenance (PM) program. Without clear and specific involvement of everyone in the organization to focus its attention on its PM program, the operation will not be as successful as required. A good PM program drives the cost of fleet operations down and promotes efficiencies throughout the organization. A good PM program minimizes breakdowns and unscheduled maintenance subsequently allowing the vehicle to remain in service as much as possible and therefore maximizing the availability of vehicles to its customers.

PM services should be scheduled on the customer's timetable. Often this is after normal working hours or at times when the vehicle may be idle for a period of time. The PM program should also incorporate multiple echelons of progressive services. That is to say that tasks particular to a specific type of PM be included in each subsequent PM. For instance PM A tasks are incorporated into PM B tasks. PM B tasks are incorporated into PM C tasks.

PM intervals should be based on certain "triggers" that meet manufacturers' recommendations or standards. In most cases that is some interval of time or some interval of usage. When one or more of the triggers is met the need to schedule the PM becomes the focus of the operation. Without documentation of meeting stated or recommended PM intervals manufacturers may deny warranty if made aware that the vehicle or piece of equipment is not being properly maintained.

Summary of Current Program Status

Industry Best Management Practice	Status	Opportunities for Improvement
Written procedures are evident and current	NO	FSD has not updated its procedures since December 2002. Recommend reviewing and bringing current as necessary.
The focus of the	YES, however,	FSD needs to focus on raising PM

Industry Best Management Practice	Status	Opportunities for Improvement
organization is clearly on PM services.	PM compliance rate of 78% is lower than standard	compliance and continually remind customers of the importance of preventive maintenance
Schedule PM services in advance in order to increase convenience to customers.	YES	
The PM program incorporates multiple echelons of progressive services.	YES	Recommend that manufacturers' service recommendations and custom tasks be included in separately styled and written PM checklists with different PMs based on mileage or usage.
Customers receive a monthly schedule of PM services forecast to be due.	YES	Recommend developing a monthly schedule and disseminating to each department
Advise customers of missed and overdue PM services.	YES	We recommend sending a written notice each month to delinquent departments.
Quick fix services are available to customers for simple repairs and PM services.	YES	
Use work orders to record all maintenance activities.	YES	
A procedure is in place at the time of work order creation to identify vehicles scheduled for replacement, to check for overdue PMs, and to check for warranties.	YES	We recommend that work orders be "flagged" to identify those scheduled for replacement as well overdue PMs and warranty referral.
Provide customers with the expected costs and time for completing repairs.	YES if anticipated repairs exceed established threshold criteria. Criteria established are reasonable.	This is especially important as the vehicle nears the end of its economic life.

Industry Best Management Practice	Status	Opportunities for Improvement
Monitor and record technician time daily.	YES, night shift gets posted next day	Mechanics should have their time posted daily to ensure prompt processing for revenue production
Monitor the status and downtime of vehicles on a consistent basis.	YES	
Shop business hours have been set for customer convenience.	YES	Continued contact with customers to ensure that hours of operation fit their schedule. In addition, certain emergencies may require adjusting hours to fit the situation.
Call customers when repairs are complete.	YES	Recommend calling immediately as there is little spare space at the Charles Street location.
Field service is available for construction equipment.	YES	Recommend emphasizing this benefit in Service Level Agreements.
Actively pursue warranty recoveries for both repairs and parts.	YES	FSD should have a more formal agreement with SFD performing warranty repairs with fire apparatus.
Technicians are encouraged to keep skill levels current through financial incentives to obtain ASE certification.	NO	Recommend conducting annual skills assessments to ensure appropriate technical knowledge.
Survey customers annually to assess satisfaction.	YES	Surveys are a good tool to use that documents customers opinions of service levels.
The organization has a clear outsourcing strategy that focuses on core competencies and service improvements.	YES	Examine some portion of the business annually to ensure competitiveness with the market place.
A formal quality assurance process is in place that includes periodic review of technician work and monitoring of comeback rates.	YES	Supervisors should continue to spot check technician's work and document findings on work order
A formal performance measurement system is in place to track the	YES	There are varieties of performance indicators that are relevant to fleet maintenance operations. We

Industry Best Management Practice	Status	Opportunities for Improvement
effectiveness of service outcomes.		recommend establishing benchmarks and then widely publish to all departments and employees. Such measures of efficiency might include all or some of the following: average downtime, average miles between breakdowns, PM compliance, breakdowns per vehicle, actual maintenance cost divided by budgeted cost. In addition, FSD should meet periodically with each department to discuss service delivery and performance measures.
Solicit outside customers in order to spread shop overhead and provide additional billable work during slack periods.	YES, Health Department and Washington State Police	Other potential customers may include smaller municipal agencies, school districts, and any federal agencies.

Summary of Findings and Recommendations

- FSD has an excellent Fleet Services Manual that covers most aspects of fleet operations. Some omissions of fleet functions are noted elsewhere in this report. Efforts in keeping the Manual current would benefit the operation and develop customer confidence in the operation. We recommend an annual review and documenting that review. The review would consist of removing obsolete procedures and revising others to reflect more accurately the current operation.

- We recommend that FSD develop an annual training program to encourage employees in skill improvements. Training is taking place but it appears to be from “targets of opportunity” or upon introduction of new equipment. We would further encourage the use of ASE and EVT certifications to provide independent study and to reward those individuals with incremental pay adjustments. This obviously would need to take place at contract time and to see if an incentive program would fit with the employees total compensation package.

- FSD should develop current Service Level Agreements with its customers and take a more pro-active effort to understand and meet customer requirements.

6. PARTS INVENTORY AND SUPPLY

Summary of Industry Best Practices

The cost effective and timely provision of high quality repair parts and supplies to maintenance workers is a key element in the overall provision of fleet maintenance services. The organization and staffing of the parts supply function, the procurement of parts, parts inventory management, warehousing, and inventory control each have a large effect on the overall success of this functional area, and a corresponding effect on the efficiency and cost effectiveness of fleet maintenance services. The optimal organization and staffing of the parts supply function varies considerably with the size and complexity of the maintenance operation, and decisions regarding procurement and inventory investment. Adequate staffing in terms of the number of employees and the tasks assigned is a critical success factor, as is designing a parts organization that is suitable in scope of responsibility to the scope of the maintenance operation as a whole. Well-designed contracts and blanket purchase agreements enable an organization to reduce administrative effort and time delays associated with procuring parts; to monitor and control parts purchases; to simplify payment for such purchases; and to secure discounts associated with buying from particular suppliers in volume. In short, they can reduce both the direct and indirect costs of buying parts and other fleet maintenance-related commodities. Procedures for establishing, monitoring, renewing, and circumventing contracts should be designed to maximize vendor performance, minimize administrative effort, and maintain a maintenance organization's flexibility to procure a part by other means when contract suppliers cannot satisfactorily meet its needs. Individual purchase orders typically are used to procure parts that are not carried in inventory or available from a local supplier under a contract or blanket purchase agreement. While they offer maximum flexibility in sourcing parts, their employment usually is limited to the purchase of infrequently used specialty parts due to the administrative effort, cost and time delays involved in their issuance and the inability to capture volume discounts through piecemeal buying.

The identification of the types of parts required to support maintenance and repair activities involves analyzing various attributes and indicators of parts needs, including the types, quantities, and timing of parts usage; parts and parts supplier performance; and parts accessibility and waiting tolerances. Determining proper inventory size and composition requires developing an understanding of several interrelated factors, including cost trade-offs between volume and individual purchases of specific commodities; trade-offs between inventory carrying and parts delivery costs; and trade-offs between parts availability and delivery times and waiting tolerances of particular fleet users and vehicle and equipment types. It also requires identifying inventory items that have become obsolete due to changes in fleet composition and no longer should be replenished. Key measures of performance in this area include inventory turns (the ratio of the value of stock items issued per year to the average value of parts carried in inventory), parts order fill rates (the percentage of requests that can be filled immediately), and order fill times (the average amount of time required to fill an order).

Inventory control involves the tracking and physical control of parts from the point of receipt through consumption. This process is important for controlling theft of, and damage to, inventory items, and has a direct effect on the cost of carrying the parts inventory. Control of physical access, and the methods employed to replenish and

disperse these items ensure that their consumption is accounted for properly. Effective parts supply processes allow mechanics to focus on the activity for which they are hired, maintaining and repairing vehicles, by putting parts in their hands with a minimum of disruption to maintenance activities. This reduces repair turn-around time and costs and increases mechanic productivity, efficiency, and effectiveness.

Summary of Current Program Status

Industry Best Management Practice	Status	Recommendations
Employees working in the parts operation are experienced in the automotive parts management field rather than generalists in the logistics field	YES	Recommend additional inventory management training.
Parts staffing is reasonable in comparison to industry benchmarks	YES	Recommend continually reviewing parts staffing as current staffing is marginally higher than our benchmarks indicate.
Parts rooms are convenient to maintenance technicians	YES	
Policies and procedures are in place detailing all aspects of parts supply operations.	NO	Recommend current written procedures covering all aspects of parts functions.
Stocking levels are reasonable and error on the over stock side in consideration that the primary role of the parts operation is to support productive and efficient maintenance activities	YES	
Parts contracts are in place for high volume items in order to reduce parts program administration requirements, define parts quality requirements, secure the lowest prices possible, and to document delivery terms and requirements.	YES	Recommend continued efforts to increase parts contracts for high usage items.

Industry Best Management Practice	Status	Recommendations
Use Requisitions to document parts orders and supervisory approval to order a part.	YES	Recommend using parts functionality provided by Fleet Anywhere to the extent possible
All parts transactions are entered into the fleet management information system in a timely fashion.	NO	Recommend issuing parts real time.
Use blanket purchase orders for high volume vendors in order to reduce the number of individual purchase orders issued.	YES	
Issue individual purchase orders for ad hoc purchases.	YES, FSD issues a controlled number of Direct Vouchers (DVs)	
Invoices are provided with all parts deliveries.	YES	
Segregate responsibilities for ordering, receiving, and approving parts purchases to ensure proper control.	NO	Recommend that invoice approval become the responsibility of the Finance & Administration Division of the Fleets and Facilities Department
Make use of procurement cards to facilitate purchases with vendors who do not have contracts or price agreements in place.	YES	
Inventory turnover approximates 4:1	NO	Review annual parts usage and move to surplus those parts with little or no use.
Parts staff provides management with regular reports detailing inventory levels, stock outs, dead stock, transactions by vendor, costs vs. budget, and performance against targets and goals.	NO	Parts metrics such as total parts in inventory, percentage of parts obtained over the counter versus ordered, number of parts lines with no movement in the last 12 months, etc. are performance measures that should be monitored and reported on regularly.

Industry Best Management Practice	Status	Recommendations
		Physical inventory reconciliation should be performed at least annually. Monthly cycle counts are preferred.

Summary of Findings and Recommendations

- Inventory turnover is one key performance measure of the efficiency of employing and utilizing city assets. Turnover indicates the dollar amount of sales or usage generated by each $1 of assets. It is calculated by dividing the inventory parts sold (i.e. not county non-stock parts) by the value of the inventory. This statistic should be a minimum of 3 for a fleet organization and even higher in an urban area such as Seattle where access to parts suppliers is excellent. The table below indicates that FSD has a low asset turnover experience.

Year	Parts Sold/Usage	Inventory	Asset Turnover
2003	$737,085	$1,280,440.	.58
2002	$629,262	$1,348,396	.47
2001	$685,247	$1,465,151	.47

Certain specialized inventory items are necessary even though there is little or no usage, but are difficult to source and have long lead times to fulfill such as parts for fire apparatus. Further, there appears to be a reduction in parts contracts because of recent City policy that has required additional inventories because of contract suppliers. We recommend continued vigilance reviewing parts usage and an increased effort to broaden the supplier base. Further effort in reducing inventory will increase the turnover. This appears to have happened in 2003 as asset turnover improved 11%. Results from 2004 were not available at the time of this report.

- Parts personnel have a good background in parts and should be encouraged to stay current with warehousing and inventory skill improvements when possible by making use of outside seminars and classes.

- We recommend the sharing of performance measures with all employees in the parts section. Some of the more frequently utilized are listed in the matrix above. This will provide all employees with a sense of ownership and diligence in managing and working in the parts area.

- Automotive parts functions require three major events: ordering, receiving, and approving for payment. To maintain accountability Parts should only have

authority to mange two of the three. Currently the Parts Section can approve all three of these events. We recommend that the approving for payment occur at the Finance and Administration Division.

- There are some procedures covered in the Fleet Services Manual however, they are not complete and do not cover all aspects of the warehouse and inventory process. We recommend a series of procedures that begin with organization and administration, ordering, receiving, warehousing including inventory control, payment approval, issuing, and security.

7. FUEL

Fuel, like automotive parts, is a commodity that has similar requirements with respect to management of automotive parts. However, it differs greatly from parts because of the highly regulated environment imposed by the U.S. Environmental Protection Agency and various State agencies.

Industry Best Practice Management	Status	Recommendations
Utilize Contracts for fuel purchases	YES	
Maintain and Reconcile Inventory Records	YES	Inventory variances are reasonable.
Verify Pricing from Contract Vendor	YES	
Utilize Automated Fuel Dispensing where practical	YES	
Maintain Infrastructure Repair Records	YES	
Conduct Tank and Line tightness testing.	YES	Recommend establishing a testing contract.
Utilize Alternate Fuels	YES – CNG and Bio-diesel	
Reconcile fueling log with invoice from Commercial locations.	YES	However, responses from Commercial stations are poor.
Written policies and procedures cover fueling practices	NO	Adding to the Fleet Services Manual written procedures

Summary of Findings and Recommendations

- We recommend that written procedures document the fueling processes. These procedures as mentioned are similar to those procedures for automotive parts.

- We recommend sending written notification to those commercial stations that are slow in responding to FSD requests.

- We recommend the creation of an infrastructure-testing contract that would perform leak detection tests as required by the US EPA. Currently, FSD requests this service on an ad hoc basis. A contract would provide for more consistency and better accountability.

8. CUSTOMER COMMUNICATION

Summary of Industry Best Practices

Customer service management is central to the effective performance of any fleet management organization. Good customer service management stems from an acute sensitivity to the needs and concerns of fleet users, and manifests itself in a set of communication, decision-making, reporting, and feedback processes which encourage fleet users to actively participate in the management and maintenance, and not simply the utilization, of a fleet.

A clear understanding of the needs and concerns of customers is also critical to effectively running a fleet services organization. Such organization's understanding of its customers' needs should not be entirely based on informal communication. The lack of a formal customer communication infrastructure can limit a fleet organization's ability to quickly revise its service practices to keep pace with changes in its customers' service needs. Relevant information may be lost or misinterpreted if communicated only through informal channels. In addition, the lack of a formal communication mechanism can prevent a fleet services organization from gathering consistent information with which to evaluate customer satisfaction with their services.

Frequent reporting on achievement of goals and progress towards meeting targets tracked in a performance measurement system are one of the most effective ways to communicate with customers. Billing is another form of communicating with customers and often can be an irritant if not presented in a clear and usable fashion. It can also be an irritant if service levels are not satisfactory.

Summary of Current Program Status

Industry Best Management Practice	Current Program Status	Opportunities for Improvement
Customers participate in managing the fleet business through a Fleet Advisory Board.	No formal fleet advisory committee or group exists. Fleet Service personnel have standing meetings with some customers and meet with others as needed.	Establish a Fleet Advisory Board of major customers that meets to discuss service levels, goals, problems, vehicle replacements, and other fleet issues on quarterly basis.
Formal service level agreements have been negotiated with primary	FSD has service level agreements with SPU and City Light. However, these	More detailed SLA's should be developed and regularly updated.

customer groups.	agreements are not very comprehensive and have not been updated in many years.	
Steps have been taken to inform customers of their responsibilities as drivers of City vehicles, to provide service instructions, and to answer frequently asked questions.	Fleet policies and procedures provide guidelines.	Policies should be updated and included on FSD's intranet web site.
A performance measurement system is in place and customers receive regular updates on the service provider's performance.	Some performance measures are tracked but many industry standard measures are missing. Customers do not receive updates.	FSD should implement an expanded performance measurement system.
Customers receive regular and useable fleet costs and management reports.	Information is provided when requested. FSD also dumps billing information into a data warehouse so that customers can run their own queries.	Development of standard Crystal Reports against the Fleet Anywhere data base would provide customers with focused management information.
Customer satisfaction surveys are conducted at least once per year.	Survey cards are placed in vehicles after services are complete. Response rates are reportedly low, but the cards that we were given to review showed a high level of satisfaction.	FSD would benefit by creating a page on its intranet site to solicit anonymous comments from customers.

Summary of Findings and Recommendations

- FSD should create a Fleet Advisory Board to give the major customers who rely on vehicle services an active role in running the fleet business. Board members provide perspectives, experiences and talents that enable the fleet services organization to improve operations and to increase the satisfaction of all customers. The Board should participate in recommending policy changes, review financial performance, and monitor achievement of production and customer service goals, among other activities.
- FSD should develop detailed service level agreements with each major customer group. Service level agreements offer a quasi-contractual arrangement between a service provider and customers. They outline the services provided and the expectations placed on both parties. The agreements should be customized to each department (and in some cases divisions within a department) in order to capture the unique operating characteristics and fleet support needs of each organization. Detailed performance standards should be included in the agreements as well as reporting requirements.

- FSD should implement a more robust performance measurement system and distribute monthly updates to key customers. Following are examples of recommended performance measures:

Performance Measure	Description	Target
Average Fleet Age	The age and accumulated use of a fleet has a great impact on cost and service level performance indicators. As such, relative fleet age should be tracked over time in parallel to key performance measures in order to track trends and to document the impact of lower or higher capital spending levels.	One-half of the avg. stated fleet replacement cycle – normally 3.5 to 5 years for a typical municipal fleet
Fleet Operating Rates Hourly Labor Rate Parts Markup Fuel Markup per Gal Sublet Markup	Properly constructed and calculated operating rates provide a strong indication of cost competitiveness, and an ongoing mechanism of comparison with other service providers.	$60 - $80 per hour 25 to 35% 5 to 8 cents/ gal 5 to 10%
Number of Vehicle Equivalents per Technician	A measure of staffing adequacy. In a fleet of reasonable age and condition, each FTE technician should be able to support the benchmark number of vehicle equivalents of between 100 and 120.	125
Trades Worker Utilization (direct labor hours)	A measure of maintenance program productivity, this measures the average number of hours billed to work orders by each FTE technician annually. Low utilization indicates possible over-staffing and/or inefficient work processes.	70 to 75% of payroll hours
Overtime Rate	A measure of staffing efficiency and effectiveness. A benchmark level of productivity coupled with reasonable overtime levels indicates an optimally staffed operation. Low productivity and high overtime indicates serious staffing imbalances. High productivity and high overtime indicates probable staffing inadequacies.	5% to 10% of productive hours

Performance Measure	Description	Target
Commercial Repair Rate	A measure of the percentage of direct labor and parts costs that are outsourced to private vendors. A low percentage coupled with high overtime indicates a potential over staffing problem.	10% to 15%
Scheduled Repair Rate	Measures the portion of all repairs identified and conducted in a controlled, planned manner. The combined purpose of the PM program, operator inspections, and service writing is to identify and take care of problems in a planned, scheduled manner so they do not result in unscheduled and costly breakdowns.	50 to 66%
Road Call Rate	This measures the percentage of all repairs conducted on broken-down vehicles that cannot be driven to the shop. In combination with the scheduled service rate, it provides an indication of PM program effectiveness.	2%
Comeback Rate	This measures the percentage of time a customer returns a vehicle or piece of equipment to the maintenance operation for the same problem within a specified period of time. It is a measure of service quality that reflects the accuracy of service writing and diagnostic activities as well as repair quality.	1%
Fleet Availability Rate	This is one of the key measures of success in a fleet management program; the degree to which the fleet service provider is able to ensure the regular availability of fleet units to their user departments. Availability rates should be highest for mission critical fleet units	95% for the entire fleet and 85% to 98% for various types of vehicles

- FSD should make the generation, analysis, and distribution of management information regarding fleet operations one of its core fleet management services. This activity is an essential aspect of fleet management and is one of the key activities that separate true fleet management organizations from mere maintenance service providers. All fleet services organizations capture a vast amount of equipment data in their fleet management information systems. Routine monthly information should be provided to middle managers within the City regarding the costs for equipment maintenance, repair, and replacement as well as utilization. One of the goals of any internal service fund and charge-back system is to heighten customer awareness of the cost and utilization of equipment so that they are willing to evaluate alternatives. Without timely and useful information regarding the costs for equipment maintenance, repair, and replacement as well as utilization, such a process will not occur. Standard reports provide some access to this data; however, ad hoc reports are often required to customize data retrieval to a particular issue that is being researched. Many fleet management organizations now use a standard ad hoc report writing program such as Crystal Reports to publish Intranet-based reports for their customers to access. This allows the users of vehicles to manage their equipment more effectively.

9. MANAGEMENT INFORMATION SYSTEM

This section of our report covers our findings and recommendations relative to FSD's fleet management information system.

The primary application that FSD utilizes for its maintenance and repair activities is Maximus' FleetFocus FA (FA), which is an industry recognized tier 1 fleet information system. The application was implemented in August 2001 as an upgrade from Prototype[9]'s EMS character-based legacy system. The EMS system was used from 1993 until December 2001 when the system was permanently turned off.

FA is currently used in 7 maintenance facilities and one administration building. The application is also utilized by some FSD customers with read-only access fro security purposes. The Department is currently utilizing FA version 5.2.4 in a client-server configuration with Oracle 8.7i as its database running on a Windows NT 4.0 / IBM blade server managed by the City's IT Department. This is an acceptable system configuration. The following diagram illustrates FSD's FA server configuration.

[9] Prototype was the original developer of EMS and FleetAnywhere. Prototype was bought by Peregrine in circa 1999. Due to financial troubles Peregrine sold its fleet software product line to Maximus, which is a large government service provider. Maximus' fleet product line (i.e. M4 and MCMS) were the most significant competitor to Peregrine's FleetAnywhere at the time of the software's sale to Maximus. Maximus re-branded the FleetAnywhere product to FleetFocus FA.

However, the versions of Windows and Oracle are outdated. Windows NT 4.0 is no longer fully supported by Microsoft. As of September 1, 2001, the following key dates for the retirement of this product were announced:

- July 1, 2002 - Microsoft announced that Windows NT Server 4.0 (Standard, Enterprise Edition, and Terminal Server Edition) will no longer be offered through the Direct OEM or reselling channels.
- July 1, 2003 - Windows NT Server 4.0 (Standard) will no longer be offered through the System Builder channel.
- January 1, 2004 - non-security hotfixes will no longer available.
- January 1, 2005 - Pay-per-incident and Premier support will no longer be available. This includes security hotfixes.

It is our understanding that the FSD does intend to migrate to Windows 2003 Server Edition this year. We strongly recommend that FSD make this a short term priority to avoid any support issues that could result in system downtime. Additionally, we recommend that FSD upgrade its Oracle version from version 8.7i to 10g at the same time it performs the operating system upgrade. Version 10g offers significant performance gains over previous versions.

It is our understanding that FSD performs semi-annual upgrades to FA. This is a good practice, but consideration should given to changing to a quarterly update schedule to take advantage of the latest functional features and to stay current with patches that address potentially unknown issues. However, new releases should always be thoroughly tested before they are put into production.

We do not recommend nor foresee the need for the City to upgrade or replace FA over the next four to five years. The system provides sufficient functionality to meet the City's needs for the immediate foreseeable future. We are aware that Maximus is recommending that all their current users upgrade to its new web-based product, M5. However, M5 is a relatively new product and FA is not at the end of its life cycle. Therefore, we recommend that FSD retain FA as long as it is fully supported by Maximus.

FSD's overall use of FA appears to by very good. We reviewed vehicle master records and found that data was complete and entered in a consistent manner. Our review of shop activities indicates that data is consistently entered into the system as services are completed. Staff appears to be well trained and knowledgeable about system functions and operating procedures. We did not notice any major differences in the way that the system is used from shop to shop. Our recommendations for system use are as follows:

1. We recommend that FSD consider increasing the number of workstations on the shop floor to limit mechanics' travel in the shop. It is our experience that mechanics tend to engage the information stored in a system, such as history and parts availability, when the system is close to their work bays;
2. We recommend that FSD begin having mechanics and parts personnel record transactions in real time. Batch possessing transactions nullifies a number of significant functional features of the system;
3. We recommend that FSD begin tracking work order delays in the system to gain a clear understanding of work order life-cycles and to provide customers with fleet downtime information (FSD has indicated that it plans to implement this suggestion in early 2005).

Web-based FA Motor Pool Module

In July 2004 FSD purchased the FA web-based motor pool module from Maximus, which is a module that will allow City employees that want to reserve pool vehicles to do so on-line through the City's Intranet. The implementation of this solution is considered an industry best practice, because it will eliminate the current manual reservation process[10] and allows FSD customers to access its services on demand.

To support this initiative FSD has implemented a third blade server to provide the web services necessary to run the FA motor pool module. As with the other servers that support the FA application, this server should be a Windows 2003 server with current hotfixes and patches appropriately tested and applied.

We also recommend that FSD develop analytical tools that will help the organization valid the size and efficiency of its motor pool operation. These tools should track demand versus supply of pool vehicles, number of dispatches per vehicle per day, number of idle vehicles per day, number f turndowns per day, average hours per trip, average days per trip, and average revenue per vehicle. FSD should ultimately be in a position to compare the cost of issuing a pool vehicle to use of a commercial rental car or reimbursing employees for use of their personal vehicle on a trip by trip basis.

FA Information Distribution and Web-based Reports

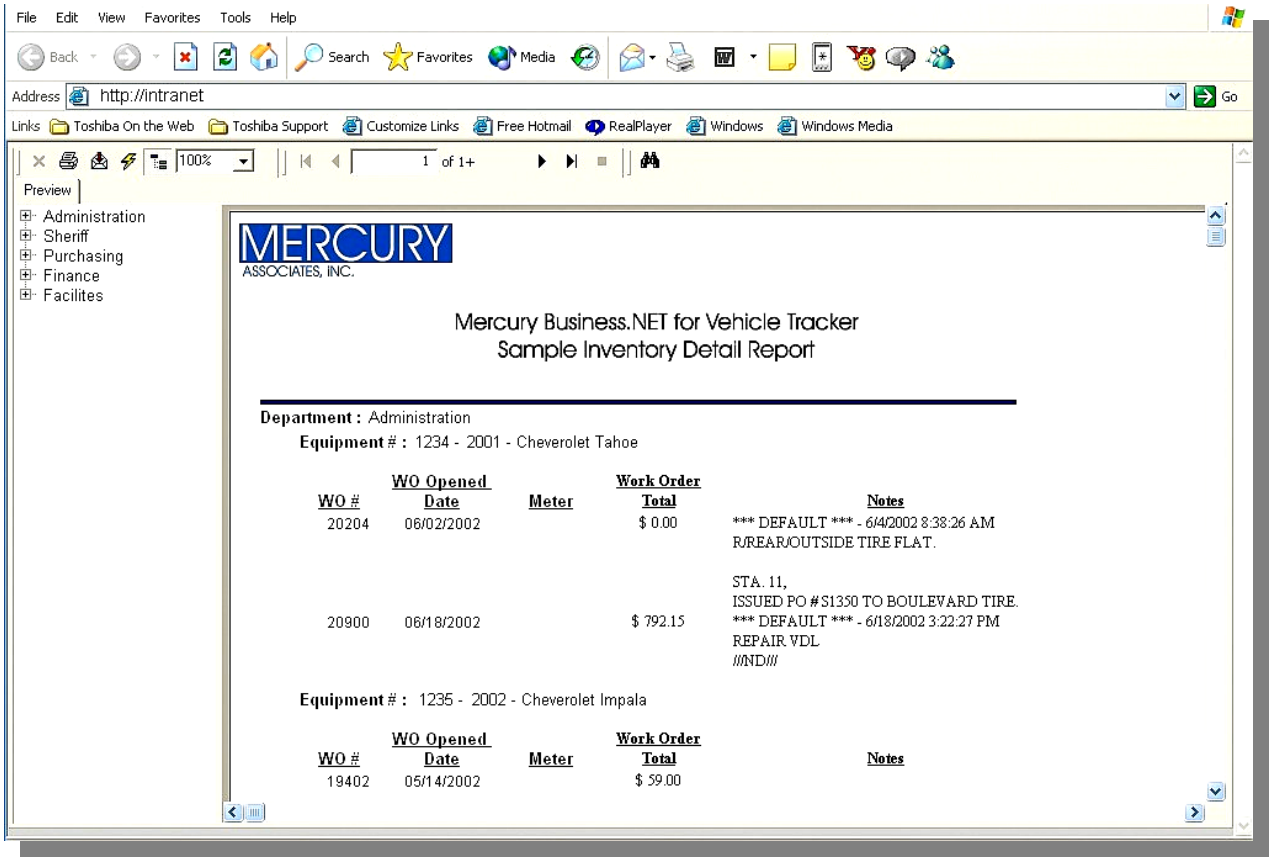
In addition to providing key customers with read-only access to FA, FSD publishes various fleet reports through an MS Access solution called FAReports. This solution is

[10] Motor pool reservations are currently managed by e-mail and phone by FSD staff.

limited in its functionality and does not provide users with parameters to narrow their report queries.

One of the leading trends in the industry is that fleet management organizations are providing their customers with information stored in their information systems (e.g. FA) through read-only reports that are accessed through secure Internet and Intranet web pages. This reporting capability allows fleet customers to manage their own vehicles and equipment by looking at reports that show utilization, fuel consumption, billing records, work orders, and inventory details.

Such reports also improve customer relations by providing transparency and a feeling on the part of customers that the fleet organization is ready and willing to provide complete information on fleet operations. An example of this concept is presented in the image below.



We strongly recommend that FSD consider investing in an ad hoc report writing solution and reporting engine (e.g. Crystal Reports and Crystal Enterprise) and train key personnel on its use. We suggest that three or four staff members attend certified product training, both novice and advanced training session, whereby these individuals can gradually assume managing typical reporting requirements. It is our understanding that the City may already have a Crystal Enterprise platform available that FSD could

use. If not, the Department could use its FA motor pool web server to host the web-based reports.

Bar Coding and Handheld Devices

One of the key initiatives that FSD has planned for 2005 is the implementation of bar coding. It is recommended that during this implementation that FSD consider bar coding not only employee badges, parts and services, but also asset VIN numbers, property control numbers, and inspection codes. The labels that are placed on a vehicle are usually located in the door jam, under the hood of the engine compartment, or inside the cab. Those assets that require bar codes to be exposed to weather elements require special coated all-weather labels or etched metal tags.

Most fleet systems like FA use one dimensional bar coding which consists of vertical bars of various widths that represent number and letter characters. One dimensional bar codes are limited because they contain only one field of information (e.g. part id). Two dimensional bar codes contain multiple fields of information, which is why they require special 2D readers that can read a wide spectrum and translate the scattered dashes and lines of a 2D label.

One Dimensional Bar Code

Two Dimensional Bar Code

Another initiative planned this year by FSD is to implement handheld devices to assist with parts management. The use of PDA or handheld devices for parts inventory control is an industry best practice, because parts personnel can perform inventory audits and other tasks much more effciently than with traditional methods.

Devices that are enabled with WiFi can also perform real-time transactions locally in facilities. In addition, through CDPD, GSM, or CDMA wireless communications a user can roam the entire City and access FA and other business applications in a real-time environment – no differently than the workstations on the shop floor at the repair facility.

An alternative to handheld devices is the use of tablet PCs, which were introduced by Microsoft in the Fall of 2002. With the release of Microsoft's Windows XP Tablet PC Edition several vendors (e.g. Compaq, Toshiba, and Acer) have launched tablet PCs lines. Tablet PCs are essentially fully functional computers (i.e. include hard drives, USB and COM ports, and 12" displays) that weigh three lbs and are available in a clam-shell or tablet design. Most tablet PCs include 802.11b wireless communications for local area (i.e. 300-500 feet from access point) mobile communications.

Panasonic offers a ruggedized tablet PC, which was released early in 2003. The cost of the Panasonic rugged tablet PC is approximately $2,500-$3,200 – according to their resellers. This solution is preferred over the ruggedized PDA devices in most cases, because the additional screen real estate allows users to see applications, like FA and electronic equipment manuals, in full view. Moreover there are many more applications developed to run on tablets then PDAs, which provides a faster return-on-investment.

Fuel Management

FSD manages approximately 25 bulk fuel sites throughout the City of Seattle. This is a typical responsibility for a municipal fleet operation. However, the technology used to manage the bulk fuel operations is a fairly antiquated version of Petrovend (i.e. K Series). The application is 8-10 years old and requires a total overhaul. FSD has understandably held off from performing this task, because the cost of this upgrade is fairly significant due to the need to replace the software and hardware at each facility.

The danger in prolonging a needed upgrade to the fuel system infrastructure is the increased potential for long periods of system outages caused by an increasingly unreliable system. These problems are exacerbated due to difficulty finding replacement parts, the need to buy less reliable used and refurbished parts, difficulty locating service resources, and increased cost for parts and services. At this time is not possible to provide a reasonable estimate as to the cost of upgrading these sites without visiting every location to verify its utilities and other resources. FSD should conduct a study to identify the cost of upgrading this infrastructure in the near future.

Commercial or retail fuel purchases are performed with vendor specific fuel cards (e.g. Chevron) or general Visa purchasing cards. The vendor specific cards provide for fuel only purchases and FSD is informed of the transaction on a regular basis. The Visa purchases are reported to FSD by the customer Department that utilized the card to buy the fuel.

Looking to the Future

There are several new technologies available that FSD should consider implementing in the future that could add value to its fleet operation and to other City departments. The following are some of the technologies that FSD should consider.

GPS Solutions

One of the best solutions available today for any organization with a fleet is GPS tracking, because it offers benefits to drivers, department administration, and the fleet operations. For example, drivers can be provided with step-by-step driving directions and routing with 100% coverage of the US and Canada. This functionality is particularly useful for routing support services, such as snow removal, and emergency services. Both through voice and text messaging drivers can communicate with dispatch personnel to re-route drivers to new locations to perform tasks.

Other benefits include detailed vehicle tracking, reporting, text messaging, constant access to data critical to performing detailed and accurate fleet cost analyses and other

liability management activities; such as fuel consumption, mileage, throttle/braking habits, average speeds and crash data retrieval. The following graphic illustrates some of the detailed information available.

Print

SPF / Fleet reports Webfleet System ver.1.0 30/10/2003

Vehicle Usage per Driver - Detailed

From date: 30/9/2003 **To date:** 30/10/2003 **From time:** 12:00:00 AM **To time:** 11:59:59 PM
Between times each day: No **Vehicle:** QX4887D-MAZDA 214887

Vehicle: 214887 **Description:** QX4887D-MAZDA

Date	Start time	End time	Time period	Driver	Description	Average speed(Km /H)	Max speed (Km /H)	Speeding		Idle time			Odometer(Km)		Trip distance (Km)	Trip cost(! MISSING ! = S$)
								Time	Counter	Total	Engine running	Counter	Start	End		
30/9/2003	08:53	09:03	00: 10	0000000000	AEMD	0.6	25	00:00:00	0	00:10	00:00	1	27338	27338.1	0.1	0
30/9/2003	09:03	09:05	00: 02	0000000000	AEMD	6	14	00:00:00	0	00:00	00:00	0	27338.1	27338.3	0.2	0
30/9/2003	09:10	10:41	01: 31	0000000000	AEMD	22.3	60	00:00:00	0	00:06	00:06	5	27338.3	27372.2	33.9	0
30/9/2003	11:11	12:06	00: 55	0000000000	AEMD	28.6	64	00:00:00	0	00:04	00:04	3	27372.2	27398.5	26.3	0
30/9/2003	12:06	12:26	00: 20	0000000000	AEMD	23.1	55	00:00:00	0	00:01	00:01	1	27398.5	27406.2	7.7	0
30/9/2003	15:26	15:32	00: 06	0000000000	AEMD	1	14	00:00:00	0	00:02	00:02	2	27406.2	27406.3	0.1	0
30/9/2003	15:32	15:38	00: 06	0000000000	AEMD	1	9	00:00:00	0	00:00	00:00	0	27406.3	27406.4	0.1	0
30/9/2003	15:57	16:03	00: 06	0000000000	AEMD	1	4	00:00:00	0	00:03	00:03	2	27406.4	27406.5	0.1	0
30/9/2003	16:15	16:18	00: 03	0000000000	AEMD	2	7	00:00:00	0	00:00	00:00	0	27406.5	27406.6	0.1	0
1/10/2003	11:04	11:42	00: 38	0000000000	AEMD	20.3	57	00:00:00	0	00:04	00:02	2	27406.6	27419.5	12.9	0
1/10/2003	14:05	15:15	01: 10	0000000000	AEMD	24	64	00:00:00	0	00:06	00:04	4	27419.5	27447.6	28.1	0
1/10/2003	15:16	15:43	00: 27	0000000000	AEMD	24.8	57	00:00:00	0	00:06	00:04	2	27447.6	27458.8	11.2	0
1/10/2003	15:43	16:23	00: 40	0000000000	AEMD	25.6	57	00:00:00	0	00:04	00:04	3	27458.8	27475.9	17.1	0
2/10/2003	09:23	10:08	00: 45	0000000000	AEMD	27.4	56	00:00:00	0	00:01	00:01	1	27475.9	27496.5	20.6	0
2/10/2003	11:04	11:33	00: 29	0000000000	AEMD	30.6	63	00:00:00	0	00:00	00:00	0	27496.5	27511.3	14.8	0

1 , 2 , 3 , 4 , 5 , 6 >>

GPS solutions can also ensure the safety of drivers with remote driver assistance. It can send notifications of rapid deceleration or provide remote vehicle diagnostics and unlock doors remotely. Moreover, it can also increase vehicle security by ensuring that only authorized drivers have access to City vehicles by using biometric user recognition. GPS service is available for as little as $18 per month per vehicle.

INSTANT MESSAGING

A pervasive communications tool used in the business world today is instant messaging. It allows two users to exchange text messages as if they were having a typed conversation. In the fleet industry many fleet operations have implemented secure instant messaging to allow mechanics, supervisors, parts personnel, dispatchers, and even drivers to communicate with each other without having to leave their current location. For example, a mechanic may want a supervisor to come and look at a vehicle when s/he gets a moment. The mechanic doesn't need the supervisor at the exact moment, because there are other tasks that can be performed on the work order. Because the IM pops-up on the supervisor's workstation or text messages his/her phone or pager, the mechanic does not have to walk around the facility looking for the supervisor. Instead the supervisor (i.e. a non-billable resource in most cases) will initiate the contact when s/he is available.

IM is a free resource that can be implemented and maintained with minimal effort.

Summary

In general FSD is fairly progressive in the area of fleet technologies and appears to capture detailed information. The organization's biggest improvement can be made in

the area of information distribution to its customer base. This is a challenge that many fleet operations are struggling with as personnel resources become scarcer due to budget constraints while at the same time customers' demands for information grow due to more awareness of the need for good fleet management.

To meet this challenge FSD must maintain channels of communication with its client base to define customers' information needs and rely upon various technologies to deliver this data in a friendly, meaningful format. This will mean having tools, such as web-based reports, that allow users to pull fleet information from FSD's data stores and applications that push information to the user at specific user-defined milestones without FSD personnel involved. Technology will allow FSD to scale its operation and services vertically for its customers, but the Department must also stay connected to its customers' fleet needs to make sure they are delivering the right resources.

10. MAINTENANCE FACILITIES

This section of the report covers our high level review of four of the primary existing Fleet Services Division Vehicle Maintenance Facilities:

1. Charles Street Complex – 805 South Charles Street, 814 8th Avenue South, and 815 South Dearborn Street
2. South Service Center Facilities – 4th Avenue South at Spokane
3. Haller Lake Facilities – 128th Street North at Stone Avenue
4. Cedar Falls Facilities – Approximately 30 miles east southeast of Seattle, near I90

Each of these sites was visited and the space was reviewed, to determine the strengths and weaknesses of the operations that are attributable to the strengths/weaknesses of the facilities. Certain conclusions reached during the review have led to some strategic-level recommendations. It is important to note that MAI was not asked to conduct a Space Needs Assessment. This is a more detailed operational analysis that would address the current and proposed sizes of the individual work areas and relate each specific work area to the operations conducted therein.

Charles Street Complex

Site. The compound has been in use for over fifty years. It is completely surrounded, and there are no more opportunities to expand the size of the compound. Over the years, the mission has increased, the size of the fleet has increased, and the surrounding area has been filled out. As a consequence, and not unexpectedly, the areas that have been outgrown are the ones that consume the most space:

1. Employee parking
2. New vehicle staging
3. Vehicles awaiting disposal action

4. Motor pool vehicles, including a loaner fleet for summer hire programs, special jobs, etc.
5. Shop vehicles (tankers, repair trucks, shop vans, wreckers, etc.)
6. Vehicles awaiting maintenance (called “deadline vehicles”)
7. Vehicles and equipment that have been repaired and are awaiting customer pickup (generally referred to as the “ready line”).

As time passed and as growth took place, these areas have been rated and ranked according to mission criticality (this rating and ranking process is sometimes accomplished consciously and sometimes subconsciously). In any case, certain reallocation decisions were made that took space from some areas and gave it to others, allowing the work to go on in a relatively efficient fashion:

1. Except for supervisors, employee parking has been relegated to leased facilities a short distance to the south. The supervisor’s parking spaces have been designated, and remain at the compound.
2. A new vehicle staging area has been leased, positioned adjacent to the leased employee parking area.
3. Vehicles awaiting disposal action are closely managed, and these vehicles are auctioned off frequently, reportedly about 8 times each year[11].
4. Some of the motor pool/loaner/special use vehicles are positioned elsewhere within the city.
5. Shop vehicles have number- or mission-designated, closely monitored parking spaces. When these spaces are “violated”, vehicles are sometimes left unattended in wider drivelines.
6. Deadline vehicles have a separate, designated “line” of spaces.
7. Ready line vehicles have a separate, designated “line” of spaces.

There are four main vehicle maintenance facilities on the compound including a fuel facility, dispensing unleaded, diesel, and compressed natural gas.

Facilities. Constructed in the early fifties, the most prominent fleet maintenance facility at the complex is the main vehicle garage (805 South Charles Street). This rather large facility now houses several of the primary maintenance operations, including the capitalization program, the car shop, and the truck shop. Also positioned within this facility are the various shop operations: paint shop, body shop,

[11] We commend the city for conducting frequent auctions. Inventories remain lower, and point of sale dollar value is higher.

fabrication shop, and machine shop. And there is a rather large warehouse operation located within this facility as well. Upstairs above the warehouse are the employee amenities: men's and women's locker/rest rooms, and a lunch/break room. An area in the front is used for data entry/administration and customer interaction. Because of the age of this facility, its' positioning on the site, and the associated site restrictions, it would be very difficult and expensive to add to the available square footage.

814 8th Avenue South is the address of the Tire Shop. This facility includes the drive through vehicle wash, a separate area for motorcycle maintenance, equipment service bays, and a large storage area for tires. Additional, covered storage for still more tires is located to the east. A mezzanine above the northernmost section of the facility serves as additional storage space for tire storage. The facility and the covered storage area are completely surrounded by either driveline or perimeter fencing; there is extremely limited space available for additions to the current configuration.

815 South Dearborn Street is the address of the Fire Garage. We understand that, while this is the newer of the two larger facilities, it is approaching thirty years old. There are several bays in the facility where maintenance can be performed on the EMS trucks, vans and pumpers. And there is an area within where the aerial trucks can be picked up and maintained. Also, there is a specialty shop for miscellaneous maintenance, and a warehouse area. A mezzanine features a lunch/break area and locker/rest rooms. The facility is surrounded by driveline, perimeter fencing, and vehicle staging/parking areas. It appears that space for additions to the current configuration is not available.

Operations. The main garage and tire shop maintenance facilities at this compound remain occupied through two shifts. All employees enjoy flex-scheduling, and work either 9/80 or 10/80. Warehouse operations remain open in support of both shifts. Recent additions to the customer list: Redmond and Lynnwood (motorcycles) and State of Washington patrol cars.

At the main garage (**805 South Charles Street**) the Car Shop has 10 car bays, manned on the first shift by seven mechanics and on the second shift by four mechanics and one servicer. There are approximately 10 Truck Shop bays, manned by nine first shift mechanics (including the two Watershed mechanics) and five second shift mechanics.

Two supervisors (Car and Truck Shops) work the first shift, and a single supervisor directs second shift operations. The paint/body shops have six worker/painters working on the first shift under one supervisor. The machine/metal shops have eight machinists/fabricators working on the first shift under one supervisor, and one working during the second shift. The machinists/fabricators have an "other-duty-as-assigned (ODA): care and maintenance of the fuel sites, and fuel testing.

The capitalization shop is a single [first] shift operation. Four mechanics work in perhaps two bays. ODA for this operation is the disposal/auction program. The bays are short, and the shop occupies a smaller space than the workload dictates.

The single ingress/egress is adequate, because the drive line within the shop is circular. Turning radii within the shop is adequate. Ceiling height is lower than that found in the shops programmed by MAI, but no complaints surfaced during the review. Oil Distribution appears to be adequate and available throughout. Lifting and hoisting capabilities are also adequate; some of the lifting devices are "roll-around", providing additional flexibility.

Warehouse operations are centrally located and secure. Seven employees work the first shift, and one works the second shift. While there was very little interaction with warehouse personnel during the review; on the surface the area seemed crowded with parts, and circulation appeared to be restricted. This is typical for fifty-year old facilities

Air exchange is considered to be adequate. The presence of ambient light is excellent – quite noticeable. The exposure is western; we suspect the facility can be warm in the afternoons during the summer months.

The shops are fairly good-sized, relative to what we typically find in metropolitan areas similar in size to Seattle. The metal/fabrication shops are crowded with tools, but this is typical. Older tools generally remain in service, even those that use three-phase power. As newer specialized tools are purchased and installed, shops are reluctant to dispose of the older ones, because they still have operational value.

The paint shop still uses some of the older equipment. We know that the cost to replace this equipment is often very high, often prohibitive.

The tire shop and motorcycle maintenance shop are located at **814 8th Avenue South**. Additionally there is a drive through wash bay. There are three or four PM/tire service bays, occupied by three Equipment Servicers during the first shift. Motorcycle maintenance has two technicians (one on each shift), and occupies an area roughly equivalent to two standard car bays. This area is drive through-configured.

Three Equipment Servicers work the second shift. ODA for this operation are [a] towing services; [b] operating a tanker, dispatched to the South Services Center and Water Operations during the second shift, to top off fuel for the fleet of vehicles staged there; and [c] responding to road calls. One supervisor handles this operation and works the

first shift; the second shift is overseen by a Senior Auto Mechanic who also does maintenance work on the motorcycles.

The bay areas are very well lit, since the bay doors are glazed. We did not receive any indication that the area is not adequately lit or heated. Lifting devices are positioned throughout. Many dozens of tires are stored within this facility (on two levels) and adjacent to it (in an open, covered area).

The fire garage is located at **815 South Dearborn Street**. It is an expansive facility, with drive through capability: there are five overhead doors on the eastern- and western-most sides.

Fire vehicle maintenance is a single shift operation, with nine mechanics on duty. One of the mechanics operates from a shop van, accomplishing maintenance at the more than thirty fire stations throughout the city. We have seen this “house call” approach in other cities, and recognize it represents a tremendous customer service in the interests of readiness. Still, the amount of windshield time required is a drain on what may otherwise be an efficient operation. We are not suggesting discontinuation; only that this practice remain an acknowledged one, should the efficiencies of operation be challenged in some way.

The facility is very well lit and well heated, and the clerestory glazing on the easternmost side of the facility allows a great deal of natural light to enter. Lifting capability for the larger trucks is available, and the ceiling height is considered adequate. Warehouse operations are centrally located, and the employee amenities are positioned below the mezzanine. Adjacent to the warehouse is a small engine repair shop, and an area for specialty repairs. If the weather is inclement, ladders can be stretched [not elevated] within the facility for limited maintenance, testing, and certification.

Conclusions. The facilities and operations at this site exert a tremendous amount of outward pressure on the site. Little or nothing can be done to add to the site. Some rearrangement is possible and perhaps some modifications can be made within the existing footprint to relieve some of the pressure.

Which operation occupies the tightest space? Further study would be required to pinpoint the existence of any bottlenecks, and where the most significant ones are. Without benefit of all the tactical information, we suspect that the Capitalization Shop within the main garage loses certain efficiencies because the work is accomplished in a very tight space. We understand that, due to lack of space and/or resources, some Capshop work is outsourced that could otherwise be completed in-house.

Can the Fleet Maintenance organization be relocated? The site is considered to be very strategically positioned for the associated mission. We understand that relocation to another site may not be affordable, and would probably have a negative impact on the efficiencies associated with the current location. A detailed time and distance study

would be needed to validate this allegation. And in the event that another location within the city would prove to be equally efficient, finding available real estate at or near the location pinpointed by such a study is highly unlikely. Moreover, the cost to prepare a new site for contemporary fleet maintenance operations will be high.

Can the other occupants of the site be relocated? The site is occupied by other city organizations. These organizations consume space, and in at least one case, consume a great deal of space (SDOT vehicle staging). Relocation of these organizations may not be palatable to city officials, but it would free up a considerable amount of space at the site. Discussions among appropriate city officials to determine the feasibility of any repositioning may have already taken place. If not (or if it has not been raised in some time), the issue should be raised (once again) to see if it will find any traction.

Without changing anything else, can additional square footage be uncovered on the existing site? Primary entry to and exit from the compound is to the west. There is a secondary ingress/egress to the north that is often closed off, to preclude penetration by local traffic. Permanent closure of this ingress/egress may not be palatable to either the Fire Department or the resident organizations, but the resultant available space could be programmed for use. Adding additional floors to the existing facilities is probably not affordable, based on the age of the facilities, and the original construction methodology. For the same reasons, adding to the existing mezzanine[s] is not an option. Essentially, the site is full. A detailed space needs assessment and/or facilities programming and planning study would be useful, to verify these conclusions from both a tactical and strategic perspective.

Recommendations. Take no action to rearrange, reposition, add, alter, modify[12] prior to conducting a Space Needs Assessment. The Assessment should include a time and distance analysis, to locate quadrant[s] that should be considered in case the Assessment concludes that relocation is necessary.

It might be possible to move one or more of the [e.g.] shop operations to another location. To learn if this is feasible, the Assessment should include an enumeration of the operations that could be “split off” and repositioned elsewhere. The Assessment should rank these operations according to the level of efficiency that would be lost, gained, or not affected.

[12] In this case, “modify” specifically includes the purchase and installation of new equipment/property for the paint shop.

South Services Center

Site. The South Services Center is located less than three miles to the south and slightly west of the Charles Street Complex. There are several facilities at the site; one of the facilities is provided to FSD for the ongoing vehicle maintenance programs. Unleaded and diesel fuel are available at a station located at the Center. There are a very few staging spaces available for shop, deadline, and/or ready vehicles. Parking spaces on the compound are not available for the employees.

Facilities. Built in the sixties, the facility is completely surrounded by driveline. Two overhead doors at either end of the shop allow for drive-through capability. Construction type is concrete, permanent.

Operations. About eight mechanics work the first shift at this Center. Four mechanics and an Equipment Servicer work the second shift. The main client is City Light, and that fleet is co-located. Much of the equipment is aerial-lifts. The aerial-lift equipment require periodic overhaul; this relatively intense level of maintenance is accomplished in house, but a fair number of aerial overhauls are completed by the private sector.

When the shop is full, there is enough space for inducting 8-10 vehicles. Additionally, there is a relatively large area adjacent to the car bay that is reserved for major assembly rebuild.

For certain maintenance procedures, the ceiling height is inadequate, because the man-lift equipment cannot be fully elevated. As a consequence, some of the work must take place outdoors.

The Supervisor's office is positioned at the entrance driveline, adjacent to the parts warehouse. Apparently the parts warehouse is not secure; we observed mechanics retrieving supplies and materials. A smaller mezzanine is located above the warehouse, where vehicle maintenance supplies and equipment are stored. There is a wash/steam room on the other side of the drive line.

At the opposite end of the shop near the egress are a tools area and reference library, a compressor area, and a small oil distribution room. Above is a mezzanine, with a lathe/workstation, employee amenities area, and a storage area for City Light supplies and equipment.

Air exchange is reportedly adequate, and the area heating is also reported to be adequate. The facility does not get overly hot in the summer, remaining relatively cool in the heat of the afternoon. Eight hoists are available, all in-ground except for the above-ground car bay lift, positioned adjacent to the wash/steam room.

Conclusions. The two shift operation is effective and probably relatively efficient, since the supported fleet is in such close proximity to the maintenance facility. This provides the Supervisor with a great deal of flexibility in scheduling, which in turn plays an important role in maximizing the customer's readiness.

This facility cannot grow. We did not review the other facilities at this site, but assume there is no additional space available. And since we did not review the other facilities, we do not know if the configuration of any these facilities would support vehicle maintenance work.

The level of maintenance effort expended on the man-lift equipment serves to increase the associated VE count. In other words, if this type of work was outsourced, the hours spent overhauling the equipment could otherwise be spread across the rest of the fleet. It is important to note that much of the aerial work is done in-house due to poor experience with the one vendor in this area who works on aerial devices.

Recommendation. Include the South Services Center in the previously recommended Space Needs Assessment. Insure that outsourcing the overhaul work is addressed.

Haller Lake

Site. The Haller Lake Shop is located several miles to the north of the Charles Street Complex. The site appears to be adequate in size, and at times the staging area at times appears to be empty. It was noted, however, that the available space is completely consumed when the supported fleet is staged at the site in the evening. Adequate space is available in front of the facility for employee parking, for positioning the deadline and ready vehicles, and for staging the three or four vehicles used by Vehicle Maintenance. The site includes a fuel station, with diesel and unleaded available for consumption.

Facilities. The driveline runs from west to east within the shop. Overhead doors are at either end, providing drive through capability. Maintenance bays are on either side of the driveline, with the smaller vehicle bays to the south, directly in front of the warehouse, tool room, and compressor room. The heavier vehicle bays are facing the north wall, much of which is glazed, allowing the entrance of a great deal of natural light. A recent construction project removed and replaced a large portion of the cement flooring inside the facility. Construction type is masonry, permanent.

Operations. All vehicles stationed north of the Ship Canal are maintained at this shop. The primary customers are City Light, Seattle Public Utilities, Seattle Police, Parks and SDOT. Many of their vehicles are staged at this site; others are staged at Seattle City Light's North Services Center, a facility located a short drive to the south.

There are eight mechanics that work the first shift at this facility, along with an administrative assistant and a part time general assistant. Seven mechanics work the second shift, as well as two Equipment Servicers. The second shift is charged with servicing a fleet of vehicles staged at the North Services Center. Throughout the second shift, the Servicers and mechanics shuttle the maintenance candidates to the Haller Lake facility for maintenance, and return them to the North Services Center North Water Operations base located across the street from the Haller Lake facility when maintenance is completed. The second shift Equipment Servicers are also charged with topping off fuel in the tanks of vehicles staged there.

There are two or three overhead cranes that run on tracks under the ceiling, providing additional lifting capabilities. While lower than what MAI would otherwise program in new facilities, the lower ceiling height apparently represents no major work stoppages, nor provides major interference.

The mechanics at Haller Lake have access to eight car bays and perhaps six truck bays. There is a wash area adjacent to the entrance to the facility.

The warehouse is open through both shifts, and is apparently secured during both shifts. A mezzanine above the southernmost area provides additional square footage for the supplies and materials, and is the location for the employee amenities.

The overhead doors slide rather than lift; this has successfully reduced the amount of maintenance they would otherwise require.

On the northernmost side of the driveline, a new oil distribution system, mounted on swing arms, will allow for access by mechanics working in up to three bays. This system is currently being installed.

A turbine-powered air exchange system within the facility is considered excellent, and there were no major issues with the heat.

Conclusions. It appears that additions or modifications to this facility – increases to the existing footprint - could be accomplished if needed. If planned and programmed correctly, there would not be any corresponding loss to the existing staging areas.

The Vehicle Maintenance operation at Haller

Lake is focused on the needs of SDOT and City Light, as evidenced by the second shift shuttle and refuel service. Without addressing any of the maintenance practices, we understand that charges for these shuttle and refueling services are relatively low.

Recommendations. Include the Haller Lake Garage in the previously recommended Space Needs Assessment.

Cedar Falls

Site. The Cedar Falls Vehicle Maintenance facility is located several miles east southeast of Seattle, four or five miles south of Interstate 90. There are several other facilities on the site, apparently used by the city of Seattle in support of watershed operations there. The site is relatively large, with staging available for several dead line or ready line vehicles and/or pieces of equipment, and two service trucks.

Facilities. The single, brick/block, permanently constructed facility is a rather small building, perhaps 900 square feet (SF) in size. There are two conex containers nearby, used to store tires. Recently added to the facility are two concrete pads, one covered by a canopy and four sides of heavy material (840 SF), and the other uncovered (850 SF), featuring an above ground hoist. The facilities are not very well lit and not very well heated. Obviously, the canopy area and outdoor bay area are not heated at all, and any light to these areas is primarily ambient.

Operations. Two mechanics work at this facility and elsewhere in the area. Two lighted, heated bays are available, sized at roughly 10'W x 25'D. Ceiling height is very low, perhaps 14'H.

While the facility is generally considered to be "home base" for these mechanics, they rarely proceed to this facility until after they have visited the site at Lake Young, where vehicles are staged. There is a single bay garage located at Lake Young and a small hoist. First thing in the morning, they park their privately owned vehicles at Lake Young, complete the work they need to do there (a fleet of 20-30 vehicles and pieces of equipment), then proceed in the shop van to the Cedar Falls facility to complete the work they need to do there (a fleet of 100-120 vehicles and pieces of equipment). The one way drive from Lake Young to Cedar Falls takes 45 minutes to an hour, depending on traffic.

Approximately twice each month or more, they proceed to a site at Tolt, where another 20-30 vehicles and pieces of equipment are staged. The drive one way from Cedar Falls to Tolt takes an hour or more.

The Fire Training Academy (which is a division of the Washington State Patrol) is a new customer for the Cedar Falls mechanics. There are 10-15 vehicles located at the Academy, which is approximately half an hour distant from the Cedar Falls facility. There is no facility at the Academy large enough for all the maintenance that needs to be performed there. Without any written guidance, the mechanics are under the impression that the Fire Academy has a higher priority than any of the others. The curriculum largely revolves around the availability of the vehicles and equipment, and classes would ostensibly grind to a halt without them.

Today, the mechanics must crawl under the larger vehicles (as well as work on them outside). We understand that talks are currently underway to see if the Fire Training Academy would be willing to deliver their vehicles and equipment to Cedar Falls for maintenance. (We have not talked to SPU about this formally yet – we need to get their buy-in before we can pose this question to the Fire Academy.)The outdoor lift at Cedar Falls is rated at 30K, large enough to raise the entire fleet, including the largest equipment owned by the Fire Training Academy. This would simplify the associated maintenance procedures – not the best solution, but an improvement.

Finally there are several worksites throughout the watershed district where vehicles and equipment must be serviced. The two mechanics schedule time to attend to the vehicles there – more windshield time, and work accomplished in the worst of conditions.

It is important to note that we support the practice of dispatching both mechanics to the various maintenance locations as a team. This is a safety concern, practiced across the nation in best-in-class fleet maintenance operations.

Conclusions. By today's standards the Cedar Falls facilities are very inadequate. We would typically program small vehicle maintenance bays to be 15'W and at least 30'D. And the larger vehicle bays would be programmed to be 22'W and 45'D. And all bays should be well heated, well lit, and under roof. And while the ceiling height within the facilities may be 15'H, we would program unobstructed vertical clearance at 24'H. The facilities do not have adequate lifting devices, and the primary lifting device is outdoors, on a pad, exposed to the weather, regardless of how inclement. Air exchange within the facilities is not active, available when the overhead doors are open.

It is not difficult to imagine the amount of unproductive time these mechanics are forced to endure. Using information provided by the city, we can estimate that the two mechanics at Cedar Falls work on approximately 193 vehicles and pieces of equipment, a large percentage of which are positioned elsewhere. Using unweighted,

stationary averages, we estimate this fleet has roughly 375 VEs. Therefore, each mechanic is expected to maintain an estimated [375 VEs] ÷ [2 MX], or 177 VEs.

We typically measure mechanic's performance assuming each mechanic's workload to be 100-125 VEs. We have estimated Seattle's workload capacity at the mid-point of this range (112.5 VEs). If a fleet of vehicles and equipment contains 375 VEs, and if each mechanic is expected to be responsible for 112.5 VEs, then the number of mechanics required for this Cedar Falls fleet is [375 VEs] ÷ [112.5 VEs/MX], or 3.3 mechanics. Under standard conditions, therefore, the Cedar Falls staff should include 3.3 mechanics; the current staff is short 1.6 mechanics.

However, in the case of Cedar Falls. We conservatively estimate that the two mechanics are "en route" for perhaps 2-3 hours each workday (25%-40%). We can therefore logically reduce the expected workload by, say, 25%.

Using this logic, the expected workload for the two mechanics at Cedar Falls is [112.5 VEs] [.75] or 84 VEs. So if each of these mechanics can reasonably be expected to retain a workload of 84 VEs, then the number of mechanics required for this Cedar Falls fleet is *actually* [375 VEs] ÷ [84 VEs/MX], or 4.5. Under *actual* conditions, therefore, the Cedar Falls staff should include 5 mechanics; the current staff is short 3 mechanics.

We interviewed the Cedar Falls mechanics on more than one occasion, and commend them for maintaining high morale under these circumstances. Across the nation, we often find morale to be low in organizations where the staff is too small for the workload, and the work environment is inferior or unsatisfactory.

Two primary options exist: [1] Increase the number of mechanics, or [2] Reduce the amount of time spent en route.

Recommendations. Perhaps the supported organizations could be convinced to bring some or all of their maintenance candidates to the Cedar Falls location. This would effectively increase the number of VEs in each mechanics effective workload. But it is important to note that even if each and every vehicle and piece of equipment were brought to the Cedar Falls location, they would still be at least 1.6 mechanics short. And the shop is already too small.

We recommend that two additional mechanics be transferred to Cedar Falls as soon as possible, to address the workload. That way, one team could be dispatched on a consistent basis to the various locations, and one team could remain at Cedar Falls to work on the vehicles there, and respond to any emergency road calls in that area.

We also recommend a concession by the Fire Training Academy: they should be able to schedule maintenance for at least their larger pieces of equipment, and bring them to the Cedar Falls location.

Finally we note that the facilities need to be modified or otherwise substantially improved. Size limitations adversely impact the maintenance capabilities, and contribute to the backlog. The facilities at Cedar Falls are too small for a staff of two mechanics, and, since the existing workload is best addressed with at least four mechanics the facilities issue would only worsen with the addition of two mechanics.

Two mechanics working a first shift and two working a second shift is not an effective long term solution. We typically program maintenance bays dedicated to each mechanic regardless of the number of shifts.

We recommend the inclusion of the Cedar Falls vehicle maintenance facility in the previously recommended Space Needs Assessment. Once the results have been published, the planning, programming, designing, and construction of new facilities there should hold the highest priority for facilities improvements.

If these recommendations are implemented, and assuming a relatively stable workload, then it may not be necessary to hire the fifth mechanic.

Summary

The FSD maintenance mission continues to increase, yet the facilities remain the same - have remained the same for many years. Under these conditions, outward pressure on the facilities' footprint is inevitable. While operating two shifts in shops that have been outgrown can provide moderate, temporary relief, we typically program maintenance bays dedicated to each mechanic regardless of the number of shifts.

But when the shop is busy, there are often situations where it is difficult and sometimes impossible to remain efficient, or maintain a hazard-free environment within the shop. Five examples follow.

1. Deadlined vehicles and equipment crowd drivelines within the facilities; these vehicles must be shuffled [e.g.] out of the way, elsewhere, or into maintenance bays, as work on others is completed.
2. The driveline is bumper-to-bumper full of dead line vehicles; moving other inductees in and around these vehicles and equipment consumes a great deal of time, and can be hazardous.
3. All the bays are full, and parts arrive for vehicles parked in the driveline; mechanics either shuffle vehicles out of one bay to make room, or install the parts on the vehicle while it is in the driveline.
4. A deadlined vehicle remains in a bay, half-finished; the second shift mechanic arrives to find his/her bay full, having no knowledge of the maintenance that remains to be accomplished.
5. Deadlined vehicles are positioned close together in makeshift bays, to take advantage of light, skill sets, tools, etc; maneuvering in and around these vehicles create inefficiencies and represents conditions that can be hazardous.

There is a corresponding solution for each of the examples sited above. Granted, these solutions can include changes to staff size and composition, changes in the way the organization operates; and changes in the tactical procedures, or the associated strategies.

But without exception, these solutions include new facilities or additions/modifications to existing facilities that have been programmed and planned from an operational perspective. It is nearly always impossible to compensate for facilities that are too small, inappropriately configured, or poorly positioned with regard to the workload.

When facilities have been outgrown or remain ill-configured, outward pressure on the footprint is inevitable. And there is no question that facilities that are too small can make dramatic contributions to the level of service or the way service is provided. In the current facilities either the provision of service suffers, or the expenses incurred to deliver adequate service are too high. A Space Needs Assessment will reveal how the level of service can be improved, or how the process of providing service can be streamlined. Furthermore it will reveal exactly where the pressure points are, and how to correct them.

APPENDIX

Vehicle list with VEU assignments

Summary of FSD's non-routine M&R costs

Sample business plan

Sample detailed charge-back rate model

Vehicle List With VEU Values

FFD Non-Routine Maintenance Costs

		Hours	Labor	Parts	Commercial	Total$
Regular Maintenance						
	Breakdown	54,510	3,655,457	2,159,401	593,978	6,408,836
	Charge to Vendor	73	5,144	1,036	0	6,180
	Emergency	143	6,841	3,566	1,288	11,695
	Sched Overhaul	2,616	182,488	296,720	189,304	668,512
	PM/Result	48,599	3,282,168	1,222,207	233,723	4,738,098
	Recall/Campaign	50	3,454	618	2,400	6,472
	Warranty	315	21,927	3,442	2,516	27,885
	Rebuilt Parts	1,991	138,839	38,565	0	177,403
	Winter Prep	451	29,741	26,751	2,738	59,230
	Total	108,748	7,326,059	3,752,306	1,025,947	12,104,311
Special Maintenance						
	Capital	10,217	712,402	548,128	14,382	1,274,912
	Accidents	4,657	326,323	239,986	71,033	637,342
	Damage	4,891	331,874	233,601	86,625	652,100
	Other	4,538	205,396	87,104	20,400	312,900
	Rebuilt Parts	1,441	100,538	27,926	0	128,465
	Sale of Vehicle	1,923	134,085	953	846	135,884
	Diesel Pollution Control				67,000	67,000
	Special Mtc	5,292	318,068	257,974	71,595	647,637
	Vandalism/Theft	288	19,953	15,101	3,651	38,705
	Total	33,247	2,148,639	1,410,773	335,532	3,894,945
Grand Total		141,995	9,474,698	5,163,079	1,361,479	15,999,256

Sample Business Plan

FLEET SERVICES DIVISION
2004 BUSINESS PLAN

Introduction and Strategic Vision

Our mission is to keep the City moving. Our vision is to be recognized by our customers as improving their efficiency and effectiveness by providing the highest level of fleet services at the lowest possible cost.

The purpose of this business plan is to focus the efforts of the division on its core mission activities, develop a roadmap to achieving our strategic vision, and to inform customers of the scope and scale of our operations. We have also developed a comprehensive fleet policy guide to educate customers on the City's polices and procedures related to fleet operations, a glove box customer service guide to inform drivers of critical service information, and service level agreements with large customer groups in recognition that a customized level of service rather than a one size fits all approach is required to meet the needs of our diverse customer base.

Services and Scope of Operations

FSD is a customer centered service organization. We provide a wide range of services to our customers including:

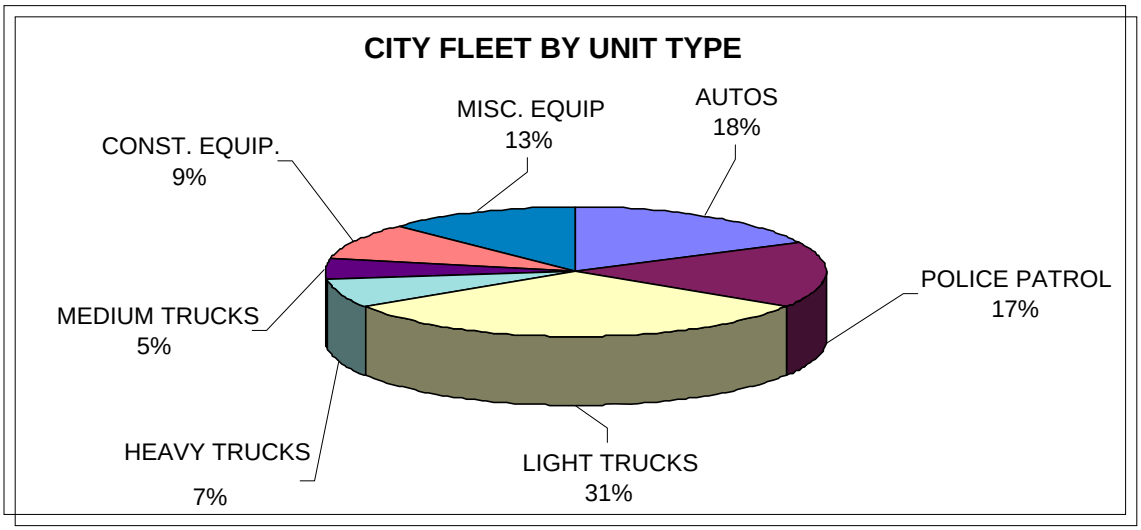
- Asset management services including fleet replacement planning, vehicle specification writing, coordination of vehicle purchases, new vehicle upfitting, and used vehicle sales;
- Custom reporting and consulting services to assist our customers lower their fleet related costs by identifying unneeded low use vehicles, charting cost trends, and keeping abreast of changes in the transportation industry;
- Fleet fueling services including bulk fuel and a commercial retail fuel station network;
- Maintenance and repair services including operation of four City-owned shops, field services for construction equipment and fire apparatus, and a network of commercial shops for specialized and overflow work;
- Materials management services including operation of four stock rooms that supply equipment parts to mechanics and general use items to various City organizations;
- Motor pool services including an in-house daily rental car program supplemented by a contract with X-Ray rent-a-car and a construction equipment pool

supplemented by a master rental program with various suppliers of trucks and equipment; and

- Specialized services such driver instruction, CDL training, and truck wash services.

Key Operating Statistics and Financial Statement

The City owns and operates a substantial fleet of vehicles and equipment. The 700 units in the fleet, which have a replacement value of $30 million, include a wide range of equipment types from 27 different manufacturers and include everything from port-a-john trailers to bull dozers. The following chart depicts the distribution of our fleet among major equipment types:



Our fleet is driven over 10 million miles per year and consumes 800,000 gallons of fuel. Our 12 ASE certified mechanics completed 4,500 work orders involving 12,000 hours of direct labor time. We also outsourced an additional $200,000 in work to commercial repair shops. The ratio of mechanics to vehicles is 60, which better than normal industry benchmarks.

FSD operates as an Internal Service Fund and charges back costs directly to customer organizations. Our rates for this fiscal year are $62.00 per hour for labor, a 28% markup on parts, a 8 cents per gallon markup on fuel, $6 per vehicle wash, and a monthly fleet management fee of $15 per vehicle. Vehicles are leased to customers on a monthly basis with charges based on straight-line depreciation plus a replacement surcharge to cover the future cost of acquiring a replacement unit. Capital charge back revenue, salvage proceeds, and interest earnings are placed in a separate replacement reserve account.

A summary of our latest financial statement is provided in the following table:

Operating Expenses	
Salaries and Benefits	$ 1,400,000
Repair Parts	$ 600,000
Commercial Sublet Services	$ 200,000
Fuel	$ 700,000
Office/Facility Related Expenses	$ 100,000
Other Operating Expenses	$ 200,000
Indirect Cost Allocation – City Support Services	$ 200,000
Overhead – Department of Public Works	$ 100,000
Total Operating Expenses	$ 3,500,000
Operating Revenues	
Operating Charge-Back Rates	$ 3,400,000
Sale of Fuel and Services to Outside Agencies	$ 100,000
Total Operating Revenues	$ 3,500,000
Gain (Loss)	$ 0
Capital Expenses	
Purchase of New Replacement Vehicles	$ 2,000,000
Purchase of New Additional Vehicles	$ 500,000
Total Capital Expenses	$ 2,500,000
Capital Revenues	
Capital Charge-Back Rates	$ 2,200,000
Contributions from other Funds for Purchase of Additional Vehicles	$ 500,000
Gain on Sale of Surplus Vehicles	$ 50,000
Interest	$ 25,000
Total Capital Revenues	$ 2,775,000
Gain (Loss)	$ 0
Total Fund Expenditures	$ 7,000,000
Total Fund Revenues	$ 7,275,000
Retained Earnings For Future Year Vehicle Purchases	$ 275,000
Start of Year Retained Earnings	$ 500,000
Total Retained Earnings	$ 775,000

Our approach to costs and revenues is to operate on a break even basis each year for operating services. For our vehicle replacement services we sometimes maintain a reserve to cover spikes in future year spending requirements that are anticipated by our

10 year replacement plan. We project that the current year reserve of $475,000 will be spent next year, when $ 3,000,000 worth of vehicles will come due for replacement.

Key Performance Indicators

FSD tracks a variety of key performance measures in order to help us quantify how we are doing, to compare our performance against peers and industry benchmarks, to home in areas of our operation that may need improvement, and to track trends over time. We view our performance measurement efforts as an essential part of our efforts to be proactive in managing our business rather than reacting to problems after they have come up. The following table details the key performance measures that we track and our performance in recent years:

Measure	Target	2001	2002	2003
Average Fleet Age	4 years	5.2	4.9	4.5
Ratio of Vehicles to Mechanics	50:1	44:1	49:1	60:1
Average Vehicle M&R Cost	$3,000	$3,800	$3,500	$2,900
Fleet Availability	95%	89%	92%	94%
24 Hour Service Turnaround Time	75%	59%	70%	78%
PM Compliance	90%	92%	94%	92%
Rework Rate	1%	2%	2%	2%
Mechanic Billable Hours	1,500	1,400	1,450	1,460

SWOT Analysis

Strengths

- Satisfied customers – latest survey indicates that 95% of customers rate our services as good or better;
- Internal Service Fund - provides financial flexibility and the ability to accumulate reserves to replace vehicles when required;
- Highly trained staff – the expertise of our mechanics has been recognized with a total of 50 ASE certifications and three of our four shops have earned the ASE Blue Seal of Excellence;
- Network of four shops, vendors, and field service trucks provides customers with convenient access to repair services;
- Intimate understanding of customers' needs allows customized approach to meeting transportation needs;
- Performance measurement program keeps us in tune with industry competitive benchmarks; and
- Non-profit/tax exempt status provides inherent cost advantages over potential competitors.

Weaknesses

- Legacy mainframe based fleet management information system is difficult to use and does not easily support custom reports;
- Stereotype of un-motivated, un-responsive government services;
- Lack of status within the City organization;
- Cumbersome purchasing process for both repair parts and new vehicles;
- Two of four shop facilities are undersized, old, and do not support productive maintenance operations;
- Lack of performance based pay does not provide opportunities to motive staff and recognize excellent performance; and
- Total compensation package (salaries and benefits) is at the top of the local market.

Opportunities

- Fire Department maintains its own fleet – presents an opportunity to expand services and reduce City costs through economies of scale;
- School District has indicated interest in outsourcing additional services to our Forest Grove Shop;
- New City Chief Information Technology Officer has plan to replace all legacy systems;
- South side redevelopment plan presents opportunity to replacement Oak Grove Shop.

Threats

- County's active pursuit of privatization creates political awareness and possible support for consideration of outsourcing by City Council;
- Senior mechanic workforce and scarcity of mechanics in the industry may disrupt our ability to provide maintenance services;
- Impending retirement of City Manager may result in less support for increased funding for fleet replacement;
- Managed competition this year for residential refuse collection services could potentially result in the loss of one-quarter of our maintenance workload if the Solid Waste Department were to lose; and
- Elections this year may change the make-up of City Council witch would have unknown consequences.

2005 Goals and Objectives

In 2005 our primary goals and objectives are as follows:

- Develop new business case for a state-of-the-art fleet management information system;
- Meet with the School District to discuss opportunities to provide additional services;
- Develop a mechanic apprentice program in cooperation with Glenbrook Community College;
- Work with Solid Waste to develop an optimized refuse equipment program in advance of their managed competition; and
- Develop a privatization cost comparison for presentation to customers and City Council.

Sample Detailed Rate Model