Fleet Review

VAUGHAN FIRE AND RESCUE SERVICES

October 29, 2021

mcg
consulting solutions

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EXECUTIVE SUMMARY

Our review of Vaughan Fire and Rescue Service (VFRS) involved creating an initial profile of the fleet and the fleet organization, conducting a Benchmarking Study against three partner organizations, and completing a Best Practice Review comparing VFRS to industry standards. This Executive Summary illustrates the three key findings of the study and the new model of operation supported by these findings. It summarizes recommendations from all parts of the fleet review including the benchmarking study and the best practice review. Details supporting the findings and recommendation can be found in the ensuing chapters.

Overall, it is important to recognize that VFRS supports a City that is experiencing significant growth. VFRS needs to continue to provide essential operational support during this transition from a small town to a large City. This report will assist in identifying the systems, personnel and processes essential to this transition.

1. Key Findings

In a best practices review, we compare existing practices to industry standards. Similarly, in the benchmarking study, we compare (VFRS) with their peers. As such, we focus on what can be improved and not what is going well. Naturally, our review identified many positives as well as many improvement opportunities. In the report, we concentrate on the latter. Overall, VFRS is an organization who is supporting a region experiencing high growth. The Department is growing to support the needs of the population and the support functions, such as fleet, need to grow to ensure effective support to operations. Recognizing this, VFRS engaged a fleet consulting team to examine current operations and recommend improvements.

The main findings of the fleet review are:

- Measuring and improving performance in most areas of fleet and maintenance management is hampered by the lack of a Fleet Management Information System (FMIS). The lack of a system can be tied as the root cause to many other issues including replacement planning, calculating maintenance efficiency and managing parts.

- Replacement planning is short term and does not encompass best practices, due in part, to a lack of FMIS.

- Maintenance operations are impacted by a shortage of administrative and parts support, and the lack of a FMIS.

2. New Operating Model

Vaughan Fire and Rescue Services (VFRS) should update their operating model to enhance operations and support future growth. This new model would be based on four pillars – an FMIS for data capture and analysis, a 20-year replacement plan to identify capital requirements, a policy framework to guide decisions, and a progressive staffing plan that will grow with the organization.

Fleet Management Information System

VFRS will explore options to cooperate with City of Vaughan Fleet Services to acquire and implement a Commercial off the shelf (COTS) Fleet Management Information System (FMIS). Existing technology does not track important fleet metrics such as maintenance productivity, and although upgrades are promised, they are years in the future. A functioning FMIS is needed now and will be the backbone of the improved operating model as it will host the fleet inventory and all data needed to make decisions on fleet and maintenance management, including parts. See page 17 for a detailed analysis of fleet system requirements.

20-Year Replacement Plan

VFRS will adopt the methodology described in this report to create a 20-Year Fleet Replacement Plan. This plan will be based on lifecycles established by VFRS data (when possible) and industry best practices. The current backlog of vehicles identified as outside of recommended lifecycles will be addressed over a levelled replacement plan. This plan will be updated annually and can be used to model the costs of delayed replacement. The plan will make capital budget predictions much easier.

Policy Framework

VFRS will use the City of Vaughan Fleet Management Policy and recommendations from this report to create a policy framework to guide fleet and maintenance management operations.

Staffing

VFRS will increase administrative/parts support to the Mechanical Division. Options to share support with the City fleet may be possible. Data to calculate productivity is not currently available but will be monitored in the future to plan for fleet growth.

3. Recommendations and Costs

A summary of the recommendations from each chapter of this report follows. In many cases, the recommendations from the benchmarking study mirror those from the best practice review. We know that staff time and resources are challenges to implementation, so we have included estimates of the time and costs required to complete each recommendation in the best practices section. These specific recommendations by functional area follow.

Benchmarking Study Recommendations

1) VFRS should assess the need for a full-time fleet manager position as the organization grows.

2) VFRS should add staff capacity to perform administrative work and parts support.

3) VFRS should update all job descriptions and develop annual training plans for mechanics.

4) VFRS should create a Fleet Policy Manual that incorporates the flow charts created during this review, as well as a Driver's Handbook highlighting information pertinent to equipment operators.

5) VFRS should develop and adhere to lifecycles for all classes of vehicles.

6) VFRS should adopt a condition assessment methodology to prioritize vehicle replacement.

7) VFRS should create a 20-year fleet replacement plan.

8) VFRS should improve their tracking of maintenance costs to better budget for this expense.

9) VFRS should adopt a pro-active PM schedule and work towards 95% compliance.

10) VFRS should consider future facility needs as the organization grows.

11) VFRS should acquire a fit-for-purpose fleet management system.

12) VFRS should determine which KPIs are most valuable to their organization and develop regular reporting procedures.

Industry's Best Management Practices Recommendations

Technology

1) Explore areas of cooperation with the City's Fleet Management department in the area of FMIS acquisition.

2) Acquire a fit-for-purpose FMIS.

3) Develop KPIs to monitor fleet benchmarks that support additional staffing needs, infrastructure improvements, and/or fleet replacements required.

The estimated time and resources required to implement these recommendations are implementation of a COTS FMIS would be between $50,000 to $150,000 (including implementation support) depending on application and collaboration with City's Fleet Management Department. Implementation of KPIs are estimated at 40 hours if done in-house.

Governance

4) Exploit areas of cooperation with the city fleet management specifically in the area of FMIS acquisition.

5) Monitor Department growth to determine the requirement for a dedicated fleet manager.

6) Create a tailored fleet policy framework for VFRS.

The estimated time and resources required to implement these recommendations are: A fulltime fleet manager position salary would be commensurate with experience and the creation of a policy framework (Fleet Policy Guidelines and Driver Handbook) would take 48 hours if done in-house.

Organization and Staffing

7) Increase parts/administration support to fleet.

8) Update and clearly define fleet job descriptions.

9) Implement cross training and backup staff when leave is taken to ensure operations are not interrupted.

10) Implement incentives to encourage staff to pursue professional certification.

The estimated time and resources required to implement these recommendations are: Additional administrative and parts support $25,000, job descriptions, cross training and a training plan would require 64 hours if done in-house.

Acquisition and Disposal

11) Create a Replacement Plan showing which vehicles need to be replaced each year and the budget required.

12) Ensure vehicles deemed ready for resale are sent to auction on a timely (monthly) basis.

The estimated time and resources required to create a replacement plan are 40 hours.

Maintenance

13) Outsource to meet maintenance requirements.

14) Take a proactive approach to PMs to meet 95% compliance.

15) Use the flow chart to make outsourcing decisions.

16) Add parts support and an inventory management system to support recent changes in organizing and managing inventory that cannot be achieved without a system.

The estimated time and resources required to implement these recommendations are: The premium on maintenance costs due to outsourcing (unavoidable but not quantifiable with current data), creating the new PM schedule would require 16 hours if done in-house, enhanced parts support may result in a 0.5 FTE at a cost of $25,000.

INTRODUCTION

This introductory chapter outlines the purpose of the Vaughan Fire and Rescue Service (VFRS) Fleet Review, the study approach utilized by MCG Consulting Solutions, the scope of the study, and a summary of the project team's findings and recommendations. To note is that pieces of this report have previously been submitted as interim deliverables. The following interim deliverables have already been reviewed by VFRS and those findings are incorporated in this report:

- Fleet Profile
- Fleet Best Practice Checklist
- Benchmarking Survey
- Decision Making and Process Flow Charts

1. Purpose and Scope of the Study

The City of Vaughan is located just north of Toronto and has a population of 330,000. Like many areas of the Greater Toronto Area, the city has experienced significant population growth over the past 30 years, nearly tripling in population. The city is currently the 17th largest in Canada. During the tour of the area as part of the site visit, continuing population growth and the City's plans to respond to it were very evident.

The City of Vaughan engaged MCG Consulting Solutions to perform a benchmarking study and best practice assessment of VFRS's fleet operations to ensure VFRS is managing its fleet of vehicles and equipment in the most effective and efficient manner possible. Key fleet functions reviewed include governance, organization and staffing, acquisition and replacement planning, technology, and maintenance.

2. Study Methodology

A central tenet of our approach to conducting operational studies is that there must be a strong analytical basis for evaluating needs and making recommendations. This methodology should be flexible enough to accommodate the unique elements of each client's scope of work and service levels. We accomplish this by analyzing client data and comparing the resulting calculations, ratios, and benchmarks with industry norms. These industry norms are derived from industry associations such as APWA (the American Public Works Association) and NAFA Fleet Management Association, as well as the

project team's experience working with hundreds of government jurisdictions. Our study approach also includes:

- Collection of basic data on the fleet including type, assigned department, acquisition date, meter reading, and maintenance and replacement costs (where available).
- Development of statistics on fleet operations such as average age, Vehicle Equivalency Units (VEUs), compliance with preventive maintenance inspections, downtime, etc.
- Interviews with users regarding their operational needs for vehicles and aspects of the fleet program that meet their needs as well as where changes may be needed.
- Assessment of fleet maintenance practices and comparison to industry best management practices.
- Benchmarking against peer organizations.

3. VFRS Fleet Profile

VFRS employs approximately 300 firefighters and a full support staff. They respond to over 11,000 calls annually. VFRS has a fleet of 61 assets, half of which are apparatus with the remainder being light to medium duty support vehicles. Vehicles and staff are dispersed across ten firehalls.

The fleet is maintained by four mechanics who work under the Chief Mechanical Officer (CMO) from a central shop located at the Joint Operations Center (JOC). Maintenance is handled by a combination of inhouse work in this facility, and outsourcing. The shop has four bays which are assigned to each of the four mechanics. In 2020, outsourcing represented approximately 33% of the overall maintenance spend. The types of repairs outsourced included major repairs such as transmissions and engines.

(1) Fleet Size

VFRS fleet is typical for a city fire department of this size. The following table shows the distribution of the fleet by class type.

Class Type	Count	Class Type	Count
Aerial	9	SUV	12
CUV	5	Tanker	2
Equipment LD	1	Trailer	3
HAZ-MAT	1	Truck HD	2
Pumper	10	Truck LD	3
Rescue	6	Truck MD	2
Sedan	5		
Total			**61**

(2) Fleet Budget

The VFRS fleet does not fall under the City Fleet Manager. The City of Vaughan has an internal service fund and rate model for fleet maintenance. VFRS, on the other hand, is funded through a general fund for capital acquisition as well as operating costs (maintenance and fuel).

The operating fund budget is approximately $645,000 annually and has been regularly overspent in the past five years due to maintenance costs. There is no evidence that maintenance costs are excessive (although issues with Work Order tracking is discussed later in this report). Since data is not available to show whether the costs of maintenance are reasonable, the issue could be attributed to unnecessary cost overruns from parts costs or labour hours. It is also possible that the budget is insufficient. To determine the root cause, VFRS will need to track costs associated with repairs on specific vehicles and analyze this data to highlight exceptions. This will help understand what a realistic allocation for vehicle maintenance should be going forward. The table below illustrates the significance of the variance between budgeted and actual costs.

Operating Expenditure Totals	2017	2018	2019	2020	Averages
Total Budget	$615,696	$621,696	$651,696	$692,116	$645,301
Total Actual	$681,031	$811,401	$885,907	$762,516	$785,214
Variance	($65,335)	($189,705)	($234,211)	($70,400)	($139,913)

Capital expenditures are made against one of two funds – the Development Fund for capital additions and the Fire Equipment Reserve for replacement vehicles. Capital replacement expenditures average almost $2.17 million per year, with an annual average replacement count of four assets as shown in the next table.

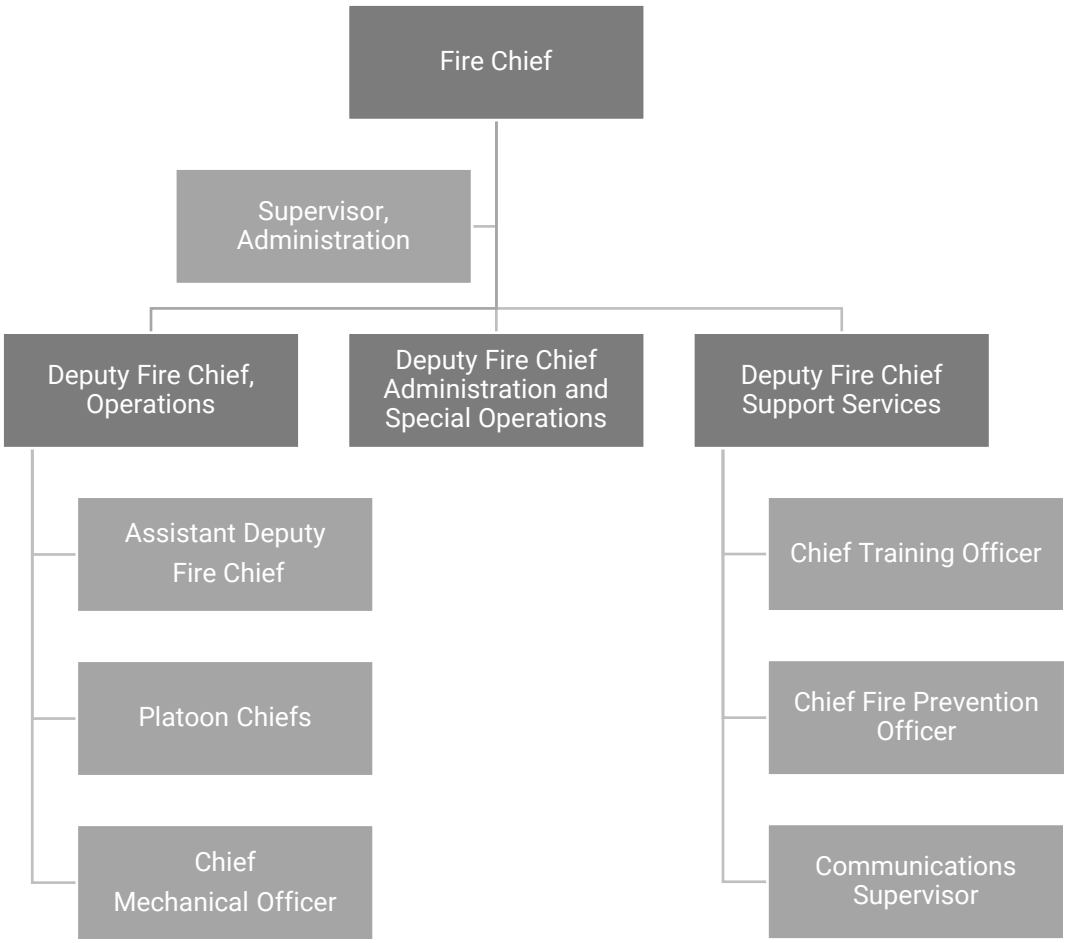
	2016	2017	2018	2019	2020
RP Budget	$3,370,106	$3,051,723	$3,332,732	$1,442,000	$597,429
RP Actual	$3,150,861	$2,993,642	$2,905,485	$1,405,518	$385,864
RP Count	3	4	3	1	10

Average Budget	$2,358,798
Average Actual	$2,168,274
Average RP Count	4

The budgeted fleet capital replacement for 2021 is $2.09 million for the replacement of two engines and one SUV. The total replacement value of the fleet is approximately $27 million.

(3) Fleet Organizational Structure

During the period of this fleet review, VFRS hired a new Fire Chief which resulted in some reorganization. The Fire Chief reports to the City Manager and has the direct reports shown in this organization chart:



There are five divisions within VFRS:

- Fire Communications Division
- Fire Mechanical Division
- Fire Operations Division
- Fire Prevention Division
- Fire Training Division

The focus of this study will be the divisions that deals with fleet operations and maintenance.

4. Obstacles and Resolution

Several challenges were encountered over the course of the study. Each was dealt with appropriately by the project team and did not hinder the overall results or completion by deadline. Having a dedicated project lead appointed by VFRS was invaluable in addressing issues as they came up.

(1) COVID 19

COVID restrictions prevented a site visit in the early months of the project. Extensive use was made of virtual platforms to make up for this deficit. When travel restrictions were lifted, our project manager was able to do a site visit and incorporate the findings in this final report.

(2) VFRS Data Availability

VFRS was very open about their current situation regarding data availability. With no fit-for-purpose fleet management information system (FMIS), we knew that basic data such as repair costs by vehicle and time spent on repairs was not available. Other pieces of information, such as odometer readings, were not readily available but gathered over time. We adjusted our schedule to allow more time to gather this information and highlighted omissions where present to demonstrate the need for a FMIS.

(3) Benchmarking Study Participation

Our goal was to compare VFRS to at least three peer organizations. One of the original partners pulled out of the study and all participants needed extra time to gather the data we needed for the study. Fortunately, we were able to secure a new partner and we

adjusted the schedule for the best practices review with the benchmarking study in order to give all partners more time to collect data.

(4) Scope Expansion

In preparing the final recommendations, the client identified that they wanted to have flow charts to map out key processes as this would assist in upcoming internal audits. As this was not part of the original scope of the project, we worked with the VFRS project lead to develop a request for scope expansion and accommodate this new deliverable within the original timeframe.

BENCHMARKING STUDY

This section compares what we have learned about VFRS with three other fire fleets situated in Ontario. The benchmarking partners are:

- Mississauga Fire and Emergency Services (MFES)
- Brampton Fire and Emergency Services (BFES)
- London Fire Department

A lack of data from VFRS prevents detailed comparison in some areas such as cost or labour hour expenditures per Vehicle Equivalency Unit. However, information on best practices and policies was shared and can benefit VFRS in the future. The best practices that we use are based on two sources. First, NAFA Fleet Management Association provides a structured program in fleet management with eight certification modules covering every aspect of fleet management. Two of our consultants hold this certification. Second, our company has completed more than 300 fleet management reviews and have a databank of findings for comparison.

An overview of the four organizations shows the size of each Department and the population supported. VFRS is the smallest Department by every measure. We chose larger organizations due to the growth expected by the City of Vaughan. Learning from these organizations can be very beneficial to VFRS.

Criteria	Mississauga	Brampton	London	Vaughan
Population	828,854	603,346	404,699	323,281
Calls	28,883	23,024	9,960	11,000
Staff	770	550	416	300

A detailed benchmarking report was submitted as a previous deliverable for the project and the summary table included as Appendix 1. This section highlights findings in the following functional areas:

- Governance and Organization
- Acquisition and Disposal
- Replacement Planning
- Maintenance Practices
- Technology and KPIs

1. Governance and Organization

Under governance and organization, we compared the reporting structure, staffing, job descriptions, training plans and policy framework of the four organizations. In terms of reporting structure, none of the organizations had a position entitled Fleet Manager but two Departments had an individual doing the full range of fleet management functions under another title (Brampton – Division Chief Apparatus and Maintenance and Mississauga – Assistant Chief Capital Assets). VFRS and London Fire assigned fleet functions to their Deputy Chief of Operations. From discussions with the Departments, it is clear that there are benefits from having a dedicated person responsible for fleet below the Deputy Chief level. This function warrants a full-time position as fleet size and complexity increase.

All Departments except VFRS have positions in the fleet organization to provide parts and administrative support. The three benchmarking partners have more up to date job descriptions and more developed annual training plans than VFRS.

Policy development was weak across the board, but most organizations are working to improve in this area by implementing Standard Operating Procedures (SOPs). The Training Divisions of all organizations except VFRS provide a Driver's Handbook during driver training that contains important information on vehicle operation.

Recommendations

Our recommendations from the benchmarking study on governance are:

1) **VFRS should assess the need for a full-time fleet manager position as the organization grows.**

2) **VFRS should add staff capacity to perform administrative work and parts support.**

3) **VFRS should update all job descriptions and develop annual training plans for mechanics.**

4) **VFRS should create a Fleet Policy Manual that incorporates the flow charts created during this review, as well as a Driver's Handbook highlighting information pertinent to equipment operators.**

2. Acquisition and Disposal

Our review of acquisition and disposal included the purchasing process, lifecycles and remarketing practices. VFRS has a standing offer for the acquisition of apparatus. This best practice saves time in the acquisition process and results in standardization of equipment with its accompanying maintenance and driver training benefits. One other Department also uses a standing offer, and another is moving to this arrangement in 2022. VFRS also has the ability to carry over capital funds from one fiscal year to the next which is essential in planning for replacement of complex equipment.

The three benchmarking partners have published lifecycles for all equipment classes. These guidelines are generally adhered to. MFES has a more sophisticated condition assessment system in place to prioritize vehicles for replacement. All organizations dispose of their vehicles through auction.

Recommendations

Our recommendations from the benchmarking study on acquisition and disposal are:

5) **VFRS should develop and adhere to lifecycles for all classes of vehicles.**

6) **VFRS should adopt a condition assessment methodology to prioritize vehicle replacement.**

3. Replacement Planning

Replacement planning includes having a multi-year replacement plan in place and a budget process that supports it. Organizations should also ensure they have a process that predicts and allocates operating funds according to need. Replacement plans should cover the time period of the life of the fleet vehicle with the longest replacement cycle. For fire fleets, this is generally 20 years. While the benchmarking partners have replacement plans that conform to this standard, VFRS utilizes a more reactive approach. VFRS plans vehicle replacement as budget permits and as equipment is assessed by the Deputy Chief and CMO as a priority.

The fleet operating budget for VFRS is always overspent due to maintenance costs. Our partners have a budget process that relies on historic spend (not historic budget) and is adjusted for inflation and other factors.

Recommendations

Our recommendations from the benchmarking study on replacement planning are:

7) **VFRS should create a 20-year fleet replacement plan.**

8) **VFRS should improve their tracking of maintenance costs to better budget for this expense.**

4. Maintenance

A number of important areas pertaining to fleet maintenance were compared. These areas include Preventive Maintenance (PM) compliance, Vehicle Equivalent Units (VEUs), outsourcing and facilities. PM compliance is a simple benchmark that compares the number of PMs conducted to those due. VFRS does not track PM compliance but feels it is less than optimal. All benchmarking partners track compliance with two partners, MFES and BFES (for apparatus only) close to the industry benchmark of 95%.

The VEU analysis showed the number of sedan equivalents in each fleet. VEUs were used to determine optimum shop staffing and all organizations were within one mechanic of the recommended levels. VFRS was understaffed by one mechanic which necessitates greater outsourcing as shop capacity is constrained to four bays. None of the partners met the industry benchmark of 1.5 bays per LD mechanic and 2 bays per HD mechanic. VFRS has only a 1:1 ratio of bays to mechanic.

Recommendations

Our recommendations from the benchmarking study on maintenance are:

9) **VFRS should adopt a pro-active PM schedule and work towards 95% compliance.**

10) **VFRS should consider future facility needs as the organization grows.**

5. Technology

We discussed current and future plans for the integration of technology and tracking of Key Performance Indicators (KPIs) with each benchmarking partner. All participants except VFRS have a FMIS capable of tracking information such as fleet inventory,

odometer readings, fuel usage and maintenance history with associated unit costs. This makes it much easier for the other organizations to conduct a fleet utilization review, develop a capital replacement plan and calculate mechanical staffing requirements.

Results showed that none of the benchmarking organizations tracked specific KPIs, even though they have the capability to do so. Each organization asked what KPIs they should be tracking and were given some guidance in this area. Important KPIs include:

- PM compliance – Number of PMs completed divided by the number of PMs due. Should be over 95%.
- Downtime – The percentage of the fleet that is not available at a given time. Should be under 15%.
- Comeback rates – The percentage of vehicles that come back to the garage for the same repair. Should be under 5%.
- Collision statistics – The number of preventable collisions per 160,000 km.
- Vehicle utilization threshold averages – The average utilization for a given class of vehicles.
- Fuel usage by kilometers. The litres of fuel used by km driven.
- Average fleet age. The average age of all vehicles in the fleet.

Cost information can also be tracked such as cost per Vehicle Equivalent Unit (VEU). Tracking such information through KPIs provides vital statistical data to substantiate additional staffing needs, infrastructure improvements, and fleet replacement requirements to maintain and support operations.

Recommendations

Our recommendations from the benchmarking study on technology are:

11) VFRS should acquire a fit-for-purpose fleet management system.

12) VFRS should determine which KPIs are most valuable to their organization and develop regular reporting procedures.

FLEET BEST PRACTICES

This section of the report elaborates on the Best Practice Checklist at Appendix B. While the checklist assessed the degree to which VFRS met industry best practices in a series of fleet functional areas, this section concentrates on the areas where industry standards were not being met.

- Technology
- Governance and Policies
- Organization and Staffing
- Acquisition and Disposal
- Maintenance Practices

Each functional area provides a narrative with recommendations to meet those standards in the future. Note that we have moved the discussion of technology to the forefront as the need for a Fleet Management Information System is paramount.

1. Fleet Technology

Comprehensive, accurate, and readily accessible records regarding fleet operations are essential to optimize performance and manage costs. Having all maintenance and other data available in a computerized system accessible by all fleet program stakeholders is key for managing shop operations.

(1) Current Fleet Management Information System.

The VFRS department does not have an appropriate fleet management system in place to manage its fleet. Currently, the VFRS department uses a software called Firehouse and excel spreadsheets to track fleet operating and maintenance activity. Firehouse is an emergency service software designed for dispatching services and has limited inventory and maintenance record capabilities.

The City of Vaughn uses JD Edwards (JDE) as their fleet management system. It is an ERP, finance-based application with modules that address asset management. It also has a work order module to record Tangible Capital Asset (TCA) maintenance activities. The

IT strategy for the City involves an update to this system in 2022, and its use by VFRS as their fleet management tool.

The following table provides a summary description of the technology tools utilized currently in VFRS fleet operations. Each tool or application is accompanied by a description of its functionality and the primary ways the fleet operations use it.

Technology	Description
Firehouse	• A customized Fire Computer-Aided Dispatch (CAD) Records Management System (RMS) software designed for first responders. Syncs live 911 calls and GPS data for law, fire, and emergency medical services across districts. Software is also used to track and manage fire rolling stock assets, SCBA, PPE, stations, inventory, and narcotics. It has budget forecasting features and real-time dispatch communications. • Application is used by VFRs for dispatch services and some fleet record maintenance activities. Application is not used for scheduling maintenance work orders.
Mobile Data Terminal (MDT)	• A computerized device used in mobile units such as transit vehicles, commercial trucking fleets, military logistics, warehouse inventory control, and emergency vehicles to communicate with central dispatch. Also referred to as a mobile digital computer (MDC), the device displays mapping and information relevant to the task and actions performed by the unit dispatched such as CAD drawings, diagrams, and safety information. • MDT is synced with Firehouse and interfaces with GEOTab telematics software.
Excel Spreadsheets	• Manual Excel spreadsheets are maintained to track the fleet replacement plan, budgets, operations, asset inventory, and maintenance records concerning fleet operations.

Technology	Description
JD Edwards (JDE)	• Oracle's cloud-based Enterprise Resource Planning (ERP) solution that provides ERP applications and tools for finance, human resources, distribution, consumer goods, and manufacturing sectors. JDE has additional module selections designed to support the above operations depending on client needs. JDE has interface compatibility with a number of outside applications that allows integration into one system for reporting purposes. The City of Vaughan uses JDE ERP solutions software as their main financial system.
Questica	• A performance management tool software that interfaces with JDE for budgeting, planning, and forecasting to set financial and non-financial goals. The City of Vaughan uses this software for budget processing only.
PSD Citywide	• Asset Management CAM system that only Finance team uses for depreciation of tangible assets. Application does not interface with JD Edwards.
VECTRO Solutions	• A centralized operational training and risk management tool. Has a combination of software products used for training, workforce management, equipment inspections, customized checklist, and inventory management with a reporting and compliance feature to help in identifying risks while improving operational efficiencies.
GEOTAB	• Web-based telematics software used to track real-time fleet activities. Track's driver behavior, speeding, idling, braking, odometer readings, fuel consumption, utilization, engine data reporting, route optimization.
Computrol	• Automated fuel control management web-based platform designed to track real-time fuel transactions, odometer readings, and fuel dispense inventory. Computrol Integrates with most financial systems and fleet management software.
Petro Fuel Credit Card	• Universal credit card that allows flexibility in fueling at multiple fueling stations. This system collects transaction dates, locations, fuel quantities, and odometer readings.

The team discovered through multiple interviews that Firehouse is not consistently used or maintained to record VFRS fleet maintenance activities. Expenses associated by asset are not captured but are expensed to a general repair cost code. Master fleet inventory is kept in an excel spreadsheet where odometer readings are not regularly updated.

Basic transactions and pieces of fleet functions can be performed by Firehouse and JD Edwards applications but neither system is adequate to properly manage and report on the day-to-day operations of a complex fleet organization required to manage fleet operations efficiently.

Key fleet data elements currently missing include:

- Recording annual odometer and hour meter readings. (this function is obtainable through current telematics software GEOTAB interface option).
- In-house work order labour hours per asset.
- In-housework order labour costs per asset.
- Part expense per asset.
- Fuel consumption by liters per asset.
- Fuel consumption by expense per asset.
- Sublet expense per asset.

To assess fleet utilization and obtain total cost of ownership the above key elements are required. Once these expenses are collected, historical data can be obtained and monitored through KPIs. Utilization data provides the foundation to establish fleet lifecycles and forecast fleet capital replacement dates.

(2) Future Fleet Management Information System.

The City of Vaughan is looking to collectively implement an all-in-one ERP system known as JD Edwards, that encompasses the multiple facets of the City's operations through the following key functional areas:

- Finance (Account payable & receivables, general ledger, financial reporting).
- Payroll (salary, hourly, expense reimbursement).
- Attendance Management (leave accruals, time-in-lieu).
- Tangible Capital Assets (fixed assets, work orders).
- Job Cost and Project Management (job cost tracking, budget reporting and management).

JD Edwards work order module is part of the Tangible Capital Asset (TCA) application that monitors fixed assets. TCA measures all assets that have a finite monetary value and usually a physical form. Tangible assets usually account for the majority of an organization's total assets and are listed by liquidity on the balance sheet.

Tangible assets can be either current assets or long-term assets. Current tangible assets include cash, cash equivalents, marketable securities, and accounts receivable. Long-term assets, also known as fixed assets, comprise of real estate (land and buildings), manufacturing plants, manufacturing equipment, fleet (vehicles and equipment), office furniture, computers, and office supplies.

Although JD Edwards touches multiple operational components of an organization it does not master any one component. JD Edwards is designed to handle basic fleet transactions but lacks functionality to properly manage and report on the day-to-day operations of a complex fleet organization. The advantage to JD Edwards is that it does allow software interfacing and is compatible with most commercial off the shelf (COTS) applications.

Any FMIS acquired for the future should have the following capabilities:

- Complete vehicle equipment life-cycle management including
  - Budgeting and forecasting
  - Acquisition and upfitting capital costs
  - Capital improvements
  - Disposal management
- Comprehensive work order functionality
  - Repair status
  - Repair type
  - Repair labor hours & costs by asset
  - Repair parts expense by asset
- Shop repair scheduling and workflow assessments
- Preventive maintenance scheduling
- Regulatory safety inspection scheduling
- Labor tracking and management
- Productivity monitoring (KPIs)
- Inventory control and parts room management
- Cost reporting and billing
- Motor pool management
- Warranty and claims tracking

When organizations decide to look for an all-in-one application that meets the needs of every operational function, organizations will make compromises in certain areas to meet their overall goals. Stakeholders should be involved and all operational components and processes should be considered before making this decision. Some limitations and issues to consider when evaluating JD Edwards ERP system as the main fleet maintenance information system:

- Capability to forecast a multi-year capital replacement plan subjective to fleet lifecycles, total cost of ownership and asset condition.
- Functionality to associate real-time labor hours and costs by asset (vehicle or equipment) and by project (job cost) without manual entry.
- Ability to allocate credit card, requisition, or purchase order expenses relating to multiple assets and projects.
- Ability to allocate costs associated with one project by function (e.g. emergency, post incident, rehibition, and preventative measure costs) without multiple children projects numbers.
- Functionality to manage shop floor activities (e.g. workflow, work orders, mechanic productivity, and parts).

The selection team should also be aware the advanced functions such as parent/child asset relationships, warranty management, job time standards, preventive maintenance scheduling by fuel use and multiple meters, fleet replacement planning, labor scheduling and backlog tracking, automatic notification of maintenance schedules to customers, on-screen notification alerts to mechanics (for issues such as overdue services, repeat repairs, and warranties), and real-time shop operations (e.g. paperless shop) are not supported. Also, the reporting functionality is limited, making it difficult to retrieve data and turn it into actionable management information.

Given the size of the VFRS fleet, required support staff, and annual maintenance expenditures it would benefit VFRS to combine efforts with the City Fleet Management department in acquiring a purpose built commercial off the shelf (COTS) fleet management information system (FMIS).

The primary benefit of a fully integrated FMIS is the ability to manage all aspects of a fleet operation through a single interface and toolkit. Having all pertinent transactional and management data consolidated in a single system and available to all fleet users

provides an effective tool for day-to-day operational management, a basis for timely management decisions, and an efficient information retrieval and reporting platform.

Leading systems are aligned with best practice processes and include standard reports and analysis tools for tracking all aspects of fleet operations. COTS solutions typically include these benefits:

- Built in business rules help frame how data is managed, processed, and validated.
- Standard designed screens, modules, and functions support best practice fleet processes.
- Predefined common asset schemas and data attribute listings are provided, such as vehicle class codes, work task codes, and parts numbers.
- Offers flexibility and user defined areas even though most data capture and workflow processing are pre-defined.

In the table below we have provided examples of COTS FMIS in two tiers. All solutions meet the needs of VFRS. The Tier 2 systems are generally more affordable but less comprehensive.

Tier 1	
Asset Works (M5)	www.assetworks.com
Chevin Fleet Solutions (Fleet Wave)	www.chevinfleet.com
Faster Asset Solutions (Faster)	www.ccgsystems.com

Tier 2	
Collective Data (CollectiveFleet)	www.collectivedata.com
Ron Turley Associates (RTA)	www.rtafleet.com
CFA (CFAWin)	www.cfasoftware.com

Some of the differences between Tier 1 and Tier 2 systems are the depth of functional features in certain areas (such as financial management, supply chain, and replacement planning), the level of customization available, resources available from the software company for implementation and training, and the flexibility of reporting and dashboard modules. With the increased capabilities comes increased complexity. Thus, these systems are more expensive to implement, and regular follow-up training is required.

Prices of a COTS FMIS vary greatly and are based on system functionality, interface development required, training and method of hosting (onsite or offsite). VFRS should

complete a needs analysis, create a RFP and select the system that best meets their needs and budget.

VFRS might consider acquiring services from an experienced consultant or system integrator to provide guidance on RFP development, system selection, system configuration, management reporting, performance metrics and defining interfaces, integrations, and developing custom reports. Prices for implementation service assistance typically range between $10,000 and $25,000.

(3) Performance Measurement Framework.

As mentioned earlier, to obtain total cost of ownership, fleet utilization must be monitored. One way to monitor fleet utilization is through Key Performance Indicators (KPIs). A good FMIS has the key data components and history required to develop KPIs.

The following KPIs are proven industry standards. Most come from the Maintenance Management Guide published by NAFA Fleet Management Association, and are amplified by our experience with more than 300 government fleet studies. KPIs that should be tracked include:

- Average Fleet Age: This measure tracks the average age of the fleet in comparison to average replacement cycles. Major classes of vehicles and data for different customer groups should be tracked separately. Trends should be presented for multiple years and associated with other KPIs as the age of the fleet has a fundamental impact on program performance. Fleet Services should begin tracking this KPI immediately. The industry benchmark for municipal fleets is an average age of 6 years, which would correspond to a fleet replacement cycle average of 12 years. This means that it would take 12 years to replace every vehicle in that fleet.

- Fleet Availability: This measure tracks the percentage of the fleet that is available for work each day. The calculation is simply the total number of vehicles and pieces of equipment in the fleet divided by the number of vehicles out of service for repair (i.e. in the shop, waiting in the deadline to come into the shop, or at a vendor). The target of performance for this KPI in the industry for high performing fleet organizations is 95%.

- Service Turnaround Time: This measure tracks the percentage of repairs that are completed within 24, 48 and 72 hours. The target of performance for this KPI is

70% of repairs and services completed in 24 hours, 80% in 48 hours, and 90% in 72 hours.

- Scheduled Repairs: This measure tracks the percentage of work orders resulting from scheduled activities (such as PMs, inspections, work discovered during PMs and inspections, recalls, etc.) versus unscheduled activities (such as breakdowns and road calls). The standard of performance for this KPI is 66% scheduled.

- PM Compliance: This KPI measures the percentage of PMs and scheduled inspections that are completed before they are overdue. The target of performance for this KPI is 95%.

- Billable Hours: This KPI tracks how productive technicians are in terms of the annual number of hours billed to work orders. The target for this KPI is 70% of annual regular payroll hours (1,428 of 2,040 hours per year).

Recommendations

Our recommendations in the area of fleet technology are provided below:

1) **Explore areas of cooperation with the City's Fleet Management department in the area of FMIS acquisition.**

2) **Acquire a fit-for-purpose FMIS.**

3) **Develop KPIs to monitor fleet benchmarks that support additional staffing needs, infrastructure improvements, and/or fleet replacements required.**

2. Governance and Policies

In this area we assessed issues relating to the governance of fleet operations and the fleet policy framework. Individual polices such as vehicle lifecycles and replacement planning are dealt with in future sections.

(1) Governance

Governance refers to the oversight and control of fleet management. VFRS has assigned responsibility for fleet management to the Deputy Chief of Operations. Some of the

budget and financial management functions are delegated to the Assistant Deputy Chief, and fleet maintenance falls under the CMO. As seen in the benchmarking study, two of the comparable organizations have created a position under a Deputy Chief who has control of all aspects of fleet. VFRS is growing quickly and should evaluate when this may be necessary.

Another aspect of governance is the relationship between the City of Vaughan and VFRS when it comes to fleet management. The city provides finance, purchasing and IT support to VFRS. In addition, the city has a fleet manager who is responsible for the city fleet of 550 vehicles. The city shop has three bays and three mechanics, located at the JOC near the VFRS shop. There is communication between VFRS and the city but no collaboration. There are opportunities for cooperation, particularly in the acquisition and use of a FMIS.

(2) Policies

Government organizations benefit from a robust fleet policy framework comprised of a Fleet Policy Manual and a Driver's Handbook.

The Policy Manual provides a reference for managers and staff to refer to as different situations arise and serves as a baseline for all employees to understand the mission, requirements, and constraints of the fleet management program. Without such a manual, individuals are left to exercise their own judgment on a range of important fleet issues such as the type of vehicles that will be purchased, when vehicles will be replaced, and whether replaced vehicles are sold or kept in service to meet other program needs. This situation inevitably leads to wide variations in fleet conditions and practices among divisions and limits the ability of the organization to implement best management practices. A Fleet Policy Manual should contain chapters on governance, acquisition, replacement planning, financial management, maintenance, operations, utilization, sustainability, safety, and remarketing

A Driver's Handbook is a supporting document that contains the information that needs to be readily available to drivers. It should include a signatory page indicating that a driver is aware of and will comply with its contents. Drivers should be required to review and sign the document annually, and their signature should also allow management to access their Motor Vehicle Record (MVR). Information in this document should include detailed instructions and requirements for pre- and post-trip inspections, service and fuel procedures, actions in case of collision and driver obligations to report all driving infractions on a timely basis.

The City of Vaughan has a Policy Manual that has not been kept up to date but contains some valuable guidance. A 2014 draft administrative directive also provided some

guidance that provides a good starting point for policy development in the areas of driver licensing, vehicle inspections, driver abstracts and collisions. As the project progressed, VFRS recognized the value of procedural guidance in key areas and requested the creation of flow charts for those functions. These flow charts will provide guidance on best practices for fleet acquisition, repair, maintenance outsourcing and remarketing.

VFRS should use these documents to create a policy framework that meets the requirements of this growing organization.

Recommendations

Our recommendations in the area of governance best practices are provided below:

4) **Exploit areas of cooperation with the city fleet management specifically in the area of FMIS acquisition.**

5) **Monitor Department growth to determine the requirement for a dedicated fleet manager.**

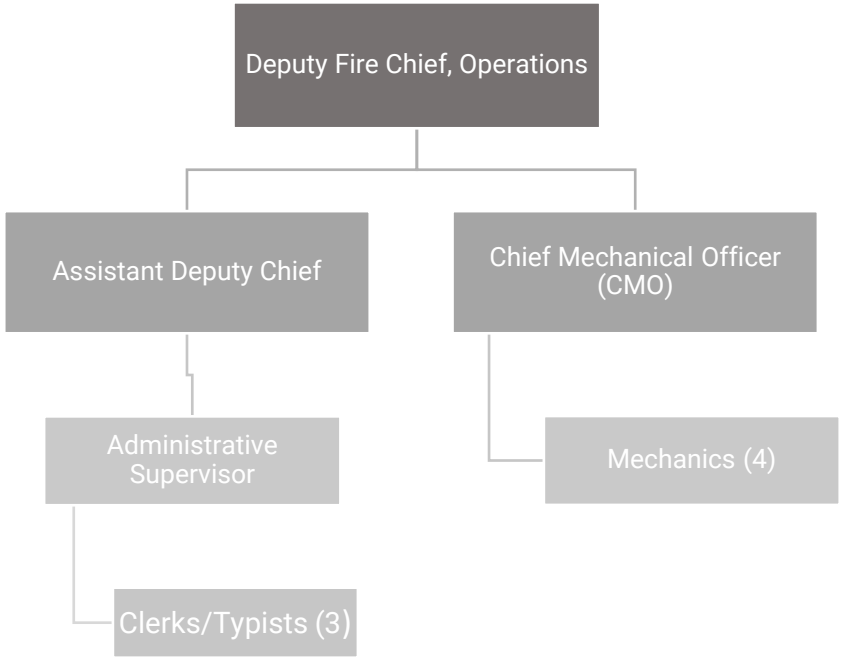
6) **Create a tailored fleet policy framework for VFRS.**

3. Organization and Staffing

The section focuses on VFRS department's fleet related operations and maintenance activities current organization and staffing structure. Staffing hierarchy and capacity, job functions and descriptions, and the departments training programs were areas findings and concerns were found during the study. Each topic area findings will be discussed concluding with recommendations to implement that will increase fleet's operational efficiencies.

(1) Organizational Structure.

The focus of this study will be the VFRS Mechanical Division that deals directly with fleet operations and maintenance. The following organizational chart depicts the reporting relationship.



The Deputy Fire Chief of Operations provides oversight of VFRS fleet maintenance and operations. He is assisted by the Assistant Deputy Fire Chief who oversees the administrative clerk/typists who render services to fleet as well as the other VFRS divisions. The fleet operating and capital budgets are managed by the Assistant Deputy Fire Chief with advice from the CMO. The clerk/typists help with administrative paperwork, safety alerts, vehicle licensing, periodic inventory updates, and invoice processing of mechanical parts and supplies. Their support is part time and the clerk/typists are located away from the shop.

The next table shows the number of authorized Full-Time Equivalents (FTE's) for fleet related staff, vacancies for those positions, and a summary of the key roles and responsibilities of each position. These staffing roles and responsibilities are not intended to provide a complete “job description" level of detail but to summarize the principal duties assigned to each position.

VFRS Fleet Staffing Roles & Responsibilities

Position Title	Authorized Positions	Vacant Positions	Key Roles and Responsibilities by Job Description
Deputy Fire Chief, Operations	1.0	0.0	• Reports to Fire Chief • Manages and supervises all fire and mechanical operations. • Responsible for planning, coordinating, and directing fire suppression duties, related emergency, and support services. • Assesses staffing needs and recruiting process. • Assists and participates in labour relation matters. • Directs the development and implementation of policies and procedures. • Prepares all tender specifications for major purchases, including fleet. • Coordinates VFRS emergency planning and liaises with Federal, Provincial, Municipal, and other authorities on matters related to Municipal Emergency Planning.
Assistant Deputy Chief	1.0	0.0	• Reports to Deputy Fire Chief(s) and Fire Chief • Provides administrative and technical assistance respecting departmental and operational issues. • Formulates and implements policies and procedures. • Prepares operating and capital budgets and forecasts. • Assists in establishing performance metrics (KPIs) and comparative analysis investigating variances in KPIs and budgets. • Defines business and information requirements for core applications. • Prepares business plans and cases to support development and replacement of capital assets.
Clerk Typists	2.0	1.0	• Report to Administrative Supervisor. • Provide phone services. • Record meeting notes and provide to DFC(s). • Assist in division budget process • Update VOL on-line website on any additions and revisions concerning policies, procedures, safety alerts, bulletins, and fire related public notices. • Type all administrative letters and notices. • Maintain and update leave accruals for VFRS.

Position Title	Authorized Positions	Vacant Positions	Key Roles and Responsibilities by Job Description
			• Order and maintain administrative supplies for all divisions. • Order uniforms for all divisions. • Process invoices and tracking activities. • Oversee training courses, course scheduling, testing, and material. • Manage training records.
Chief Mechanical Officer	1.0	0.0	• Reports to Deputy Fire Chief, Operations. • Schedules and coordinates mechanics. • Assists DFC and ADC in fleet specifications preparations. • Develops and oversees general and emergency repair and preventative maintenance. • Arranges services from local vendors. • Provides advice on Division budget needs. • Maintains detailed mechanical record system. • Maintains operational and maintenance manuals. • Dispatches to fires and other emergencies as required.
Fire Department Mechanic	4.0	0.0	• Reports to Chief Mechanical Officer. • Performs PM, repairs, engine tune-ups, alterations, and installations of systems and equipment. • Services all hydraulic equipment including aerial devices and extrication equipment. • Services and repairs all small-engine powered equipment such as portable pumps, saws, generators, etc. including non-powered tools and equipment. • Services main fire pumps and accessories, transfer cases, shifters, primers, valves, controls, plumbing, and pressure regulating devices, etc. • Provides input on equipment specifications. • Performs quality control, safety, and trade compliance. • Performs all necessary annual and quarterly inspections in compliance with safety standards for all VFRS department rolling stock. • Assists in training and providing instruction on specific operational functions related to all VFRS rolling stock assets.

(2) Staffing

There are staffing shortfalls which impact the efficiency of the Mechanical Division. This section deals only with administrative support as a complete Vehicle Equivalency Unit Analysis appears in the maintenance section of the report. The administrative areas for consideration involve administrative/parts support and the Fleet Manager position.

In interviews with the CMO and mechanics, we learned that mechanics maintain their own work orders though a manual paper process versus the use of a FMIS. Mechanics also order most of their own parts taking time away from vehicle repair. Labor hours and costs are not being recorded or allocated back to the asset. A best-in-practice shop opens a new Work Order every time a mechanic touches a piece of equipment. Should a higher priority force reallocation of labour before a repair is completed, the mechanic temporarily closes that Work Order and opens another. In this way, time spent on a particular repair or on a specific vehicle can be tracked. This, in turn, makes it possible to calculate mechanic productivity and to identify if a vehicle is incurring excessive maintenance costs. With a paper-based system, Work Order tracking is onerous, but it is greatly facilitated with automated tools located on the shop floor. Better tracking tools and dedicated administrative/parts support would contribute to mechanic productivity.

As organizations grow, the need for a full-time position as Fleet Manager will develop. That individual would have a complete understanding of the fleet budget, replacement plan, equipment options, maintenance, fuel, safety and disposal functions. This would allow the CMO to concentrate more fully on shop operations. Although VFRS's size may not warrant this change today, the situation should be monitored.

In the following table we summarize our view of future staffing requirements.

Position	Current State Maintained	Future State Adopted
Fleet Manager	0	1
CMO	1	1
Mechanic	4	4
Parts/Admin	0	1
Total	**5**	**7**

(3) Job Descriptions

Job descriptions do not exist for all positions, and those that do exist are out of date. A current job description is necessary in evaluating employee performance and accountability and determining any additional duties that should be added, deleted, or delegated. Job descriptions should be accessible upon request, whether kept by Human Resources or the responsible manager. Job descriptions should be reviewed annually during performance reviews and updated regularly. As in many occupations, the use of technology and the regulatory environment in the fleet industry means that responsibilities change to keep pace. A five-year window ensures adaption and response to these changes.

Specific examples of missing/outdated descriptions:

- The administrative clerk/typists job descriptions could not be supplied for review. Through interviews clerk/typists job descriptions are not clearly defined and randomly added to depending on the immediate task at hand requiring completion. Each administrative clerk was able to verbally describe their daily tasks and monthly duties but described many additional duties they did not always anticipate.
- The mechanic job descriptions were created in 1999 and have not been updated. Updated descriptions should contain the requirement to track time spent on individual Work Orders.

Clear job descriptions, supported by policies and Standard Operating Procedures, would improve overall efficiency by enabling all staff to be more proactive and better respond to emerging situations. Current job descriptions are important, not only to the incumbent, but to other employees as they articulate who to go to for assistance or decisions. Knowing this can ensure tasks are actioned promptly which improves efficiency. VFRS should also provide cross-training for administrative staff to make them more adaptable in case of absences. Overall, this will provide better accountability and decision making frameworks.

(4) Training Program

Professional certification is an important way for technicians and other staff to demonstrate their knowledge, training, and commitment to the organization. Fleet organizations are increasingly recognizing that adopting programs designed to ensure that technicians are well trained and technically expert is a business necessity. Vehicles and fleet equipment are becoming more complicated and increasingly expensive.

Training and professional certification provide an organization with assurance that equipment will be properly maintained and, therefore, that the value of the organization's equipment investments will be preserved. Training can also act as a retention tool in areas where technicians are in high demand.

In the past, fleet organizations relied almost entirely on training that was provided by vehicle and equipment manufacturers (OEM) free of charge. Though still available, OEM training is increasingly difficult to access. Consequently, municipal fleet organizations today are having to develop training programs that tap a variety of sources to provide technicians with the technical knowledge and updated skill sets that are required to maintain modern fleet equipment.

For technicians, certification is available through the Emergency Vehicle Technician (EVT) Certification Commission and the National Institute for Automotive Service Excellence (ASE). These independent, nonprofit corporations are dedicated to improving the quality of services and repair through the testing and certification of technicians throughout Canada and the United States. EVT and ASE certifications provide a valuable yardstick by which to measure technician's skills and knowledge as well as a fleet organization's commitment to providing its customers with efficient and high-quality repair services.

The EVT Certification Program has four emergency vehicle certification tracks and a Management Track. The emergency vehicle certification tracks are for fire apparatus, ambulance, law enforcement, and Airport Rescue and Fire Fighting (ARFF) Vehicle technicians. Technicians have two options of becoming EVT Certified.

- Option 1: Technicians can become certified in the specific test area(s) by taking only the EVT exams.

- Option 2: Technicians can attain the highest EVT Certification by combining EVT and ASE exams to reach Level I, II and Master EVT Certification.

The ASE program offers certification in a number of repair specialties such as brakes, electrical, engine repair, etc. Technicians can earn Master Technician status by obtaining a number of specific certifications within their area of expertise (automotive technicians, for instance, must pass eight exams). The tests are difficult and require a comprehensive understanding of the subject matter, approximately one out of three test-takers fail to pass. Technicians also must pass re-certification exams every five years. Both programs have certification courses available for management staff recognizing that shop foreman and supervisors also require up to date training.

Many organizations provide financial incentives in the form of hourly pay increases to technician staff to encourage them to pursue professional certification. Preparing to successfully pass the certification exams is a time consuming and arduous undertaking. Technicians who go through this process acquire updated skills and knowledge that enable them to provide their employers with more productive and effective technician services. In addition, such incentives improve the organization's ability to recruit and retain technicians.

In an industry where vehicle complexity is increasing and OEM training opportunities are harder to attain, skills maintenance is something that all organizations should plan for. Skilled and experienced mechanics, such as those currently employed, are very difficult to recruit and retain and an ongoing investment in training can assist in this.

Discussions with the CMO and mechanics revealed that there is no formal training plan or financial incentives to pursue EVT certification. Despite this, one of the mechanics has achieved partial EVT certification and plans to continue his training and retain his current credentials.

Individuals involved in fleet management can also benefit from functional and leadership training. NAFA Fleet Management Association offers two professional designations in fleet training – the Certified Automotive Fleet Specialist (CAFS) program, and the Certified Automotive Fleet Manager (CAFM) program.

Recommendations

Our recommendations in the area of organization and staffing are provided below:

7) **Increase parts/administration support to fleet.**

8) **Update and clearly define fleet job descriptions.**

9) **Implement cross training and backup staff when leave is taken to ensure operations are not interrupted.**

10) **Encourage staff at all levels to pursue professional certification.**

4. Acquisition and Disposal

This section will cover fleet acquisition and disposal practices, concluding with recommendations for improvement.

(1) Fleet Acquisition

Vehicle acquisition is the process of identifying the need for a new or replacement vehicle, creating specifications for the asset, conducting a Request for Proposal (RFP) or bid process, evaluating bids, and bringing the new asset into the fleet. The methods used to acquire and dispose of vehicles and equipment directly impact fleet performance and cost.

Acquisition processes should be designed to meet fleet users' needs while gaining efficiencies from volume purchasing, standardization of vehicle types, and government discounts. Organizations should also be cognizant of the level of effort and amount of time required to acquire vehicles and seek to go through the process in an efficient manner.

The acquisition process begins with determining the business requirements of the user department and translating this into vehicle specifications that describe the configuration, technical features, and functional capabilities required. Specifications should balance the need for custom design features (which can be expensive and delay delivery of vehicles) with standard equipment.

Service manuals, parts list, driver and mechanic training, and any specialized shop or diagnostic tools should be included in purchase specifications - particularly for specialized equipment. Additionally, procedures should be in place to inspect vehicles upon delivery to ensure their compliance with order specifications.

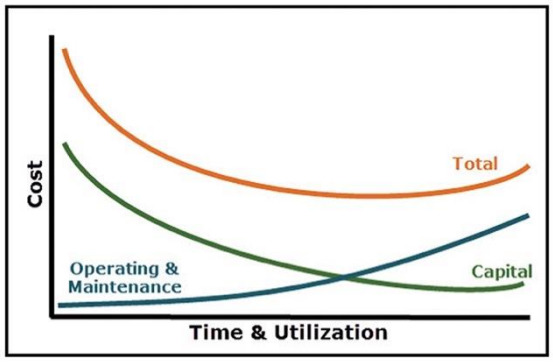
VFRS has incorporated many best practices in their acquisition strategy. Since 2018, they have been purchasing apparatus through a standing offer, standardizing equipment types. This has many advantages, including standardization of driver training and vehicle repair with related savings in parts, tools and mechanic time. They have also decreased administrative time spent on the tender process.

(2) Fleet Replacement Planning.

There are four key aspects of a best practice fleet replacement program, as outlined below.

1) **Reasonable replacement cycles should be created to identify when fleet assets should be retired in order to minimize lifecycle costs.**

The age and accumulated miles on vehicles fundamentally impact the cost and performance of the fleet. The foundation for a successful fleet replacement program is the development of reasonable replacement criteria. Replacement criteria are a set of parameters that initiate planning for the replacement of an asset. Fleet replacement parameters are generally set as time (months in service) and use (miles or engine hours) for each class of vehicles and equipment in the fleet. More mature replacement programs include a condition assessment in addition to time and utilization and often use a point system similar to the one used by MFES.



Equipment capital costs tend to decline over time (because annual depreciation is highest in the initial years of ownership), while operating and maintenance costs increase. The combination of these two basic curves results in a "U-Shaped" total cost curve. The economic theory of fleet replacement predicts that vehicles and equipment should ideally be replaced during the flat portion of the curve; that is, at the time annual operating costs begin to outweigh capital costs. Replacing an asset at this point produces the lowest lifecycle costs.

2) **A multiple year fleet capital plan should be used to project future year replacement based on the replacement cycles developed in the prior step above.**

Once reasonable replacement cycles have been established, an organization needs to develop a long-range replacement plan to forecast funding requirements for vehicles and equipment. The primary purpose of such a plan is to identify peaks and valleys in future year funding needs so financial planners and decision makers can accommodate this in the budget process.

The variability in annual funding requirements is a characteristic of owning any fleet, as vehicles deteriorate and are driven at different rates. Therefore, static funding is insufficient to properly replace a fleet.

3) **Budgeting practices should make funds available each year to replace vehicles in accordance with the replacement plan.**

Many organizations find it difficult to budget sufficient funds to replace their vehicles. This is largely because many public sector organizations do not have good processes in place to deal with yearly variability of spending requirements when revenues to finance these costs are largely fixed.

There are three (3) basic financing approaches available to government organizations: cash appropriations each fiscal year, establishment of a reserve fund, and borrowing (such as bonds, lease-purchasing, certificates of participation, etc.). The reserve fund and debt approaches are generally better than use of cash because they spread the capital cost of vehicles over several years which makes budgeting for vehicle replacements easier.

4) **A process should be developed for prioritizing spending of the money secured in the replacement plan for the coming fiscal year.**

The last step in an effective fleet replacement program is a short-term replacement decision-making process that identifies and prioritizes when to replace individual vehicles and pieces of equipment. While the replacement plan will project when vehicles need to be replaced years in advance, real world conditions often require adjustments once money is available to be spent. For instance, some vehicles may need to be replaced sooner than forecasted (because they have been destroyed in an accident or due to expensive repairs that are required) and some vehicles will turn out to be in good shape and can be kept in service another year or more past the replacement guidelines.

Therefore, several factors in addition to age and mileage need to be used to identify the specific units most deserving of replacement in any given year. These factors include historical repair costs, type of use (such as severe duty, mission critical or back-up), reliability, and an assessment of a candidate unit's current condition.

Many organizations have developed a point system that combines the factors listed above in a quantitative process of assigning replacement priorities. This has the advantage of taking most of the politics out of the replacement decision-making process because all stakeholders (including budget staff and departments that use vehicles) understand the factors being considered.

VFRS does not have the four elements in place to support replacement planning. There are no formal lifecycles by vehicle class, no multi-year replacement plan, no equipment replacement fund, and no point system to prioritize replacement. The implementation of these four elements would enable VFRS to create a plan that would predict which vehicles would need to be replaced each year and the required funding.

To demonstrate these four elements the team took the VFRS fleet inventory and developed a sample replacement plan. Below are the lifecycle criteria used for this example. We have used a combination of our experience from past studies and the benchmarking results to determine these lifecycle intervals. VFRS could use their lifecycle policy of 20 years for apparatus, or lifecycles calculated from their own data when it becomes available).

Lifecycles			
Class Type	**Years**	**Odometer**	**Hours**
Aerial	16	248,000	6,500
CUV	5	148,000	N/A
Equipment LD	7	148,000	3,500
HAZMAT	18	248,000	6,500
Pumper	13	248,000	6,500
Rescue	13	248,000	6,500
Sedan	5	148,000	N/A
SUV	5	148,000	N/A
Tanker	18	248,000	6,500
Trailer	10	N/A	N/A
Truck HD	12	248,000	6,500
Truck LD	7	148,000	N/A
Truck MD	7	148,000	N/A

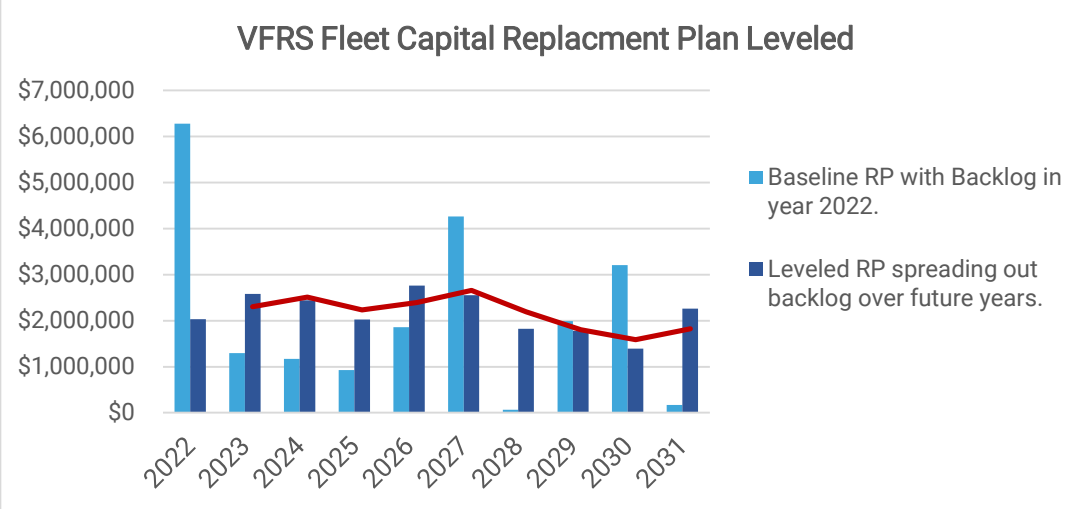
A replacement plan is a strategic approach to monitor the fleet and prevent large funding backlogs from happening that can take years for the fleet to recover from. The logical way to recover from such a backlog is to use a leveling method. Matrix recommends this method so fleet replacements are spread out over low capital cost years to avoid assets from being replaced within the same time frame and avoid high capital expenditures from hitting all in one year.

The following table demonstrates how the leveling method can be used to distribute current backlog (vehicles beyond replacement cycles). Note that we have used the replacement cycles from the previous table.

Year	Recommended Base RP	Base RP Count	Backlog	Leveling of Backlog	Total Spend	Leveled RP Count
2022	$6,275,500	21	**$6,195,500**	($4,245,000)	**$2,030,500**	**11**
2023	$1,297,800	4		$1,282,350	**$2,580,150**	**10**
2024	$1,166,990	6		$1,273,080	**$2,440,070**	**7**
2025	$928,818	2		$1,092,727	**$2,021,545**	**4**
2026	$1,859,341	3		$900,407	**$2,759,748**	**4**
2027	$4,260,332	18		($1,704,133)	**$2,556,199**	**10**
2028	$66,867	2		$1,755,257	**$1,822,124**	**10**
2029	$1,992,396	8		($209,079)	**$1,783,317**	**6**
2030	$3,204,928	5		($1,811,481)	**$1,393,447**	**5**
2031	$172,230	2		$2,087,637	**$2,259,867**	**4**

The table above shows that VFRS currently has 21 units out of lifecycle creating a replacement backlog of $6.2 million dollars. Spreading out the backlog by applying the leveling method results in a smoothing of the fleet replacement forecast without spikes in capital investment, making capital planning more predictable. Note, asset condition assessment should be completed on the vehicle backlog to identify units that have useful remaining life, allowing for proper prioritization of vehicles.

The following graph gives a visual of the VFRS Fleet Capital Replacement Plan baseline with backlog and our recommended leveled plan spread out over future years.



VFRS should use this methodology to develop and maintain a replacement plan for their fleet.

(3) Disposal Processes

In terms of fleet disposal, the best practice is to use an online auction company to sell assets because such companies provide specialized expertise, hold frequent sales, and reach a large audience of potential buyers. With specialty equipment, such as fire apparatus, online auctions are widely used. Other disposal options, such as donation may be appropriate if an item does not sell at auction.

It is also best practice to dispose of vehicles that have been replaced immediately. This practice avoids the ongoing maintenance costs associated with even a fully depreciated vehicle.

VFRS disposes of their vehicles through GovDeals. During COVID, some vehicles were retained for many months awaiting disposal as the public could not access the facility to pick up auctioned vehicles.

Recommendations

Our recommendations in the area of acquisition and disposal is provided below:

11) **Create a Replacement Plan showing which vehicles need to be replaced each year and the budget required.**

12) **Ensure vehicles deemed ready for resale are sent to auction on a timely (monthly) basis.**

5. Fleet Maintenance and Repair Services

Fleet maintenance and repair processes have a significant impact on vehicle availability, reliability, safety, economy, and environmental integrity. The principal ingredients of fleet maintenance are mechanic labour, facilities and equipment, parts, and outsourced services. The challenge of any fleet maintenance process is to mix these ingredients together to maximize operating performance while minimizing costs.

The indirect costs of fleet maintenance activities are also important and can far exceed the direct costs. For example, mechanical failures that idle employees or disrupt service

activities can result in productivity losses or more severe problems whose costs can often be much higher than those of repairing a vehicle.

In this section we will discuss VEUs, productivity, PMs, outsourcing and parts.

(1) VEUs

The number of technicians and related positions required for a maintenance operation to operate effectively is primarily driven by the size and composition of the fleet. Because most fleet operations service a wide variety of vehicles and equipment, it is necessary to establish a relative measure that allows for the evaluation and comparison of staffing needs and costs.

A process known as Vehicle Equivalent Unit (VEU) calculation is used to equate the level of effort required to maintain dissimilar vehicles to a passenger car, which is given a baseline VEU of 1.0. Our work with other fleet organizations has shown that a VEU of 1.0 is equal to between 10 and 15 annual maintenance labour hours, depending upon a number of factors unique to each organization. All other types of vehicles are allocated a VEU value based on their relationship to a passenger car.

We applied this methodology to VFRS as well as the three benchmarking partners. The high-level results for the partners were included in the benchmarking report, and we briefed each partner on the details of the VEU analysis for their fleet.

For this project, we assigned a VEU for each make and model of vehicles. The 61 active vehicles and equipment pieces in the fleet total 451.5 VEU's. The VEU Unit used is based on industry best practice and our findings over past studies. The following table summarizes our VEU calculations:

Class Type	Count	VEU Unit	Total VEU's
Aerial	9	15	135
Tanker	2	12	24
Hazmat	1	12	12
Pumper	10	15	150
Rescure	6	12	72
Sedan	5	1.5	7.5
SUV	12	1.5	18
CUV	5	1.5	7.5
Truck LD	3	1.5	4.5
Truck MD	2	2.5	5
Truck HD	2	3	6

Equipment LD	1	1	1
Trailer	3	0.5	9
Total	**61**	**79**	**451.5**

Industry standards tell us that each VEU requires between 10 and 15 hours of maintenance, depending on factors such as fleet age, operating conditions, parts support, etc. Our evaluation of the VFRS fleet would put the average annual maintenance hours per VEU at 14 as shown in the next table.

Factor	Value	Explanation
Baseline hours per VEU	10.0	Standard starting point
Fleet age	0.5	Average fleet age is 12 years which exceeds industry standard
Utilization levels	0.0	
Operating environment	1.0	The use of brine and severe weather have some impact on fleet
Facility and tools	1.0	The shop has only 4 bays which impacts mechanic productivity
Parts support	1.5	Technicians source their own parts
Skills and training	0.0	
Adjusted hours per VEU	**14.0**	

Postion	% Maint.	Annual Maint. Hrs.	FTE
CMO	0%	0.0	0.0
Lead Mechanic	0%	0.0	0.0
Fire Mechanic	100%	4750.0	3.8
Parts	0%	0.0	0.0

The labour required to support this fleet is therefore 451.5 VEUs x 14 hours per VEU for a total of 6,321 hours.

Productive hours per mechanic are the next calculation. A typical work year would be approximately 2,040 hours. Mechanics cannot be expected to work every hour of that total as we need to take vacation, training, sick days and administration into account. The industry standard for mechanic productivity is 70% or 1,428 hours. With this in mind, a fleet requiring 6,321 hours of productive work would need 4.3 mechanics.

VFRS currently has five FTEs in the Mechanical Division, but only 3.8 FTE doing actual maintenance work. The Chief Mechanical Officer does not work on vehicles and the Assistant CMO (a mechanic) is called to replace him approximately 20% of the time. Using the 70% productivity standard, this staff has 5,426 hours for maintenance work. We

were unable to confirm if VFRS staff meet the 70% productivity standard as those records are not kept. As previously stated, tracking mechanic time allocated to work orders has not been done as it would be very time consuming without a proper fleet system.

Postion	% Maint.	Annual Maint. Hrs.	FTE
CMO	0%	0.0	0.0
Lead Mechanic	0%	0.0	0.0
Fire Mechanic	100%	4750.0	3.8
Parts	0%	0.0	0.0

There is a gap between the 4.3 FTE needed to maintain the fleet and the 3.8 FTE they currently have. This gap is .5 FTE and cannot be met by hiring additional staff as there is no space to allocate to another mechanic. Outsourcing should be used to fill that gap. The decision on what to outsource should be made using the flow chart provided under separate cover. The use of an established vendor network in conjunction with the City can assist with quality control. The main factors to consider in the outsourcing decision are labour availability, skill availability, parts availability and the time required for repair.

(2) Preventive Maintenance

A well-designed and executed preventive maintenance (PM) program is the cornerstone of effective fleet maintenance. The objective of a PM program is to minimize equipment failure by maintaining a constant awareness of the condition of equipment and correcting defects before they become serious problems.

A PM program minimizes unscheduled repairs by causing most maintenance and repair activities to occur through scheduled inspections. An effective PM program provides benefits not only in improved equipment safety and reliability, but also financially by extending the life of equipment, minimizing the high cost of breakdowns, and reducing lost employee productivity resulting from equipment downtime.

VFRS prioritizes the safety of employees and citizens and conducts all mandatory inspections of apparatus on a timely basis. For the medium and light-duty fleet, PMs are done when the vehicles come in to put on winter tires in the autumn and take them off in the Spring. MFES has provided a best practice schedule for PMs which can be adapted for VFRS. PM compliance needs to be tracked and should be over 95%.

(3) Outsourcing Practices

Fleet organizations use vendors to complete services for a variety of reasons, including maintaining service levels during periods of peak workloads and/or staff shortages, avoiding costly investments in tooling, and to providing service in remote locations. No fleet organization can expect to be proficient in all areas of maintenance and repair services. Moreover, it is not practical for an organization to staff to the peaks of its workload. Doing so would mean that mechanics would be idle at other times. Developing partnerships with key vendors is an efficient way to meet peak and specialty demands. This is particularly true for fire fleets where EVT mechanics are experts in the specialty aspects of the fleet, and it is inefficient for those mechanics to spend time on large repairs in non-specialty areas (transmission and engines).

VFRS has constraints on their ability to perform maintenance in that they have four mechanics and four bays with no opportunity to expand. This means that outsourcing is inevitable for the fleet but should be done after following a deliberate process to determine what work should be outsourced. We have developed a flow chart to guide these decisions.

(4) Parts

The acquisition, management, and provision of replacement parts to technicians is a key ingredient of the inhouse fleet maintenance process. An efficient parts program is essential to producing effective and productive fleet maintenance operations. The goals of a fleet parts program are to:

- Facilitate productive maintenance by ensuring the right part is available to technicians when they need them.
- Anticipate parts requirements for PMs and scheduled repairs to minimize downtime.
- Obtain parts at a reasonable cost.
- Provide appropriate control over the stockroom.

The most significant aspect of parts supply is the impact that the function has on the efficiency and effectiveness of the fleet maintenance operation, and the ability of the fleet to support operations.

Technician productivity and repair quality depend on parts. The timely availability of high-quality repair and service parts directly impacts fleet availability. Service and repair

activities which are consistently delayed due to the unavailability of parts translate into reduced operator productivity, and the need for spare vehicles and a larger fleet to support the same level of services. Parts need to be readily available in a secure place that ensures an accurate inventory is maintained.

In general, the parts acquired for use are of good quality and there is an appropriate mix of OEM and aftermarket parts. Storage is in a convenient location, but the parts rooms are not secure. As there is no dedicated parts support, the CMO and mechanics research, collect and/or pick parts from the three onsite parts rooms. The parts rooms have been recently reorganized and the layout is a significant improvement. Now that this effort has been put into making the rooms more usable by the mechanics, an inventory management system (as part of the FMIS) should be implemented.

Recommendations

Our recommendations in the area of fleet maintenance are provided below:

13) **Outsource to meet maintenance requirements.**

14) **Take a proactive approach to PMs to meet 95% compliance.**

15) **Use the flow chart to make outsourcing decisions.**

16) **Add parts support and an inventory management system to support recent changes in organizing and managing inventory that cannot be achieved without a system.**

IMPLEMENTATION PLAN

The 28 recommendations provided can be approached by level of priority and resources required. Level one tasks are those that can be accomplished by existing staff almost immediately. These were covered in the “quick wins” section. Level two tasks are those requiring moderate effort (up to 50 staff hours, or $50,000). Level three tasks require more significant effort (over 50 staff hours or $50,000).

These tasks are prioritized based on level of effort and cost to best accomplish the goals of the organization and move to the new operating model.

The following should be accomplished within 6 months:

Task 1. Increase administrative support hours to Mechanical Division (Level 2)

Task 2. Create an RFP for FMIS. (Level 3)

Task 3. Develop fleet policies, encompassing the flow charts developed. (Level 2)

Task 4. Develop a 20-year Replacement Plan (Level 1)

Task 5. Define job duties and reporting relationships in updated job descriptions. (Level 1)

The following should be accomplished within one year:

Task 6. Acquire a fit-for-purpose fleet management system. (Level 3)

Task 7. Implement cross training and backup staff when leave is taken to ensure operations are not interrupted. (Level 1)

Task 8. Implement incentives to encourage staff to pursue professional certification. (Level 2)

Task 9. Ensure vehicles deemed ready for resale are sent to auction on a timely (monthly) basis. (Level 1)

Task 10. Adopt a condition assessment methodology to prioritize vehicle replacement (Level 2)

Task 11. Adopt a proactive PM schedule and work towards 95% compliance. (Level 2)

Task 12. Implement incentives to encourage staff to pursue professional certification. (Level 2)

The following should be accomplished in the longer term:

Task 13. Assess the need for a full-time fleet manager position as the organization grows. (Level 3)

Task 14. Consider future facility needs as the organization grows. (Level 3)

Task 15. Determine which KPIs are most valuable to their organization and develop regular reporting procedures. (Level 2)

Task 16. Develop future operating (maintenance) budgets using information provided by the FMIS. (Level 1)

Appendix 1 – Benchmarking Summary

This table provides an overview of the information provided in all benchmarking categories and can be a ready reference when comparing performance in specific areas.

VFRS Benchmarking Survey	Mississauga	Brampton	London	Vaughan
City Population	828,854	603,346	404,699	323,281
Staff	770	550	416	300
Firehalls	21	13	14	10
Annual Calls	28,883	23,024	9,960	11,000
Fleet Size	92 units	117 units	86 units	61 units
Fleet Size (Light Duty units vs. Apparatus units)	LD 39% Apparatus 61%	LD 68% Apparatus 32%	LD 67% Apparatus 33%	LD 51% Apparatus 48%
Mechanics	7	8 & 1 SCBA	7	4
Fleet Parts Techs	1	1	0	0
Heads Mechanical Division	Head Mechanic	Assistant Division Chief	Supervisor Apparatus Division	Chief Mechanical Officer
Service Writer(s)/Admin support	1	1	1	.5
Current Job Descriptions	Y	Y	Y	N
Annual Training Plan	WIP	Informal	WIP	N
EVT Training	6 EVTs (mandatory)	10 x 310T (mandatory) 5 EVT Cert. (Not mandatory)	7 x 310T (mandatory) 7x310 S (preferred) EVT (preferred)	4 x 310T certified EVT Certs (encouraged)
Annual Work Orders	Not available	1,104	850.5	Not available
Operator Handbook	Yes – Training Division	Yes – Training Division	Yes – Training Division	PPT slides in driver training
Fleet Management Policy	N	N	Y (Not followed)	N
Bays	10	12	6	4
Wash bays	1	0	0	0
VEUs	859	697.5	536.5	457.5
Annual capital budget (2-year average)	$9.9 million	$1.6 million $4.5 in 2022	$1.6 million	$2.1 million

VFRS Benchmarking Survey	Mississauga	Brampton	London	Vaughan
Annual Maintenance budget (in-house)	$768,000	$832,000	$777,000	$583,962
Annual Fuel Budget	$296,000	$243,000	$249,000	$201,252
Replacement Plan	10-year	12-year	15-year	None
Operating Budget Process	Based on previous year	Based on 3-year average	Historic review with % increase	Based on previous year
Lifecycle – Light Duty	Point system	LD 8 years Chief 4 years	LD 10 years Chief 7 years	LD 7 years will push to 10years
Lifecycle - Apparatus	Point system	12 years then 8 years as spare	17-3 Want to move to 12-3	20 Years, Ad hoc
Standing Offers – Procurement	Pierce	No	No RFP, 2021 plus 2 years	SafeTech
Spares	6	6 (3 Pumps, 3 aerials)	6 (4 engines, 1 aerial, 1 tanker)	4
Outsourcing ($ and type)	$134,400 Major repairs.	$130,400 Transmissions, body work.	$38,900 5% outsourced. Heavy welding.	$297,622 Engines, transmissions.
Fleet System	Yes – Faster	Yes – M5	ICO Solutions Technology	Firehouse and JD Edwards
KPIs tracked	None	None	None	None
PM compliance	90%	LD 60-70% Apparatus100%	Low PM Compliance (reactive)	Not scheduled (Completed as seasons change)
Fuel Source & Technology	Petrocan	Esso and Petrocan	Phoenix, PetroVend	Computrol, Shell, Esso, Petrocan
Remarketing Surplus Units	Brian's Farm and Auction.	LD – Adesa Apparatus - Donated	LD – GovDeals Apparatus – Donated	GovDeals

Appendix 2 – Best Practice Checklist

Best Practice / Operational Target	Meets Target	Misses Target	Comment
Governance and Fleet Administration			
Fleet program is centralized to capture economies of scale.	✓		VFRS has their own Mechanical Division separate from the City of Vaughan. It is staffed by four mechanics, a Chief mechanical Officer (CMO) and supported by a part time admin.
A Fleet Policy Manual is in place describing fleet and user responsibilities, acquisition, utilization, fueling, maintenance and remarketing procedures.		✓	The City of Vaughan has a Fleet Policy Manual. Some policies are applicable to VFRS, but the organization needs a complete policy tailored to their needs. A 2014 VFRS Administrative Fleet Policy Draft was provided by the Association President. It was never adopted but covers many of the elements needed.
A Driver Handbook outlines key driver responsibilities and drivers sign to acknowledge compliance annually.	✓		Training Division conducts a two-week course for all equipment operators. They provide a package of information to all drivers.
A formal process exists for ensuring compliance with Provincial and Federal commercial driver license requirements.	✓		Lead Driver Examiner pulls driver abstracts twice a year.
Procedures exist to monitor compliance with commercial pre-trip inspection requirements.	✓		Thorough inspections are performed in accordance with the “Vehicle Checks and Maintenance” SOG.
A formal fleet safety program exists for driver and operator training in general and for problem drivers.	✓		The reporting culture for incidents has improved since 2016. Accidents are tracked and assessed as to preventability. Drivers receive additional training as needed.

Best Practice / Operational Target	Meets Target	Misses Target	Comment
A formal performance measurement system is in place to track the effectiveness of service and performance levels compare reasonably well to industry benchmarks.		✓	A lack of Fleet Information Management System makes it impossible to compare the VFRS fleet to industry benchmarks.
Asset utilization policies and guidelines are clearly defined to ensure that vehicles and equipment are allocated properly based on job requirements.	✓		Assets are allocated based on job requirements.
Processes are in place to capture utilization data from available sources to validate and analyze.		✓	VFRS does not have a formal information gathering process for this.
A replacement policy is in place and asset replacement cycle guidelines reasonably follow industry norms.		✓	The City of Vaughan has a replacement policy, but it does not cover fire apparatus. VFRS has an informal practice of keeping apparatus 10-15 years and light-duty vehicles 7-10 years.
A multiple-year fleet equipment replacement plan has been developed to identify future peak year funding requirements so that this can be dealt with in a planned manner.		✓	There is no multi-year replacement plan. Vehicles needing replacement are identified by the DFG and budget allocations are made on an annual basis.
Fuel management practices are in place to ensure efficiency.	✓		The City is responsible for the fuel provided on site. VFRS also makes use of fuel cards for commercial purchases where convenient.
Organization and Staffing			
		✓	The existing organization chart does not reflect the actual reporting

Best Practice / Operational Target	Meets Target	Misses Target	Comment
An organization chart clearly shows relationships and accountability for the fleet.			relationships in all cases. VFRS hired a new Fire Chief and changes are expected to be made. Currently, the Mechanical Division reports to the Deputy Chief of Operations.
Accurate job descriptions exist for all staff involved in the management and maintenance of fleet assets.		✓	Work is pending on job descriptions.
An appropriate shop shift structure is in place to support fleet operations and shop operating hours are convenient for users.	✓		The Mechanic Division hours are 7-320 Monday to Thursday and 3 on Fridays. There are no mechanics on call, but the CMO or Deputy take the phone home.
The use of overtime in the organization is appropriate	✓		There is very little overtime within the organization. When overtime is required, it is authorized and approved by Deputy Fire Chief.
Outsourcing v. Insourcing processes determine the best option (capability, cost, downtime, etc.) for undertaking a repair. Fleet uses outsourcing to manage peak workloads.	✓		All repairs are done in-house with the exception of OEM warranty, recalls, major engine and transmission repairs in which units are outsourced to OEM or local dealership. The outsourcing decision is system related. In general, the following work is outsourced: Apparatus –all suspension work (except airlines), major engine repairs, transmissions, and differentials.
Shop Staffing is appropriate for the size and composition of the fleet.	✓		Staffing is roughly on par with requirements. Some additional admin and parts support would help.

Best Practice / Operational Target	Meets Target	Misses Target	Comment
Mechanics have the requisite training for the composition of the fleet and plans are in place for ongoing training and skill development.	✓		All mechanics are 310 S and 310 T heavy duty certified. Several mechanics are pursuing EVT.
Acquisition and Disposal			
Cooperative purchasing agreements are used in order to take advantage of volume pricing.	✓		The City of Vaughan uses York Purchasing Corporative (YPC) for parts, rentals, leases, maintenance, and fuel.
Focus is on matching vehicle design to meet specific customer job requirements and customers are given ample input into the specification process.	✓		VFRS has a standing offer 5-year apparatus contract with Smeal. They previously had the contract with Pierce but there were issues getting proprietary parts. Stakeholders are involved in the acquisition process. Procurement works collaboratively with VFRS to ensure procurement requirements and client needs are met.
Non-technical requirements such as parts lists, repair manuals, diagnostic tools, and training are included in vehicle specifications.	✓		Yes

Best Practice / Operational Target	Meets Target	Misses Target	Comment
Vehicle upfitting processes minimize the use of in-house resources for vehicle upfitting and put newly acquired vehicles into service as quickly as possible. When post-delivery upfitting is necessary, ensure that the associated costs are captured and codified properly in FMIS and capitalized where appropriate.		✓	A significant amount of upfitting is done in-house. It used to be outsourced but that was stopped 8 years ago. Upfitting usually involves 2 to 4 vehicles a year and each vehicle requires 2-3 weeks work by a dedicated mechanic. One vehicle took 3 months to complete. Mechanics like this type of work as there is pride in rolling out a new truck.
Vehicles are remarketed at the optimum point in their lifecycle to minimize the Total Costs of Ownership (TCO).		✓	The goal for apparatus is 10 to 15 years. It is unknown whether this is optimal as data on maintenance costs is lacking.
Equipment standardization is ensured where possible in order to minimize the number of tools needed and maximize the efficiency of mechanics and driver training.	✓		Most light duty units are SUVs. A recent decision has led to these being split between Toyota Corolla and Ford Explorers due to issues with the Explorers. VFRS is in the process of evaluating what units will performed better for future purchases. Apparatus are standardized through the Standing Offer.
Vehicle decommissioning practices ensure that vehicles are disposed of in the most efficient and cost-effective manner possible. Vehicles determined to no longer be needed are physically removed from service so as to control fleet size.	✓		When units are replaced, they are sent to auction (GovDeals.com). There is some lag time between vehicle replacement and sale at auction.

Best Practice / Operational Target	Meets Target	Misses Target	Comment
Technology			
A fleet system is in place that uses modern technology and provides up to date functionality for asset management, maintenance management, performance measurement, and cost reporting.		✓	Currently there is no fleet information system in place to manage the VFRS Fleet. VFRS uses excel spreadsheet for asset management and Firehouse for some record maintenance activities. There is no system to capture total cost of ownership (TCO) by asset.
Data integrity procedures produce accurate and timely fleet information.		✓	There are no reports or processes in place that generate accurate and timely fleet information.
Access to the fleet system is readily available to all staff, including parts clerks and technicians.		✓	Currently there is no fleet system available to all staff. Firehouse is available to mechanics to record work orders. However, work orders are not consistently maintained or closed out in a timely manner.
Technology is used for scheduling to reduce wait times and enhance service levels.		✓	Currently there is no system in place to monitor scheduling for PM maintenance and repairs. Appointments are scheduled by phone.
All members of staff have been appropriately trained in the use of the fleet system (Firehouse).	✓		Only a handful of staff have access to the fleet inventory list excel sheet. Mechanics are trained to use Firehouse but there is no follow through or consistency in process.
A fuel management system is in place.	✓		Computrol is the automated system for the City pumps. Petrol fuel universal credit cards are used to obtain fuel the majority of the time.
The fuel system has a fuel card assigned to each vehicle and a secure PIN for each driver.	✓		The City pumps have an automated management system with secure PINs for each driver.

Best Practice / Operational Target	Meets Target	Misses Target	Comment
A telematics system is in place to improve routing and scheduling of services, identify driver training issues, and provide timely fleet data.		✓	VFRS does not currently have a telematics system to track their fleet with. There is a Computer Aided Dispatch (CAD) system in Firehouse for dispatch use that provides unit location but not information such as kilometers, hours, or engine diagnostic codes. The City uses telematics software (GEOTAB) to track fleet assets.
Information produced by systems are routinely used to make management decisions and reports are provided to customer departments.		✓	A FMIS is needed to store information upon which to base decisions.
Maintenance and Repair			
A comprehensive PM program is in place that complies with manufacturer recommendations. Customers receive notification of scheduled service dates and compliance levels are 95% or better.		✓	There is no schedule for PMs. CMO brings vehicles in at 200 hours, based on personal knowledge. Apparatus comes in for their annual PMCVIs, and this is the best time to do PMs but then they are out of service for a long time as there can be a lot to do. NFPA guidelines are followed. PMs on light duty vehicles are done twice a year in the Spring and Fall. May outsource the PMs if VFRS Shop is too busy to West Vaughan Automotive who does pick-up and delivery of vehicles.
Users are always called when repairs are complete.	✓		Yes

Best Practice / Operational Target	Meets Target	Misses Target	Comment
Fleet availability meets the industry standard of 95%.	✓		There are spares at the shop to ensure that needs are met even when vehicles are in the shop. There is a spare to replace pumper, ladder, rescue, and quint.
Service turn around adheres to the industry standard of 70% of repairs and services completed in 24 hours and 90% in 48 hours.		✓	There is no data to confirm this.
Field service is available for roadside breakdowns and construction equipment.	✓		Road calls were more common prior to COVID. When called, the CMO will decide whether to send a mechanic out (for a quick repair) or send recovery.
Warranty recoveries are actively pursued for both repairs and parts.	✓		Warranty repairs are conducted at dealerships.
Repair parts are readily available through a combination of efficient stockroom operations and just in time delivery from parts suppliers.		✓	There is no process in place for parts support. The CMO handles requests when he has time.
Parts Inventory Management system has mechanism to identify slow moving and/or obsolete parts.		✓	There is no inventory management system. Obsolete parts are on hand even after the vehicles they were for are retired from the fleet.

Best Practice / Operational Target	Meets Target	Misses Target	Comment
Facilities are designed and built to provide adequate working space for maintenance technicians. Work bays are large enough to accommodate the type of equipment assigned to the shop and to provide safe working distances between bays. Supply hoses and electrical outlets are of industrial quality and easily accessed. The building has adequate and properly designed storage for tools and supplies. The entrance/ exit to bays is traffic friendly and avoid multiple vehicle movements. The building, offices, bays, doors, and lighting are all fully functional and in good repair.	✓		The facility is fit for its purpose and has the necessary tools and equipment to support efficient operations.
Shop tools and equipment are available to allow technicians to perform work efficiently and safely.	✓		Yes
Support to Firefighters			
Fleet operations contribute directly to the enhanced safety of firefighters	✓		VFRS has a Fire Training Division that is dedicated to the safety of its firefighters. Fleet operational training includes safety, PPE, driving, operating, mechanical, and inspections processes.
Fleet operations contribute directly to the availability of firefighters.	✓		The Mechanical Division takes pride in providing timely repairs to support operations.