Fleet Maintenance & Repair

In-house Feasibility Assessment

October 28, 2022

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Project Objectives, Scope & Approach

Project Objectives

- Determine requirements for an in-house fleet maintenance and repair organization
- Identify order of magnitude costs for in-house fleet maintenance and repair organization
- Identify required transitional elements and costs

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Scope

- Conduct diagnostic assessment of current mode of operation (CMO)
- Develop cost of service model for the CMO
- Determine avoidable, unavoidable, and new budgetary costs related to in-house maintenance and repair
- Determine number of employees required for in-house fleet maintenance and repair operation
- Determine the salary and fringe benefit costs related to the number of new employees required
- Develop an in-house version of the cost of service model
- Assess the feasibility of in-house maintenance and repair

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Project Approach

- Mercury developed and submitted a form Request for Information (RFI)
- City provided available data and documents relative to the CMO
- Mercury project team reviewed and assessed data and documents for completeness and accuracy
- Mercury conducted on-site visit to meet with City representatives and other fleet stakeholders
- Mercury conducted follow-up meetings for verification, clarification, and for supplemental information
- Mercury developed future mode of operation (FMO) including staffing levels, productivity assumptions, etc.
- Mercury and City identified personnel costs (i.e., salaries and benefits), additional required tools and equipment, fleet management information system requirements, etc.
- Mercury developed cost of service models to determine impact of switching to in-house maintenance and repair approach on operating costs

Acronyms Used in this Report

- CMO: Current Mode of Operation
- EVT: Emergency Vehicle Technician
- FMIS: Fleet Management Information System
- FMO: Future Mode of Operation
- FY: Fiscal Year
- M&R: Maintenance & Repair
- OEM: Original Equipment Manufacturer
- PM: Preventive Maintenance
- SFB: Salary and Fringe Benefits
- VEU: Vehicle Equivalent Unit

Assumptions

- No change in fleet size or composition
- No improvements to the fleet maintenance facility
- No additional major or specialty equipment or tools required
- No change in fuel costs/fuel management approach
- No change in pass through parts costs
- Same types of services to be provided by the proposed in-house fleet management organization as are currently provided
- Employee costs are based on market-based salaries
- Employee benefits costs provided by City Human Resources

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Fleet Profile

Vehicle Equivalent Units (VEUs) Explained

- Mercury maintains and constantly updates a database of VEU values for more than 600 vehicle and equipment classifications.
  - The database includes the entire spectrum of vehicles and equipment found in a typical fleet, from push mowers to aerial bucket trucks and from sedans to transit buses of all sizes.
- Each class is given a VEU value as it relates to that of a passenger sedan (rated at 1.0 VEU)
  - A general-purpose trailer can be assigned a rating of 0.5 VEUs.
  - A pickup truck may have a rating of 1.5 VEUs, and a 40-foot passenger transit bus may be 5.
- By statistically expressing the size of a fleet in VEU terms review, we can make reasonable, standards-based comparisons with the fleet operations of other organizations.
  - A fleet of one hundred (100) pickup trucks, each rated at 1.5 VEUs, constitutes a fleet of 150 VEUs.
  - The number of maintenance mechanics required to maintain this fleet is more than those needed to maintain a fleet of 100 sedans (100 VEUs), but far less than those needed to maintain a fleet of 100 transit buses with 4.5 VEUs per bus totaling 450 VEUs.

Vehicle Equivalent Units – Some Examples

1.0 VEU

2.5 VEUs

4 VEUs

- Common Allentown vehicles:
  - Trailer: 0.5 VEUs
  - Pickup: 1.5 VEUs
  - SUV – Law Enforcement: 2.5 VEUs
  - Street Sweeper: 6 VEUs

Average VEU for Allentown vehicles:

- Mean: 2.28 VEUs
- Median: 1.5 VEUs

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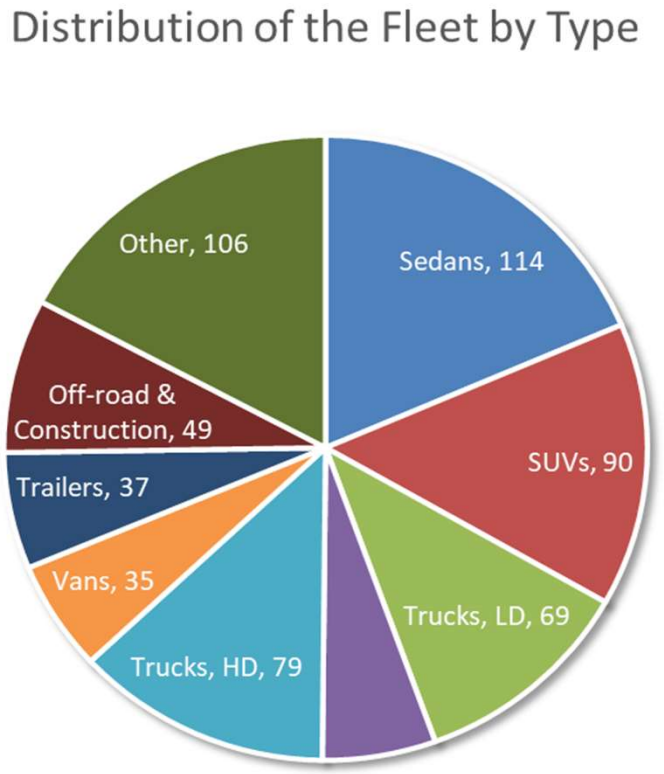
Fleet Profile

- Workload
  - 614 total fleet assets
    - Vehicles and other fleet equipment
    - 8.9 years – average age of the fleet
  - 1,400 Vehicle Equivalent Units (VEU)
- Workforce
  - 1 City of Allentown employee manages contract maintenance and repair provider
- Workplace
  - Current contractor utilizes City's fleet maintenance facilities



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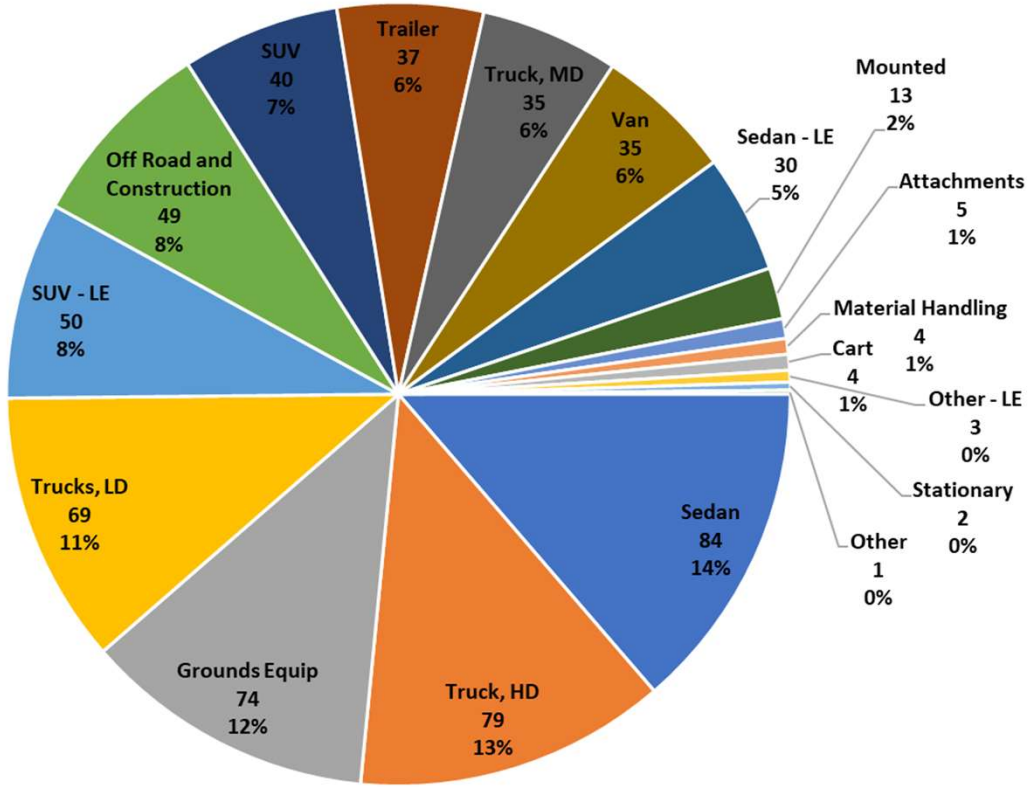
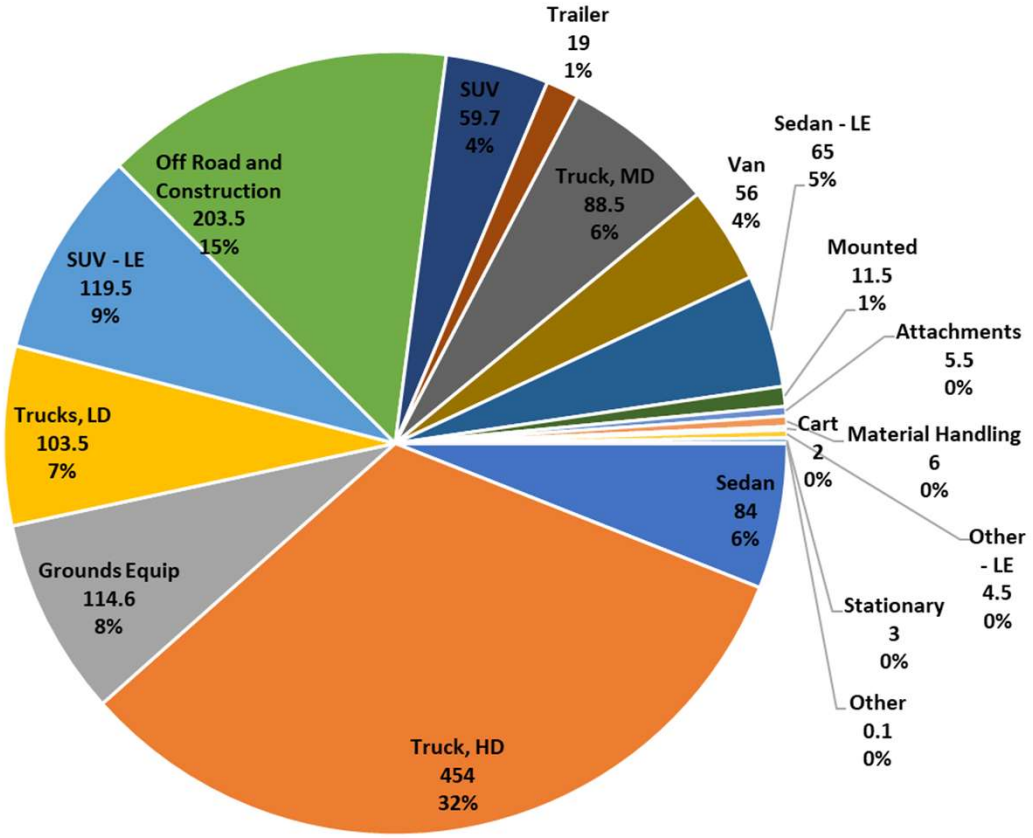
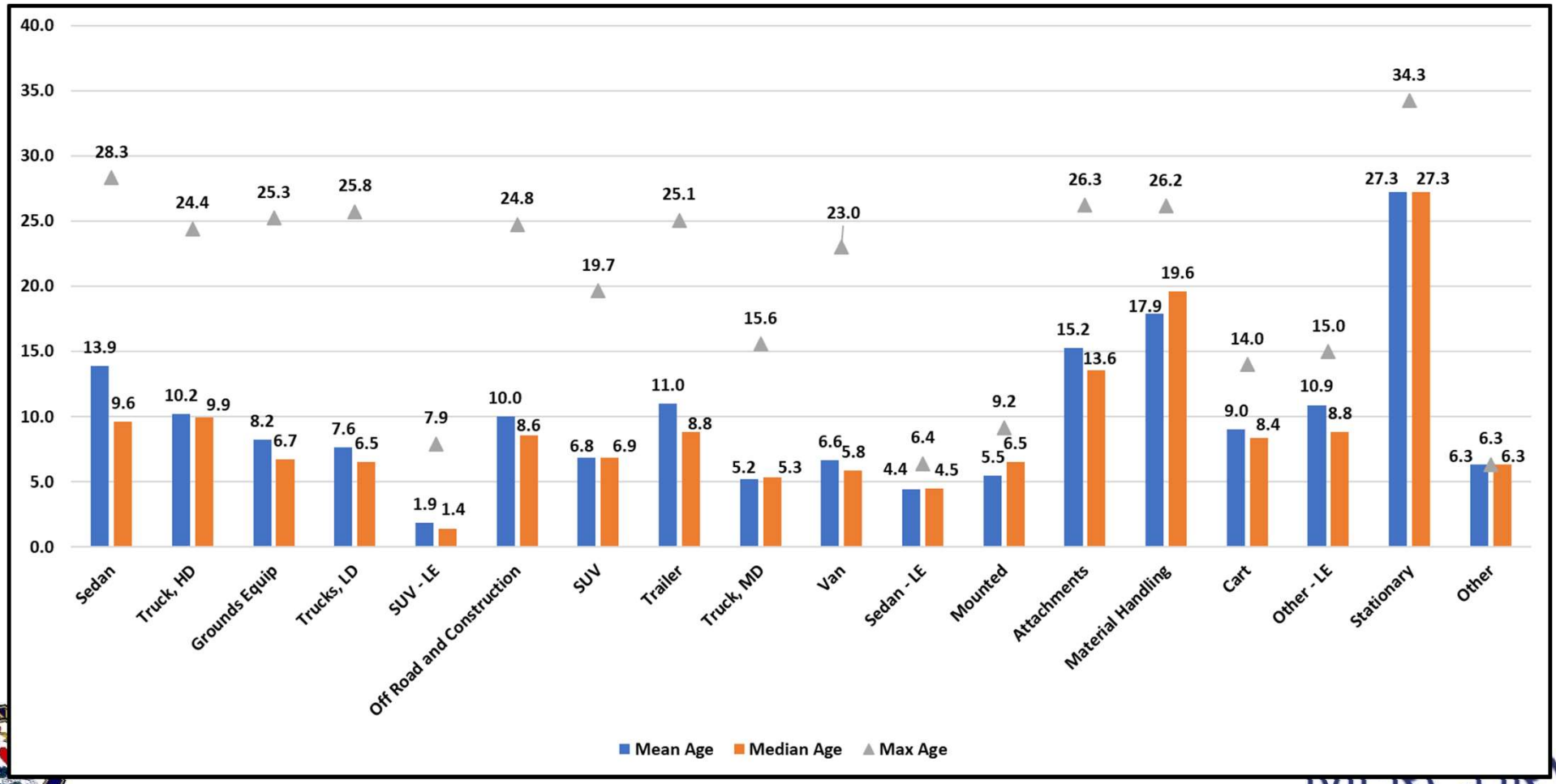
Distribution of Assets by Type



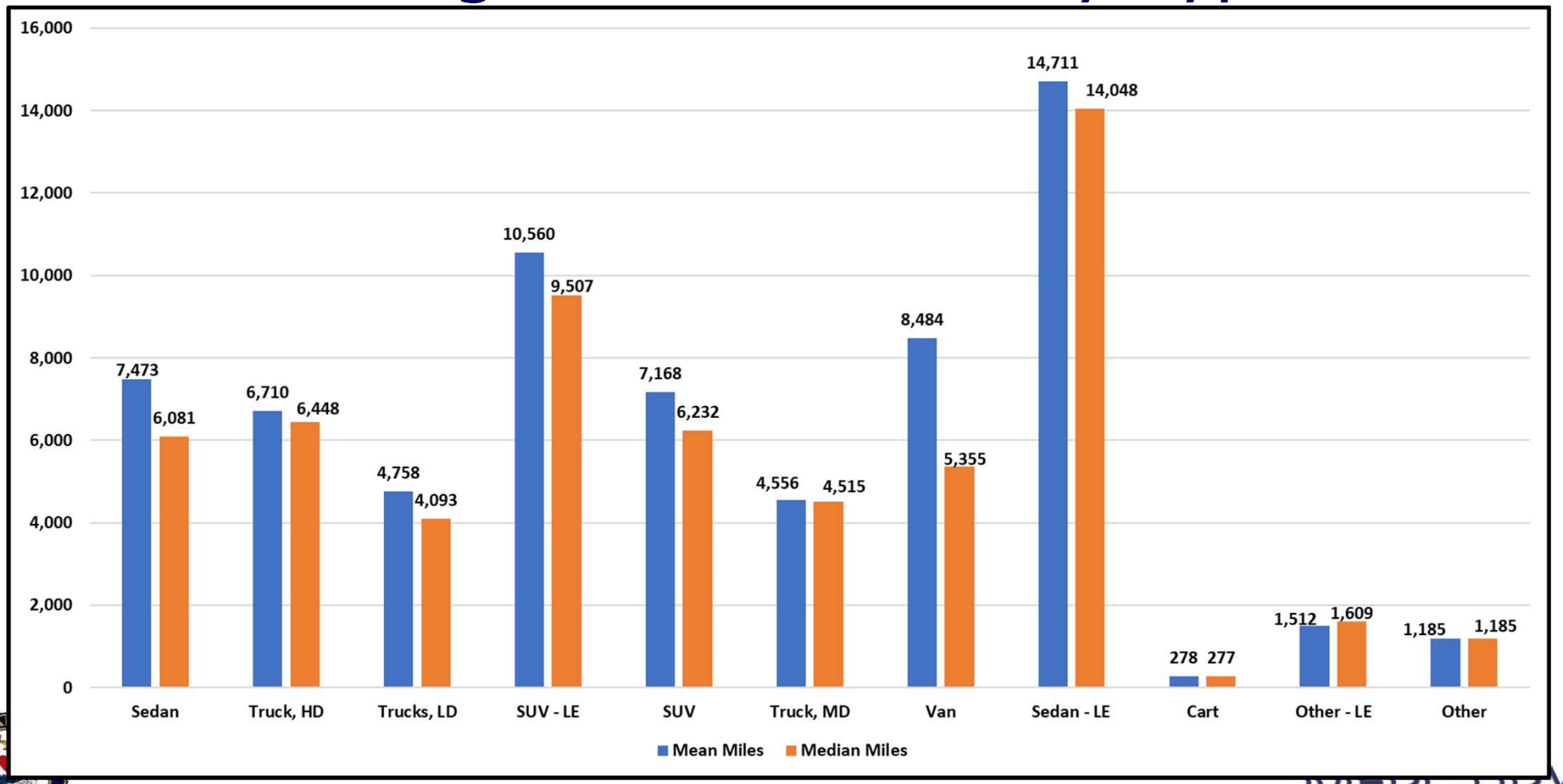
Distribution of VEUs by Type



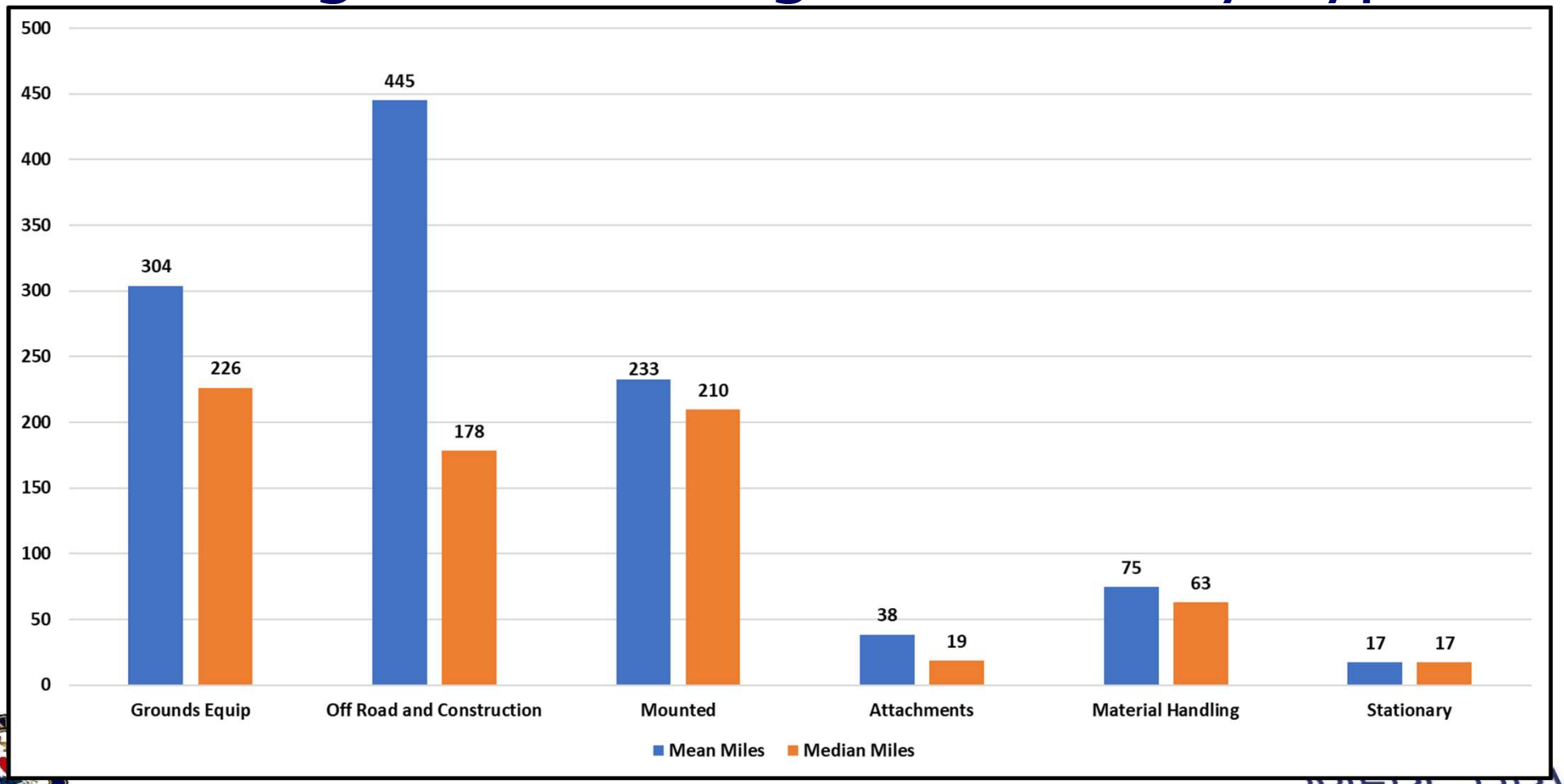
Average Age of Assets by Type



Average Annual Miles by Type



Average Annual Engine Hours by Type



Current Mode of Operation (CMO)

Maintenance & Repair

- Currently the City has outsourced vehicle and equipment maintenance and repair (M&R) since the mid-1990s.
- Contractor utilizes the City's facility, vehicle lifts, paint booth, shop tools and equipment, and welding equipment.
- Contractor charges for M&R services using a target and non-target approach which is common in the industry.
- Accidents and vehicle abuse are billed directly to the customer if damages are under $500. Repairs over $500 goes through Risk Management.
- The City has one employee that monitors/manages the contract. (Chief Maintenance Supervisor - Fleet Operations).
- The Maintenance Supervisor reviews all assets down with the contractor daily after reviewing the downtime report.

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Maintenance & Repair

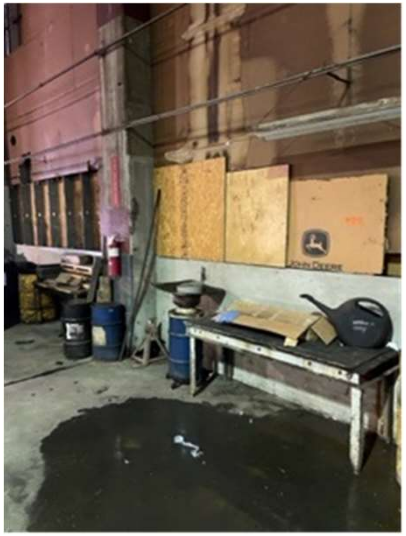
- The City does not own a fleet management information system (FMIS). The contractor is required to supply the FMIS and the current system is FASTER. Reliance on the contract to manage and report on performance using their own FMIS has made it very difficult for the City to provide fleet information and performance data to Mercury for this study.
- Some data requested was not provided due to the contractor's non-response to the requests.
- The City does specify in the contract the preventive maintenance (PM) intervals for the contractor to follow.
- The City pays all utilities and maintains the fleet maintenance facility.
- Parts are stored in the shop and are on consignment (i.e., owned by the contractor until consumed by the City). The contract does not require the City to purchase the stocked parts at the end of the contract.
- The Parks Department has an equipment technician to maintain equipment such as push mowers, chain saws, trimmers, etc. This is not part of the current maintenance contract.

Fleet Facility

- The City's shop is adequately sized for the current workload.
  - 21 M&R bays in the main shop
  - 1 welding shop/bay
  - 3 bays and paint booth
- Shop has adequate number of vehicle lifts.
- The shop is old and has many deficiencies such as poor lighting, a leaking roof, holes in walls, shop floor damage, etc.
- The second floor of the shop is condemned as a result of the damage caused by the leaking roof.
- New facility should be considered in the near-term.

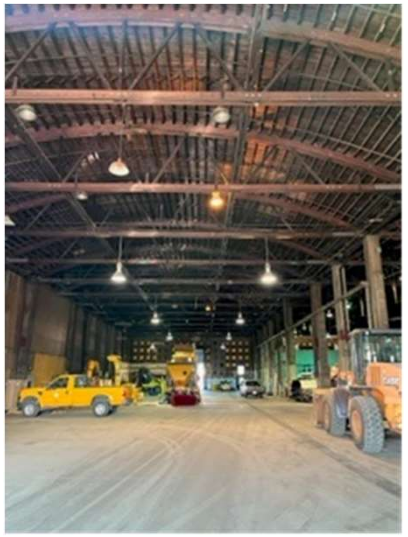
Fleet Facility

Roof leaking and water running down the wall



Puddle in the shop after a rain storm

Holes in the walls in the shop area



Poor lighting in the shop work bays

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Fleet Facility

Shop bay with inground lift

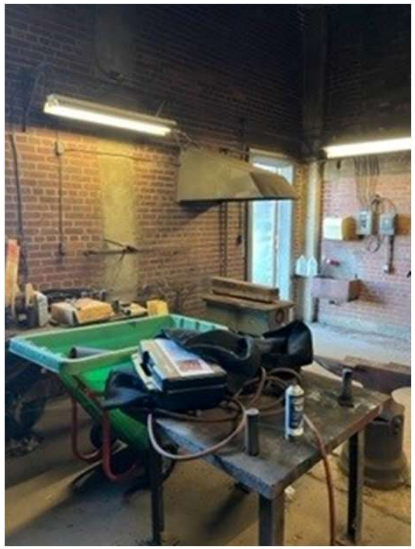
Breakroom inadequately sized and furnished

Shop bay with portable vehicle lifts

Paint booth and body repair bay

Fleet Facility

Poor lighting in the machine shop



Poor lighting in the welding shop

Equipment storage area clutter

Shop bay clutter

Cost of Service Analysis CMO

Current Mode of Operation
Operating Costs

- Contractor's monthly charges over the last four years for Target and Non-Target maintenance and repair

Monthly charges	2018	2019	2020	2021
Jan	$195,698	$205,391	$202,680	$202,885
Feb	$198,796	$202,676	$198,368	$242,202
Mar	$200,895	$207,043	$198,700	$201,424
Apr	$193,808	$196,043	$200,743	$201,294
May	$193,514	$196,595	$198,088	$201,285
June	$193,787	$200,318	$198,461	$201,427
July	$194,078	$196,318	$199,128	$201,322
August	$193,514	$195,772	$198,088	$201,787
Sept	$193,514	$195,772	$199,200	$201,839
Oct	$193,514	$196,602	$199,150	$201,060
Nov	$195,252	$195,797	$199,016	$203,784
Dec	$195,277	$196,708	$203,268	$202,072
Annual Total	$2,341,648	$2,385,034	$2,394,890	$2,462,380

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FY2023 CMO Operating Cost Per VEU Analysis

Cost	Operating Cost Category	Cost per VEU	Total Costs
In-house Labor	M&R Operating Cost	N/A	N/A
Sublet Repair Services	M&R Operating Cost	$2,016	$2,822,520
Parts	M&R Operating Cost	N/A	N/A
Fuel	Variable Operating Cost	$1,324	$1,853,641
Asset Management	Fixed Operating Cost	$29	$40,173
	Total M&R Cost per VEU	**$2,016**	**$2,822,520**
	Total Operating Cost per VEU	**$3,369**	**$4,716,334**

- Industry benchmark is $1,800/VEU for M&R costs
- ~1,400 VEUs maintained by the contractor

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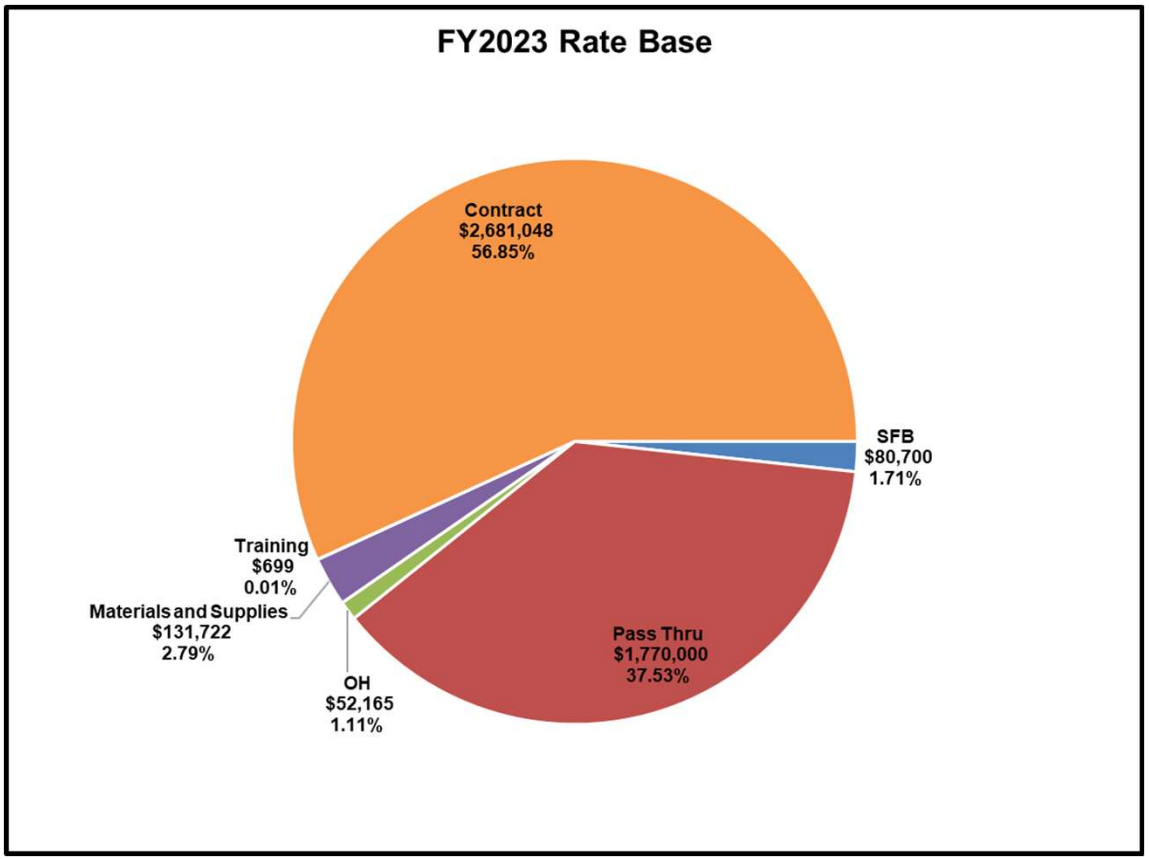
Projected FY2023 Operating Costs



- SFB: Salary and Fringe Benefits
- Pass Thru: Fuel Costs
- OH: Overhead

* Salary and benefits for the maintenance supervisor is not paid out of the Fleet Maintenance Operations budget

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In-house Fleet M&R Cost Projection (FMO)

Future Mode of Operation (FMO)

Workforce Analysis

Total Fleet Assets	614
Total VEUs	1,339.9
Total in-house demand hours	13,999.0
Tolerance (direct labor hours) per technician	1,500
Technicians required	9.33

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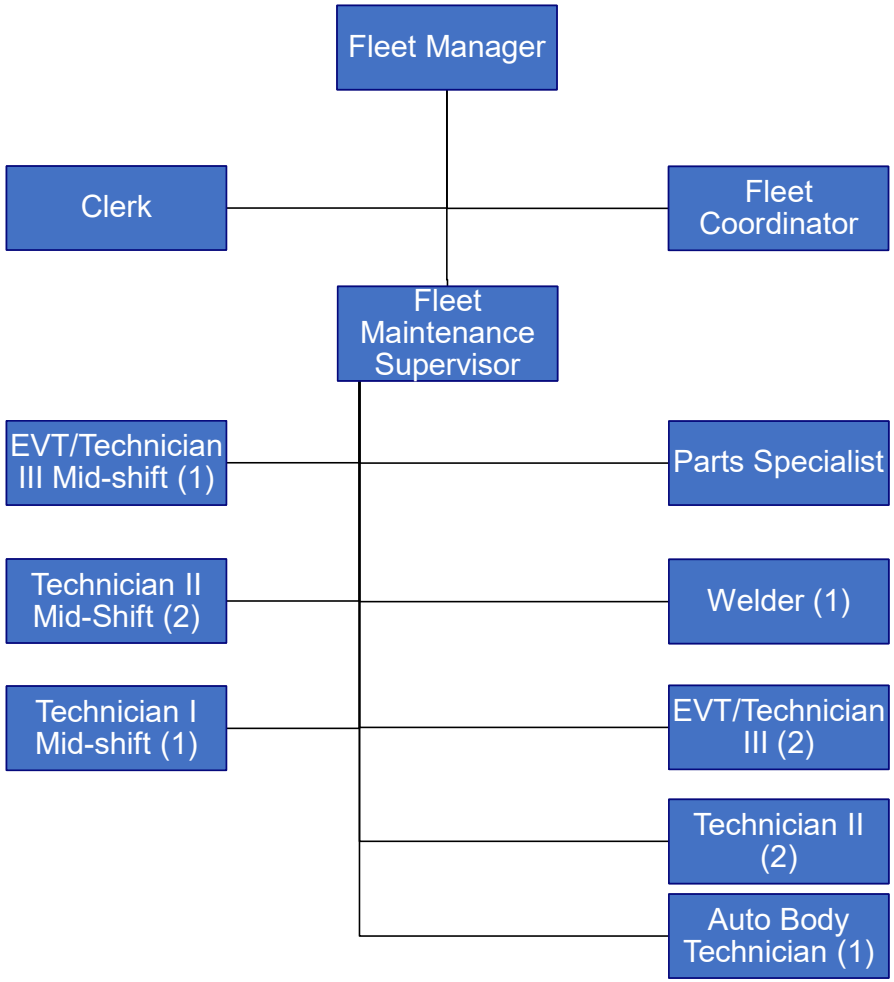
Proposed Fleet Org Chart (FMO)



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Staff Requirements

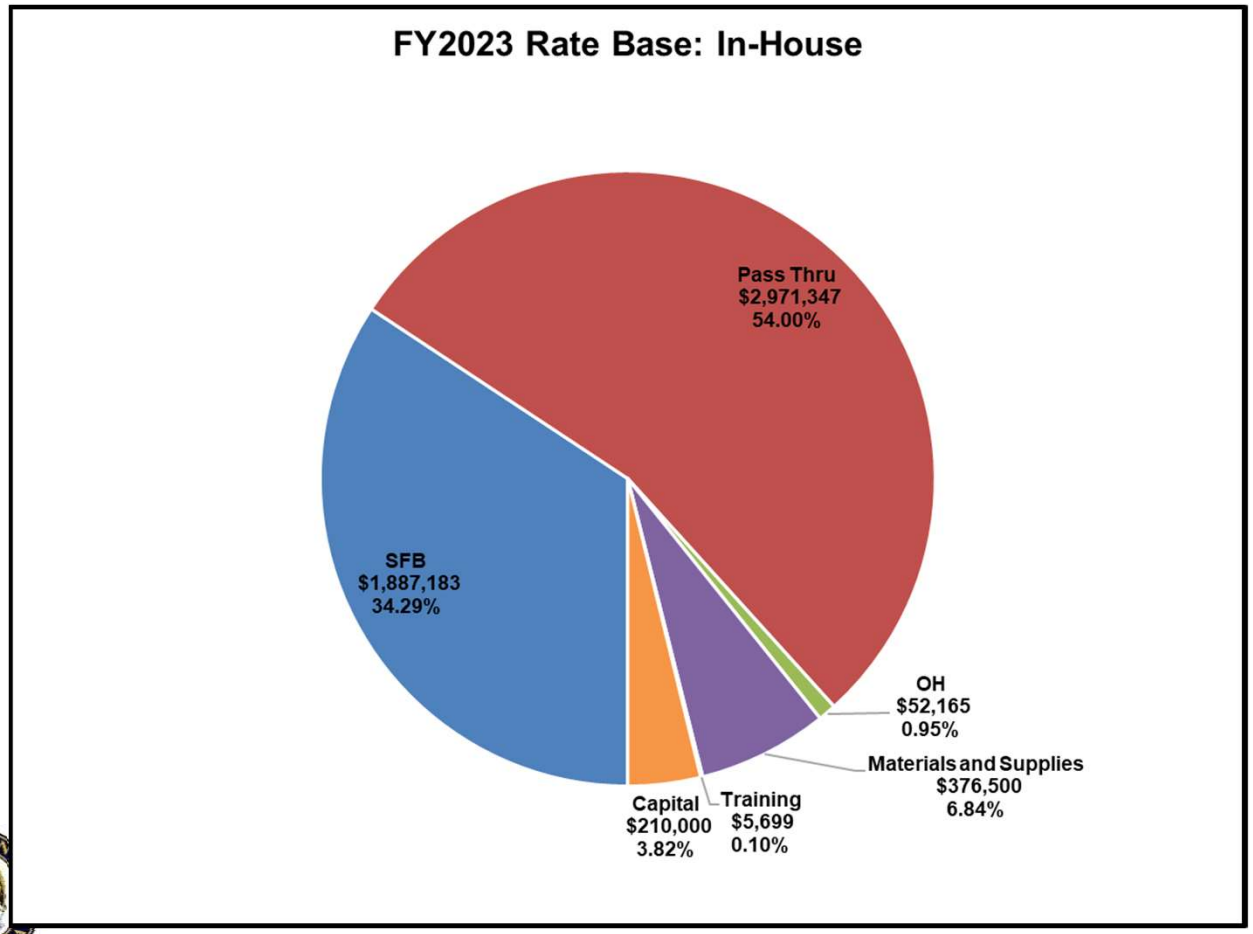
Employee Title	Number of Employees	Starting Salary Range	Average Salary Range	Ending Salary Range	Benefit Cost
Fleet Manager	1	$79,419	$89,652	$99,884	$42,919
Fleet Coordinator	1	$41,551	$46,739	$51,928	$51,560
Clerk	1	$39,551	$44,740	$49,928	$51,560
Maintenance Supervisor	1	$62,000	$70,000	$78,000	$42,919
EVT/Technician III	3	$58,240	$63,440	$68,640	$51,560
Technician II	4	$52,000	$58,240	$64,480	$51,560
Technician I	1	$39,520	$44,720	$49,920	$51,560
Welder	1	$46,883	$53,453	$60,022	$51,560
Body Technician	1	$46,883	$53,453	$60,022	$51,560
Parts Specialist	1	$33,161	$38,254	$43,346	$51,560
Total	**16**	**$771,688**	**$864,291**	**$956,890**	**$756,118**

- Fringe benefit costs provided by the City's Human Resources Department
- Salary ranges developed from multiple sources including salary.com, City of Bethlehem salaries for fleet employees, and from the contractors pay scale.

Annual FMO Operating Cost Per VEU Analysis: In-house

Cost	Operating Cost Category	Cost per VEU	Total Costs
In-house Labor	M&R Operating Cost	$1,364	$1,909,582
Sublet Repair Services	M&R Operating Cost	$284	$397,094
Parts	M&R Operating Cost	$784	$1,097,117
Fuel	Variable Operating Cost	$1,371	$1,918,935
Asset Management	Fixed Operating Cost	$129	$180,167
	Total M&R Cost per VEU	**$2,431**	**$3,403,792**
	Total Operating Cost per VEU	**$3,931**	**$5,502,894**

Projected FY2023 Operating Costs: In-house



- SFB: Salary and Fringe Benefits
- Pass Thru: Fuel, Parts and Sublet M&R Costs
- OH: Overhead

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Calculated Fleet Service Rates (all costs) – FMO

Rate	Service-based Shop Rates
Labor Rate Based on Probable Hours	$136.40
Labor Rate Based on Achievable Hours	$127.31
Asset Management Fee	$24.45
Fuel Markup	$0.37
Sublet Markup %	18%
Parts Markup %	26%

- Probable hours are based on 1,400 hours per FTE technician which represents a reasonable expectation of direct labor in the first year of the in-house fleet M&R operation.
- Optimal hours are based on 1,500 hours per year per FTE technician which represents a high performing fleet workforce.

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Calculated Fleet Service Rates
FMO less One-time Transition Costs

Rate	MAI Calculated Rates
Labor Rate Based on Probable Hours	$114.43
Labor Rate Based on Optimal Hours	$106.80
Asset Management Fee	$22.42
Fuel Markup	$0.36
Sublet Markup %	16%
Parts Markup %	19%

- These rates do not include $395,000 for the one-time transition costs that include a new FMIS, technician tools and boxes, etc.

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Comparison of Operating Cost: CMO vs FMO

Cost	Operating Cost Category	Current Total Cost	In-House Total Cost	Variance in Total Cost
In-house Labor	M&R Operating Cost	N/A	$1,909,582	$1,909,582
Sublet Repair Services	M&R Operating Cost	$2,822,520	$397,094	($2,425,426)
Parts	M&R Operating Cost	N/A	$1,097,117	$1,097,117
Fuel	Variable Operating Cost	$1,853,641	$1,918,935	$65,294
Asset Management	Fixed Operating Cost	$40,173	$180,167	$139,994
Transition Costs	One Time Capital Costs	N/A	$395,000	$395,000
	Total M&R Cost	**$2,822,520**	**$3,403,792**	**$581,272**
	Total Operating Cost	**$4,716,334**	**$5,502,894**	**$786,560**

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Comparison of Operating Cost: CMO vs FMO Does Not Include One-time Transition Costs

Cost	Operating Cost Category	Current Total Cost	In-House Total Cost	Variance in Total Cost
In-house Labor	M&R Operating Cost	N/A	$1,602,055	$1,602,055
Sublet Repair Services	M&R Operating Cost	$2,822,520	$392,076	-$2,430,444
Parts	M&R Operating Cost	N/A	$1,032,408	$1,032,408
Fuel	Variable Operating Cost	$1,853,641	$1,916,129	$62,488
Asset Management	Fixed Operating Cost	$40,173	$165,225	$125,052
Transition Costs	One Time Capital Costs	N/A	N/A	N/A
	Total M&R Cost	**$2,822,520**	**$3,026,540**	**$204,020**
	Total Operating Cost	**$4,716,334**	**$5,107,894**	**$391,560**

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Required Action Items for FMO

- Build an inventory of parts, supplies, and bench stock
  - Buy the existing inventory of parts (some or all) from the current contractor.
  - Establish a parts inventory from the ground up (i.e., start from a zero-based inventory).
- Acquire a new FMIS
  - Projected initial capital cost for the purchase of the software, system configuration, implementation services, etc. of approximately $160K.
  - Projected recurring annual cost for software maintenance is $9,400.
  - Acquiring an FMIS is required even if the City elects to continue outsourcing fleet M&R.

Required Action Items for FMO

- Develop new fleet policies and procedures
- Create Key performance indicators(KPIs) to evaluate fleet performance.
- Develop a training and certification program for fleet personnel.
- Construct new fleet maintenance facility that provides a safe and efficient environment for the maintenance and repair of the fleet
  - Programming of the facility should be accomplished by experienced fleet professionals and planned based on workload, workforce, and workplace calculations.
- Develop position descriptions and classifications for new employees.

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Submitted by Mercury Associates, Inc.
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October 2022