HALTON REGION
REPORT NUMBER: 19M-01582-00

FLEET MANAGEMENT REVIEW

JANUARY 31, 2020

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DATE: JANUARY 31, 2020

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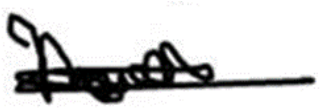

January 31st, 2020

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Date

APPROVED[1] BY

January 31st, 2020

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ABBREVIATIONS LIST

Abbreviation	Definition
ABC	Activity Based Costing
ADP	Software System
BAU	Business-as-Usual
BEV	Battery Electric Vehicle
CAGR	Compounded Annual Growth Rate
CBA	Cost Benefit Analysis
CMMS	Computerized Maintenance Management System
CNG	Compressed Natural Gas
CPI	Consumer Price Index
EMS	Emergency Medical Services
EV	Electric Vehicle
FCM	Federation of Canadian Municipalities
FTE	Full Time Equivalent
GHG	Greenhouse Gas
gLe	gasoline litre equivalent
GMF	Green Municipal Fund
hr	hour
HRPS	Halton Region Police Services
HRPS-A	Halton Region Paramedic Services
HVAC	Heating Ventilation Air Conditioning
km	kilometres
kWh	kilowatt hour
L	litres
MBN	Municipal Benchmarking Network
min	minutes
NRCan	Natural Resources Canada
OEM	Original Equipment Manufacturer
PM	Preventative Maintenance
PPE	Personal Protective Equipment
SaaS	Software as a Service
SAP	Software System
SKU	Stock Keeping Unit
sq. ft	square feet
TCO	Total Cost of Ownership
WSIB	Workplace Safety & Insurance Board
WTU	Wrench Time Utilization
YoY	Year-over-Year
YTD	Year-to-Date

LIMITATIONS OF THE STUDY

The findings presented in this study are based on the information and data available at the time of writing. Furthermore, the analysis is based on the fleet and facilities data and stakeholder workshops held at the start of the study with Halton Region. Analysis is conducted on the assumption of Halton Region assuming the responsibility for the accuracy and quality of all data provided. In addition, through the engagement in stakeholder workshops, it is assumed that attendees have provided an accurate portrayal of Halton Region and Halton Region Fleet Services through the information communicated.

WSP has also conducted on-site observational studies at both facilities in an effort to quantify staff allocation of time spent on various duties (i.e. repair time, clean-up time, break time, part ordering). Limitations should be noted that the period of time spent on-site conducting these time study audits is limited and may not be fully indicative of all operations over the course of one year, in as that reasonable variances are expected to exist.

Green fleet findings and analysis are subject to change due to the nature of the constant technological evolution demonstrated to date from the alternative propulsion technologies included in the assessment. This refers to the availability of vehicle market data on alternative propulsion vehicles. Furthermore, to support the analysis, supplementary sources were used which included data collected from early adopters, academic journals, and global experts.

EXECUTIVE SUMMARY

In 2019, the Premier of Ontario announced $7.35 million in funding to municipalities in Ontario as part of the Audit & Accountability Fund to conduct a cost savings review of services provided in order to help curb the Provincial debt. Overall, the objectives of the funding are to modernize services, find better governance models, reduce costs, implement efficiency improvements, and direct additional funding to municipalities who need it most.

Halton Region is comprised of the City of Burlington, the Town of Oakville, the Town of Milton, the Town of Halton Hills and is home to a population of more than 500,000 inhabitants. Halton Region Fleet Services provides fleet management, maintenance, capital planning, procurement and commissioning services to three (3) distinct fleet user groups in Halton Region, Paramedic Services (HRPS-A), Police Services (HRPS) and Public Works.

Halton Region Fleet Services operates out of two facilities, the North Operations Centre which is primarily used for fleet maintenance on Paramedic vehicles (i.e. ambulances), and the Woodland Operations Centre which services Police and Public Works. This Fleet Management Review, funded by the Audit & Accountability Fund, has the following objectives for Halton Region's Fleet Services:

1. **Operations:** Review fleet operations and service offerings compared to the organization's requirements and industry best practices to identify changes in processes and required skill sets to deliver fleet services in the most cost effective, efficient and sustainable way possible.
2. **Business Model:** Review the current business model of fleet services with a focus on financial resources, allocation and conduct an expenditures review with the goal of identifying cost saving opportunities and ensuring financial sustainability of the program (i.e. budget neutral) as the Region continues to grow.
3. **Green Fleet Opportunities:** Review the current fleet, industry trends, and identify opportunities to modernize and reduce greenhouse gas (GHG) emissions. Recommend suitable technologies that are typically used in the context of a green municipal fleet and identify short and long-term recommendations that can result in cost savings and a reduction in GHG emissions.

Fleet Services is currently staffed with one (1) Fleet Manager, one (1) Fleet Supervisor, eleven (11) mechanics requiring dual 310T and 310S licenses and one (1) Fleet Clerk. One of the five mechanics staffed at the North Operations Centre is a sub-foreperson and there is also one sub-foreperson role which is filled by the mechanics on a rotational basis at the Woodland Operations Centre.

Through the course of this Fleet Management Review, internal stakeholder meetings were held within Fleet Services, fleet user groups and supporting departments (i.e. Stores and Finance) as well as on-site observations at each facility. The objective was to best understand the current state of operations, feedback for possible improvements in the cost recovery structure and operational efficiencies. Furthermore, a peer benchmarking review was done with municipalities offering similar services and having a similar fleet mix of user groups in order to help source innovative ideas and best practices.

This engagement has resulted in a list of recommendations which can be prioritized and pursued by Halton Region Fleet Services to improve operational performance and cost recovery. Estimated cost savings are listed against each recommendation. Collectively, these recommendations provide sufficient cost savings to achieve budget neutrality within the current cost recovery model of an hourly shop charge back rate. Additionally, two potential cost recovery models are proposed which can further assist Halton Region Fleet Services.

1.1 COST RECOVERY MODELS

The current cost recovery model used by Fleet Services is based on the premise of a total cost recoverable budget (i.e. budget neutral). In this methodology, all overhead costs (i.e. building costs, staff wages, equipment, supplies, etc.) are aimed to be recovered through an hourly rate charged for all fleet maintenance.

The hourly rate is determined as the annual budgeted expenses divided by the anticipated available labour hours for the staff of eleven (11) fleet mechanics. This rate is currently $115.51/hr and has historically increased about 2.75%

per year to cover inflationary growth, despite the fleet size increasing from 656 vehicles in 2014 to now over 700 vehicles. Furthermore, the number of mechanics has remained constant over this period of growth at 11.0 full-time equivalents (FTEs). Halton Region Fleet Services also uses external fleet maintenance service contracts to help manage periods of peak workload, specialized repairs, and original equipment manufacturer (OEM) repairs. Annually, external fleet maintenance service contracts are typically around $400,000.

Halton Region Fleet Services achieved breakeven cost recovery in 2014 but has since posted a shortfall anywhere from $300,000 up to $580,000. The primary reason is the cost recovery model is indexed to the number of billable hours charged by fleet mechanics as their wrench time utilization (WTU). Non-billable time worked by mechanics does not contribute to any form of cost recovery.

Non-billable work includes mechanics ordering non-inventory parts, picking parts, shuttling vehicles, work order administration, shop clean-up and duties of Union representatives. It is estimated that the WTU of mechanics is 70.8% at the North Operation Centre and 62.7% at the Woodland Operations Centre. This 8% difference in productivity can be attributed in part to the Fleet Supervisor who works on-site at the North Operations Centre. Furthermore, one mechanic at the Woodland Operations Centre is a Union president and has to respond to some duties and meetings outside of the shop, thereby also contributing to lower WTU.

The current methodology of having cost recovery tied to an hourly shop rate can be disadvantageous as there is no benefit of performing vehicle lifecycle maintenance more efficiently (i.e. shorter repair time for a defined scope of work) as the current cost recovery is indexed to the total number of billable mechanic hours. Both proposed alternative cost recovery models address this advantage by either billing the total cost under an activity based costing (ABC) approach or utilizing a vehicle lifecycle rental rate where maintenance is rolled into a pre-defined rental rate for all amortized capital, maintenance, fuel, insurance and other lifecycle costs. These cost recovery models are presented and summarized in Table 1.

Table 1 Cost Recovery Model Summary

Ref No.	Opportunity	Observation	Leading / Best Practice or Improvement Recommendation	Estimated Effort	Estimated Savings or Cost Recovery Gain ($ value if applicable)
Cost Recovery Model Recommendations					
1.0	**Activity Based Costing (ABC):** pilot an ABC approach to cost recovery where Fleet Services issues monthly invoices for all services provided to each user group. 100% cost recovery will then be achieved.	There has been a notable discrepancy in budgeted versus actual billable labour hours which greatly impacts Fleet Services cost recovery model as it is indexed to an hourly shop rate. This has resulted in annual cost recovery shortfalls up to $580,000 over the past 5 years. On average the shortfall over this time has been $360,000.	The best practice as demonstrated by Halton Region's Public Works department and several other municipalities is to adopt an ABC approach. This best practice was noted in the Auditor General's report on the City of Ottawa's Audit of Fleet Services (2016). Further explanations are provided on cost recovery model best practices under Recommendation 2.0.	High	Estimate 100% cost recovery, invoiced monthly to user groups. Therefore, the impact will be equal to the annual shortfall of the current cost recovery model. **Est. Annual Cost Recovery: Full cost recovery, annual shortfalls would be eliminated in Halton Region Fleet Services through full allocation to user groups.**
2.0	**Vehicle Lifecycle Cost Recovery Model:** implement a charge back model for all user group fleet vehicles where the total lifecycle cost for a particular vehicle class (i.e. 227 light-duty municipal) is calculated and this total lifecycle cost is amortized into a monthly vehicle rental rate charged to the user group. The total lifecycle cost is inclusive of vehicle procurement, commissioning, maintenance, fuel consumption, salvage and decommissioning. In cases where user groups do their own commissioning this expense can be deducted from the total lifecycle cost.	There has been a notable discrepancy in budgeted versus actual billable labour hours which greatly impacts Fleet Services cost recovery model as it is indexed to an hourly shop rate. This has resulted in annual cost recovery shortfalls up to $580,000 over the past 5 years. On average the shortfall over this time has been $360,000. Furthermore, performing vehicle lifecycle maintenance more efficiently (i.e. shorter repair times) is not beneficial under this current cost recovery structure as this can reduce the total number of billable hours booked for cost recovery although the scope of work is completed.	The best practice as demonstrated from peer municipal benchmarks is that all direct costs are charged back to each user group following the principle of Activity Based Costing. Through this approach some municipalities have split cost recovery streams: 1. **Capital Reserve:** providing replacement schedules for user group fleet vehicles. Any surplus in the actual versus budgeted cost of new vehicle procurement is put into a capital reserve fund. 2. **Shop Rate:** encompassing mechanic and related overhead cost recovery 3. **Management Recovery:** covering administrative costs (i.e. Fleet Manager, Fleet Clerks, Supervisors, related equipment and facility space). This cost recovery is distributed to user groups on a per vehicle basis to keep user groups accountable for their fleet size.	High	To fully assess the impact of this recommendation a pilot of this methodology would need to be launched (i.e. two or three vehicle types) in order to validate the use of historical data and lifecycle modeling assumptions against the cost recovery from charging a monthly vehicle rental rate. In addition, variable lifecycle costs such as maintenance and fuel would need to be reconciled. The assumption is forecasting lifecycle costs based on the average vehicle utilization for a particular class (i.e. 214 Police Cars) that although some vehicles will be over utilized and some under utilized, on average the cost recovery will breakeven as the total average utilization will converge to the lifecycle model assumption. **Est. Annual Cost Recovery: TBD**

1.2 COST SAVINGS & EFFICIENCY IMPROVEMENTS

The following Table 2 details a comprehensive list of recommendations along with quantifying their impact to cost savings and efficiency improvements. These recommendations are important as they align with Halton Region's objectives to deliver fleet services in the most cost effective, efficient, and sustainable way possible as well as identifying cost saving opportunities and ensuring financial sustainability of the program (i.e. budget neutrality) as the Region continues to grow. Note that the terminology "Est. Annual Cost Savings" is used to denoted holistic cost savings opportunities for the entire Halton Region while "Est. Annual Cost Recovery" is used to highlight opportunities specific to the cost recovery of Fleet Services.

While all recommendations made may not be implemented, this does pose significant cost saving opportunities to close to $677,000 which would enable Fleet Services to achieve breakeven on their cost recovery as well as benefiting Halton Region. The next step would be for Halton Region to review these recommendations internally and with all relevant stakeholder groups in order to build support and prioritize which recommendations to act upon.

Efficiency improvements concerning WTU are recommended to be addressed before looking to bring contracted maintenance back in-house. Furthermore, an apprenticeship program has also been recommended by Union representation and staff have demonstrated support for adding an apprentice mechanic in Fleet Services. In addition, there is an opportunity for Halton Region Fleet Services and Stores to work more collaboratively in order to address several more cost saving and efficiency improvements as noted in Table 3. Monthly standing meetings are recommended to be put in place to enhance communication between Stores and Fleet Services on issues such as warranty tracking, inventory management and part obsolescence.

Table 2 Summary of Cost Savings & Efficiency Improvement Recommendations

Ref No.	Opportunity	Observation	Leading / Best Practice or Improvement Recommendation	Estimated Effort	Estimated Savings or Cost Recovery Gain ($ value if applicable)
Cost Recovery Recommendations					
1.0	**Utilization of Wash Bay Area at Woodland Operations Centre:** there is an opportunity to reallocate function of the wash bay area at the Woodland Operations Centre due to its low utilization. The majority of user groups wash vehicles off-site due to the decentralized fleet usage vehicles, most notably Police and Paramedic Services.	The wash bay area at the Woodland Operations Centre accounts for approximately 1,600 sq. ft costing Fleet Services $27,000 per year of overhead. There is an opportunity to repurpose this area for indoor vehicle storage for EMS vehicles thereby reducing the shuttling effort of vehicles to the North Operations Centre for repair as the Regional EMS headquarters is located adjacent to the Woodland Operations Centre. The wash bay, measuring approximately 20 ft by 80 ft, would provide enough indoor storage space for three vehicles. Another opportunity would be to allocate a portion of this space as inventory storage for summer/winter tires as currently tires for the Police fleet are stacked in various areas of the working shop space at the Woodland Operations Centre.	The best practice is for user groups to take responsibility for washing their own vehicles which can be done off-site thereby increasing the potential for effectively utilizing this indoor facility space.	Medium	Estimate saving up to $27,000 per year on overhead expense if the wash bay area is used effectively or allocated to another user group which can benefit from this indoor facility space. **Est. Annual Cost Recovery: Up to $27,000**
2.0	**Allocation of Police In-house Minor Repairs:** there is an opportunity for the portion of minor repair work currently done internally by Police Services staff to be allocated to Fleet Services. This would help improve the cost recovery of Fleet Services by having more billable wrench time available. This reassignment of work to Fleet Services can also enable Police Services to focus on more value-added work including vehicle commissioning.	Police Services has noted that they currently perform an estimated 870 hours (in 2019) of minor repair work in-house which could be managed by Fleet Services.	The best practice would be to have a single entity (i.e. Fleet Services) responsible for all fleet maintenance due to accountability of repair work. Peer municipalities have demonstrated the approach for either Fleet Services to conduct all maintenance on Police vehicles or Police Services managing all fleet maintenance within their own department.	Low	Estimate based on the $33.08/hr (plus 21.95% fringe & benefit) for 870 hours (0.5 FTE) which would result in additional cost recovery at the $115.51/hr shop rate. **Est. Annual Cost Recovery: $65,300**
3.0	**Charging for "Freebie" Repairs:** all work done in the Fleet Services shop should have a work order opened for tracking and be charged back to the appropriate user group.	Fleet Services has stated that minor repair tasks (i.e. light bulb change or wiper replacement) are not charged to the Police user group.	The best practice is for all repair work, regardless of scope, shall have a work order opened and the total cost of that work order charged back to the vehicle user group. The value of minor repair work can add up to a considerable amount due to the frequency of these repairs.	Low	Estimate based on work orders opened (2018) for wiper and light bulb replacements. **Est. Annual Cost Recovery (Wipers): $9,000** **Est. Annual Cost Recovery (Light Bulbs): $14,000** (Estimates may be higher than indicated as additional repairs of this nature may not have work orders created).
The estimated cost recovery refers to an improvement to Halton Region Fleet Services cost recovery model as costs are appropriately allocated to other Regional departments. Therefore, there is no net benefit received for Halton Region as a whole.				Cumulative Est. Annual Cost Recovery: **$115,300**	

Ref No.	Opportunity	Observation	Leading / Best Practice or Improvement Recommendation	Estimated Effort	Estimated Savings or Cost Recovery Gain ($ value if applicable)
Cost Savings Recommendations					
1.0	**Facility Overhead Expenditure:** there is an opportunity to evaluate the need for two separate fleet maintenance facilities and reduce the facility overhead cost incurred by Fleet Services.	Fleet Services incurs interdepartmental overhead charges for the usage of both the North Operations Centre and Woodland Operations Centre. In total this overhead accounts for $589,774 or approximately 27% of the Fleet Shop total overhead expense. Furthermore, this facility overhead expense equates to a cost of $19.55 per sq. ft which is higher than peer municipality facility overhead costs at approximately $16 per sq. ft.	The best practice for facility overhead expenditure is around $16 per sq. ft. The focus should be on the North Operations Centre as it has the largest cost per square foot discrepancy in comparison to peer facility overhead expenses. Peer municipalities have also demonstrated the need to shuttle vehicles between facilities up to 25 km (30 min) apart.	High	Estimate based on peer municipality facility overhead costs for fleet services at approximately $16 per sq. ft. Total area allocated to Fleet Services is 30,160 sq. ft (North Ops Centre 15,200 sq. ft + Woodland Ops Centre 14,960 sq. ft). Facility consolidation cost savings based on North Ops Centre overhead expense. **Est. Annual Cost Savings: Up to $107,210** (cost per sq. ft, facility chargeback improvement) **Est. Annual Cost Savings: Up to $338,342** (single facility consolidation cost savings)
2.0	**Bring Contracted Services (75%) Back In-house and Increase Mechanic Staff Count:** there is an opportunity to bring a majority of contracts service labour for fleet maintenance back in-house to increase billable labour time and aid cost recovery under the current model.	Fleet Services has historically spent close to $500,000 annually on external service contracts. This impacts the current cost recovery models as billable wrench time is done externally rather than increasing the staff count of mechanics to do this work in-house. Approximately 50% of service contract value can be attributed to labour cost which translates to 3,200 to 3,500 hrs of work done externally.	The decision on what percentage and what type of fleet maintenance should be done in-house versus contracted out is dependent on the unique set of circumstances of each municipality. This includes fleet size, availability of skilled labour, local shop rates and contract agreements. There is no “best practice” approach in this regard.	High	Current estimate of externally purchased shop labour through fleet maintenance external service contracts (3,200 to 3,500 hrs). External shop labour rate $77/hr compared to in-house mechanics $33.08/hr (plus 21.95% fringe & benefit). Opportunity for external labour hours to now be part of cost recovery at $115.51/hr. Assume 75% of external service contracts can be brought back in-house. Specialized repairs would still need to be done externally. **Est. Annual Cost Savings: $190,000 to 225,000**
3.0	**Apprentice Work Assignment (Tire / Fluids Changes / Wipers / Light Bulb Replacement):** a subset of billable fleet maintenance work can be covered by a lower wage group, reducing labour expenses.	Mechanics with dual 310S and 310T licences perform all fleet maintenance and repair work. There is an opportunity to assign a scope of maintenance work not requiring these qualifications to a lower wage group staff, thereby reducing labour expenses.	The best practice is to employ staff to support fleet mechanics on work not requiring 310S and 310T qualifications. This scope of work commonly includes tire changes, oil changes, wiper blade replacements, fluid top-ups and tire pressure checks. A lower wage group staff can be hired to do this work or it can be delivered as part of an apprenticeship program thereby training the next generation of fleet mechanics. To implement this recommendation Fleet Services would need to negotiate approval with the mechanics’ Union.	Medium (Union approval required)	Estimate 1,200 hours per year (2018) spent on fleet maintenance / repairs of this scope (~0.75 FTE). Mechanic rate $33.08/hr (+21.95% fringe & benefit) versus $18.19/hr Apprentice Automotive Technician (Ontario). **Est. Annual Cost Savings: $28,000** **Note:** the remaining capacity of the Apprentice Mechanic can be combined with Vehicle Shuttle/Parts Runner recommendation.

Ref No.	Opportunity	Observation	Leading / Best Practice or Improvement Recommendation	Estimated Effort	Estimated Savings or Cost Recovery Gain ($ value if applicable)
4.0	**Work Order Administration:** there is an opportunity to reduce the amount of manual effort in administering work orders as well as enabling digital work order records to serve fleet analytics through more structured and detailed data entry fields.	Mechanics can typically spend 35 minutes per day administering work orders. The current setup of the SAP system requires a lot of manual effort from fleet mechanics and the Fleet Clerk to issue paper copies and record mechanic's notes along with part invoices back into the SAP system to close off work orders. At the North Operations Centre the Fleet Supervisor spends 3 to 4 hours daily administering work orders while mechanics assume this responsibility at the Woodland Operations Centre.	The best practice would be to use a more digital work order system compatible for mechanics to make notes directly on the digital work order thereby reducing administration time and the need to transfer notes manually into the maintenance management system. Mechanics can be equipped with a digital app and tablet to view electronic work orders, affix notes and pictures (i.e. EMDECS, eMaint and Fiix). The upgraded CMMS should also be compatible with multi-line work order entry.	High	Estimate saving 20 minutes per work order on the administrative effort of mechanics, Fleet Clerk and Fleet Supervisor to perform manual data entry to/from hard copy work orders. This time saved can improve WTU of mechanics and aid cost recovery. Estimated 8,000 work orders created annually by Fleet Services. Total savings of approximately 2,700 hours per year at opportunity cost of $115.51/hr. Cost of an improved CMMS estimated at $4,000 per month, $48,000 per year. **Est. Annual Cost Savings: $264,000** **Note:** Specific implementation costs of upgrading the CMMS would also need to be factored in (i.e. training time for staff and time to become fluent in software use). This would be required to estimate the return on investment of the CMMS implementation.
5.0	**Shuttling Vehicles / Parts Runner:** adding a staffed position for parking vehicles and shuttling vehicles to/from external vendors for repair (if needed) would free mechanic resources from this non-billable activity.	At each facility approximately 30 minutes per day is spent parking and re-parking vehicles on-site. In addition, vehicles are often required to be shuttled to/from external vendors for maintenance, thus detracting from wrench time.	The best practice is to employ staff in a lower wage group (i.e. without 310T or 310S licence) to handle these duties of shuttling/parking vehicles. Halton Region has previously employed a summer student to handle this responsibility.	Low	Estimate 30 min per day shuttling vehicles, 260 working days per year, mechanic rate $33.08/hr (+21.95% fringe & benefit) versus $18.19/hr Apprentice Automotive Technician (Ontario). **Est. Annual Cost Savings: $2,800** Additional 30 min per day of available wrench time for mechanics at cost recovery rate of $115.51/hr. **Est. Annual Cost Savings: $18,500** **Est. Annual Cost Savings (Total): $21,300** **Note:** 0.25 FTE of Apprentice Mechanic can be assigned to this function
6.0	**Mechanics with Union Rep Duties:** there is an opportunity for the number of Fleet Services mechanics with Union rep duties to be revised. This would help improve WTU and the availability for billable hours which would improve cost recovery.	Fleet Services currently has three (3) mechanics out of eleven (11) functioning with Union rep duties. The time spent for these duties outside of the shop impacts WTU and cost recovery. On average there is a 7% difference in WTU of mechanics with and without Union rep duties.	Halton Region's Public Works department has one Union rep for a staff count of approximately 200.	Medium	Estimate based on a 7% WTU gain for two mechanics (270 hours per year) while retaining one mechanic with Union rep duties. These 270 hours can be billed at the shop rate of $115.51/hr for Fleet Services billable work and cost recovery. **Est. Annual Cost Savings: $31,200**
The estimated cost savings pertain to a net benefit received for Halton Region.				Cumulative Est. Annual Cost Savings: **$642,000 to $908,000**	

Table 3 Stores & Fleet Services Collaborative Cost Saving Opportunities

Ref No.	Opportunity	Observation	Leading / Best Practice or Improvement Recommendation	Estimated Effort	Estimated Savings or Cost Recovery Gain ($ value if applicable)
Stores & Fleet Services Collaborative Opportunities[2]					
1.0	**Part Kits:** preparation of part kits for preventative maintenance work by Stores would facilitate the work flow and help reduce non-productive time of mechanics searching for parts.	Mechanics are currently responsible for entering the Stores area and picking their own parts. Furthermore, stocked inventory SKUs are not labelled with vehicle make/model. It is currently the responsibility of the mechanics to know which parts they are looking for.	The best practice is for the Stores department to operate a counter service. This would enable mechanics to drop off a picking slip and submit the request for part kits in advance of scheduled maintenance, thus saving time searching for parts.	Medium	Estimate saving 5 to 10 minutes of non-productive time for scheduled maintenance work orders (2,291 work orders in 2018). Est. Annual Cost Savings: $22,000 to $44,000 - Est. Additional Stores Resources: $16,750 (0.25 FTE) = **Net Annual Cost Savings:** **$5,240 to $27,250**
2.0	**Mechanic Part Picking:** the Stores department should assume responsibility for picking parts for all work orders. After a picking slip is dropped of by the mechanic, Stores can pick the parts needed while freeing up time for mechanics to spend on billable wrench time during the wait.	Mechanics are currently responsible for entering the Stores area and picking their own parts. Furthermore, stocked inventory SKUs are not labelled with vehicle make/model. It is currently the responsibility of the mechanics to know which parts they are looking for.	The best practice is for the Stores department to operate a counter service. This would enable mechanics to drop off a picking slip and submit the request for parts needed for corrective repairs thus, saving time searching for parts. In addition, the Stores department should have a strong enough knowledge of automotive parts to correlate SKUs to vehicle make/models.	Medium	Estimate saving 5 to 10 minutes of non-productive time for corrective maintenance work orders (5,474 work orders in 2018). Est. Annual Cost Savings: $52,000 to $105,000 - Est. Additional Stores Resources: $50,250 (0.75 FTE) = **Net Annual Cost Savings:** **$1,750 to $54,750**
3.0	**Non-Inventory Part Ordering:** develop a standard procedure for Stores to manage ordering of non-inventory parts, supplies and materials.	Mechanics currently contact vendors directly for placing orders on non-inventory parts spending **10% to 15%** of their time on this non-billable activity. This process excludes Stores and there is no feedback between Fleet Services mechanics and Regional Stores so that frequently re-ordered parts become stocked inventory with a SKU assigned.	The best practice is for the Stores department to process all part ordering, and in the case of non-inventory parts, a request form should be completed by the mechanic and submitted to Stores so that the part can become stocked inventory.	Low	Estimate 1,500 to 1,650 billable hours per mechanic if 10% to 15% spent ordering parts for a staff of 11 mechanics lost time at $115.51/hr cost recovery rate. Est. Annual Cost Savings: $190,500 to $314,500 - Est. Additional Stores Resources: $67,000 (1.0 FTE) = **Net Annual Cost Savings:** **$123,500 to $247,500**
To implement these recommendations, it is anticipated that the Stores department may need up to two additional FTEs. The cost savings presented can be used to help justify the need for this staffing increase.				Cumulative Est. Annual Cost Savings: **$264,500 to $463,500** Est. Annual Resource Cost to Stores: **$134,000 (2.0 FTE)** **Net Est. Annual Cost Savings: $130,500 to $329,500**	

[2] Recommendations 1.0 to 3.0 may require additional staff resources for Stores to action these items. As a result, the resource cost of 2.0 FTEs has been factored into the potential cost savings split with the allocation of 0.25 FTE to Part Kits, 1.0 FTE to Non-Inventory Part Ordering and 0.75 FTE to Mechanic Part Picking.

1.3 GREEN FLEET OPPORTUNITIES

In addition to the traditional lens of the Fleet Management Review this study has also looked at green fleet opportunities for Halton Region to pursue lowering their greenhouse gas (GHG) emissions. Meetings focused on stakeholders' reception to adopting alternative propulsion technologies. While not suitable for all vehicles (i.e. front-line Police and Paramedic vehicles) there is an opportunity and interest to establish a rotational green vehicle pool of support vehicles as summarized in Table 4.

Table 4 Green Fleet Opportunities

No.	Opportunity	Observations
Green Fleet Opportunities		
1.0	**Green Fleet Pilot Program:** a green vehicle pool and rotational program can start the transition of the Region's fleet towards more sustainable fleet operations, saving on fuel and maintenance costs while lowering GHG emissions. Est. Annual Impact: **$39,500 to $56,300** Green vehicle pool equivalent annual cost (EAC) (with grant funding applied) $63,700 for compressed natural gas (CNG) and $80,500 for battery electric vehicles (BEV).	Halton Region historically has an annual expense of approximately $850,000 in expensed mileage of personal vehicle use. A green vehicle pilot program has the potential to reduce this expense by capturing grant funding opportunities and providing a vehicle pool for employees to use instead of expensing the cost of a personal vehicle.

The triple bottom line (TBL) business case helps justify this vehicle pool with several grants available to help cover vehicle and infrastructure capital costs. Observed industry trends have been included in this report, detailing new vehicle technology alongside a vehicle market scan. Grant funding opportunities such as the Federation of Canadian Municipalities (FCM) Green Municipal Fund (GMF) can assist Halton Region with developing a roadmap to lowering fleet GHG emissions.

Industry trends have demonstrated battery technology improving at 6 to 8% per year in terms of energy density (kWh/lb) as well as lowering costs with an exponential decline of about 20% per year. It is forecasted that a key tipping point will be in 2025 when the cost per kWh reaches $100/kWh, making it on par with gasoline and diesel vehicle costs. Natural gas is also a viable option. Natural gas and electric vehicles offer reduced operating cost in terms of vehicle maintenance and fuel/energy usage. This can help offset their capital cost and build long term cost savings for the fleet. However, natural gas is often viewed as an interim solution to lowering GHG emissions as consumption remains fossil fuel based. Renewable natural gas, produced from biomass is another alternative as a fuel source.

Furthermore, to build upon a successful pilot program Halton Region is advised to stay engaged with market trends and new vehicles as well as seek feedback from peer municipalities on their new vehicle launches. Halton Region should look to incorporate green vehicles and GHG reduction into the capital planning of their fleet, building a fleet replacement plan to introduce new green vehicles as the existing fleet retires. This phased implementation approach will help mitigate the risk of rapidly adopting new technology while fully utilizing the existing fleet before replacement.

2 CURRENT FLEET SERVICES

2.1 FACILITIES OVERVIEW

Halton Region Fleet Services currently operates out of two separate facilities. The Woodland Operations Centre is located at 1179 Bronte Rd., Oakville (adjacent to the Regional headquarters for Paramedic Services) and a North Operations Centre at 8140 5th Line, Georgetown. There is about a 25 km (30 minute) headway between the facilities.

2.1.1 WOODLAND OPERATIONS CENTRE

This shop operates 7:30am to 4:00pm daily Monday to Friday. The Fleet Manager is stationed at the Woodland Operations Centre and is supported on-site by one Fleet Clerk and a staff of six fleet mechanics which includes one rotational sub-foreperson. As there is no designated on-site Fleet Supervisor, the Fleet Manager and sub-foreperson take on a portion of this responsibility.

Figure 1 Woodland Operations Centre Maintenance Area

The maintenance area of the garage has two drive-on lifts as well as five two-post vehicle hoists. There are storage rooms for tire inventory, fuel, a rear indoor vehicle wash bay and a separately managed open stock keeping area (4,000 sq. ft) allocated to Regional Stores.

Fleet Services is allocated approximately 13,700 sq. ft of floor space for the vehicle maintenance area and 1,260 sq. ft of office/administrative space for the Fleet Manager's office, clerical working area, and mechanic breakroom; all of which are attributed to the overhead cost of Fleet Services.

This facility typically services Police and Public Works vehicles, whereas ambulances are shuttled to the North Operations Centre for maintenance and repairs. This incurs an additional workload for shuttling vehicles as the Regional EMS headquarters is located adjacent to the Woodland Operations Centre. Furthermore, there are some issues with space constraints of this facility, in particular with storing the tire inventory and conducting the seasonal summer/winter tire programs for the Police fleet. There is an opportunity for better use of the wash bay at the rear of this facility or reallocation of this area due to its low utilization as user groups tends to wash their vehicles off-site.

2.1.2 NORTH OPERATIONS CENTRE

As previously noted, a major difference between the facilities is that maintenance and repair work for the ambulance fleet is conducted at the North Operations Centre. Despite the Woodland Operations Centre being located next to the Paramedic Services headquarters there is a need to shuttle these vehicles to the North Operations Centre for repair, where specialized on-site equipment is located. Furthermore, Paramedic Services requires that all ambulances be stored indoors within a secure facility. There is a lack of available indoor parking space in the Woodland Operations Centre. Approximately 50% of the workload at the North Operations Centre is for Paramedic Services.

Figure 2 North Operations Centre Maintenance Area

The North Operations Centre has an approximate 15,200 sq. ft of indoor vehicle maintenance, storage and a parts/materials stores area, all of which is accounted for in the overhead of Fleet Services. There are five hoists and eleven bays on-site as well as a fueling station located outside in the facility parking area.

2.1.3 FACILITY OVERHEAD COST IMPACT

Fleet Services incurs interdepartmental overhead charges for the usage of both the North Operations Centre and Woodland Operations Centre. In total this overhead accounts for $589,774 or approximately 27% of the total Fleet Shop overhead expense. See Table 5 which includes a breakdown of the facility overhead.

Table 5 Overhead Impact of Facilities

Facility	Area (sq. ft)	Overhead (2019$)	Cost Recovery Impact ($/hr)
North Ops Centre	15,200	$ 338,342	$ 18.28
Woodland Ops Centre	14,960	$ 251,432	$ 13.59
Total	**30,160**	**$ 589,774**	**$ 31.87**

This facility overhead expense is burdensome to the cost recovery of Fleet Services. In the hourly shop charge back rate used by Fleet Services for cost recovery the facility overhead component constitutes $32 per hour of the total $115.51 per hour charge back rate. Refer to Section 8.1 for a detailed explanation on the methodology used by Fleet Services to establish their charge back rate.

Furthermore, the wash bay at rear of Woodland Operations Centre is seldom used due to user groups taking on responsibility for washing their own fleet vehicles. In particular, due to the decentralized usage of Police and Paramedic fleets, users often wash their vehicles at multiple off-site locations at the end of their shifts.

The wash bay area at the Woodland Operations Centre accounts for approximately 1,600 sq. ft costing Fleet Services $27,000 per year of overhead which contributes to about $1.5 per hour of the cost recovery rate. There is an opportunity to repurpose this area for indoor vehicle storage for EMS vehicles thereby reducing the shuttling effort of vehicles to the North Operations Centre for repair as the Regional EMS headquarters is located adjacent to the Woodland Operations Centre. The wash bay, measuring approximately 20 ft by 80 ft, would provide enough indoor storage space for three vehicles. Another opportunity would be to allocate a portion of this space as inventory storage for summer/winter tires as currently tires for the Police fleet are stacked in various areas of the working shop space at the Woodland Operations Centre.

In terms of benchmarking the cost per square foot ($ per sq. ft) for Halton Region Fleet Services a comparison is made to peer municipalities and their charges for facility overhead. This comparison is shown included in Section 7. Not only are there opportunities for Halton Region to better utilize their existing facility space but the cost per square foot also indicates Halton Region pays more than their peers for their facility space and overhead charges. Halton Region Fleet Services average cost of $19.55 per sq. ft for both the North Operations Centre and Woodland Operations Centre while peers are close to $16 per sq. ft. Achieving a facility overhead expenditure closer to market rates could amount up to $107,270 in annual savings for the Region. The focus should be on the North Operations Centre as it has the largest cost per square foot discrepancy in comparison to peer facility overhead expenses. Furthermore, consolidation to a single facility could reduce overhead cost by up to $338,342.

2.2 SERVICE CONTRACTS

Fleet Services has an assortment of service contracts valued at $3.9 million. Currently, Fleet Services has 27 separate contracts with 24 different vendors. The majority of these contracts are 1 or 2 years duration and set to expire by the end of 2019 or in 2020. Contract scope ranges from autobody repairs to OEM parts and repair.

These contracts are used to help manage peaks in vehicle maintenance and repair needs by providing additional capacity. Contracts also cover work on specialized vehicles (i.e. sewer/vac trucks), thus eliminating the need to purchase specialized equipment and train staff for repair work on a limited number of these vehicles. Fleet Services has historically spent between $200,000 to $610,000 annually on service contracts inclusive of parts and labour.

2.3 STAKEHOLDER WORKSHOPS

2.3.1 WORKSHOP OBJECTIVES

As part of the Fleet Management Review, WSP engaged with Fleet Services staff, other supporting Regional departments, and fleet service customers. These workshops were held over the period of October 22nd to November 5th with the following objectives:

1. Identify the objectives from WSP's engagement of conducting the Fleet Management Review.
2. Understand the current business model of Fleet Services including the organizational structure and cost recovery structure. This includes current operational challenges, risk mitigations and the success of prior cost saving strategies and process improvements implemented by the Region.
3. Identify the portfolio of services offered by Fleet Services, classification of core services as well as discretionary "nice to have" services and any differences offered to the various customer/user groups. As well, identify the various requirements and feedback from the customers of Fleet Services.
4. Map interactions and division of responsibilities between Fleet Services and other supporting departments which include Regional Stores, Finance, Capital Budgets and user groups.
5. Evaluate the knowledge, experience, acceptance level and objectives for adoption of Green Fleet technologies.

2.3.2 SUMMARY OF KEY FINDINGS

A summary of main findings from the stakeholder workshops is presented in Table 6. In addition, feedback received regarding green fleet opportunities is referenced in the discussion under Section 9.1.

Table 6 Stakeholder Workshops Summary

Fleet Services (Internal Reflection)
Core Competencies
1. Fleet maintenance and repair. 2. Management of maintenance and vehicle records (i.e. work orders and commercial vehicle operator's registration. 3. Management of vehicle replacements. Due to the diversity of the fleet, Fleet Services brings knowledge of evaluating remaining useful life and setting decommissioning requirements of unique vehicles (i.e. tractors).
Areas of Improvement
1. **Turnaround Time**: On a daily basis, the quick turnaround time for Police and Paramedic vehicles must be managed to ensure that critical front-line vehicles are available. This creates challenges with scheduling service requirements due to the decentralized location of these vehicles. 2. **Mechanic Licensing & Resources:** Need for Dual 310T and 310S challenge in talent acquisition and aging workforce.

3. **Vehicle Commissioning:** The variance in scope of work and limited availability of Fleet Services staff creates challenges for scheduling.
4. **WSIB Incidents:** Causes a large impact to cost recovery, creating the need to back fill and pay salary of staff to accommodate WSIB.
5. **Dual Site Supervision:** Fleet Supervisor needing to provide oversight to both garages while being stationed at the North Operation Centre. At the Woodland Operations Centre, the Fleet Manager often assumes a portion of this responsibility.
6. **Vehicle Inventory:** Fleet Services does not have direct input to the quantity of vehicles (i.e. spare capacity) that user groups carry, namely Police and Paramedic Services. Having a low number of spare vehicles creates challenges for Fleet Services to meet quick turnaround times.
7. **Public Works Vehicle Budget:** A decentralized approach for procurement of Public Works vehicles can sometimes create vehicle add-ons or changes that were not accounted for in the initial budget.
8. **Vehicle to Mechanic Ratio:** Growth in fleet size has not resulted in corresponding growth of the number of mechanics. Service contracts are used to provide additional capacity.

Customers (Fleet User Groups)

Paramedic Services	**Score = 4 "Very Satisfied"**

Core Competencies:

1. **Vehicle Turnaround Time**: Fleet Services is able to accommodate quick turnaround times on most vehicle repair. Most delays have been the result of warranty work completed externally by the OEM dealer.
2. **Communication and Customer Service**: Fleet Services is highly organized with weekly communication on vehicles scheduled for preventative maintenance. There is daily correspondence on the status and estimated turnaround time for vehicles that are in the shop for repair.
3. **Facility Security**: There is secure transfer of vehicles for repair from operators to fleet mechanics. Ambulances in for repair are kept indoor inside a secure facility to prevent vandalism and/or theft.

Areas of Improvement:

1. **Distance to North Ops Centre**: The physical distance to transport vehicles to the North Operations Centre for maintenance has increased demand on the workforce to shuttle vehicles around.
2. **Availability of Indoor Storage**: Although the Woodland Operations Centre is located adjacent to the Regional headquarters for Paramedic Services, the North Operations Centre was opened to alleviate parking space restrictions. Paramedic Services has a requirement for all ambulances to be stored indoor in a secure facility which is a primary reason for allocating vehicles to the North garage.
3. **Delays in Vehicle Commissioning**: There have been some delays (up to 1 month) related to final pre-delivery inspection (PDI) and commissioning of new vehicles (i.e. outfitting lighting systems and other specialized equipment). This is partially due to the limited availability of Fleet Services staff to complete the commissioning work. The aim is to complete the majority of commissioning work at the manufacturer's facility, however, this is not always possible.

Police Services	**Score = 2.5 "Unsatisfied/Satisfied"**

Core Competencies:

1. **Customer Service**: Police Services has praised Fleet Services for the department's customer service and staff engagement. Police Services also works in conjunction with Fleet Services to handle any vehicle recalls or warranty work. Fleet Services also provides root cause analysis on vehicle repairs in an effort to mitigate repeat repair work.
2. **Prioritization of Needs**: Prioritization of special requests and repair needs of police vehicles which are critical to front-line service. Efforts are made to prioritize repair needs although this does not always translate to quick turnaround time.

Areas of Improvement:

1. **Repair Turnaround**: Improve turnaround time for preventative maintenance services (i.e. PM-A and PM-B)
2. **Pro-active Commissioning**: To have vehicle decaling, specialized police equipment and radios installed before vehicle commissioning. Since 2012, Police Services has employed staff for commissioning of their own vehicles.

3. **Wrench Time Utilization**: Fleet Services can achieve higher wrench time utilization.

Public Works	**Score = 3 "Satisfied/Very Satisfied"** ("Unsatisfied" for preventative maintenance scheduling)

Core Competencies:

1. **Customer Service**: Very good communication with Fleet Services in order to accommodate scheduling and rescheduling of work due to vehicles needed in service by Public Works. A weekly schedule is sent out listing vehicles scheduled for preventative maintenance.
2. **Vehicle Spares**: Flexibility of Fleet Services in providing "loaner vehicles" to Public Works while other vehicles are still in the process of procurement, commissioning, or out for maintenance.
3. **Support Equipment Servicing**: Fleet Services also provides Public Works with an asset inventory and servicing of small equipment (i.e. plows, salt spreaders, trailers, etc.).

Areas of Improvement:

1. **Repair Turnaround**: Often vehicles scheduled for preventative maintenance remain in queue in the parking lot. There is a tendency for Police and Paramedic vehicles to take priority and bump Public Works vehicles down the queue. Public Works has commented that having the option to use an external vendor for simple preventative maintenance work (i.e. oil changes) could help address the turnaround time. There is also a reliance on Public Works staff to shuttle vehicles around to/from maintenance facilities.

   The installation of aftermarket hardware (i.e. backup cameras and Bluetooth systems) has also impacted turnaround time and vehicle availability as the ownership between Fleet and IT seems to be conflicted. Public Works views that these should be standard safety features on all new vehicles.
2. **Budgeting Process**: Asset management and finance staff often have outdated information on vehicles and specifications that do not align with the needs of the end user. This budgeting process should be streamlined to just involve knowledgeable Public Works and Fleet Services staff by means of a centralized, accessible and current asset inventory.
4. **Warranty Repairs**: Consider the option of purchasing a front-end maintenance package with procurement of new vehicles.

Collaborative Departmental Feedback (Stores & Finance)

Areas of Improvement

1. Address operational inefficiencies between Fleet Services and Stores by creating communication channels (i.e. establish a standing meeting, weekly, monthly, quarterly).
2. Have only the Stores Department order non-inventory parts directly from vendors.
3. Develop a formalized process for warranty and core tracking.
4. Develop a formalized process and reporting measures for inventory monitoring of min/max levels and shrinkage.
5. Preparation of parts kits containing necessary materials for performing preventative maintenance based on the vehicle make/model scheduled for service.
6. Focus on capital budgeting for service critical fleet maintenance equipment (i.e. hoists).
7. Utilize a feedback loop to communicate actual salvage value of fleet assets for accounting purposes so that estimates can be revised.
8. The cost recovery rate and its inputs could be tracked to assist with budgetary analysis.

3 GOVERNANCE STRUCTURE & STAFFING

3.1 ORGANIZATIONAL CHART

To best illustrate the staff and functions of Fleet Services an organizational chart is provided in Figure 3. Some notable points from this organizational structure and staffing of Fleet Services is the lack of supporting roles and apprenticeship positions to assist fleet mechanics. Furthermore, the lack of a designated supervisor position at the Woodland Operations Centre can impede the process flow and work productivity. It should be made a priority for the rotational sub-foreperson position to become a full-time assignment.

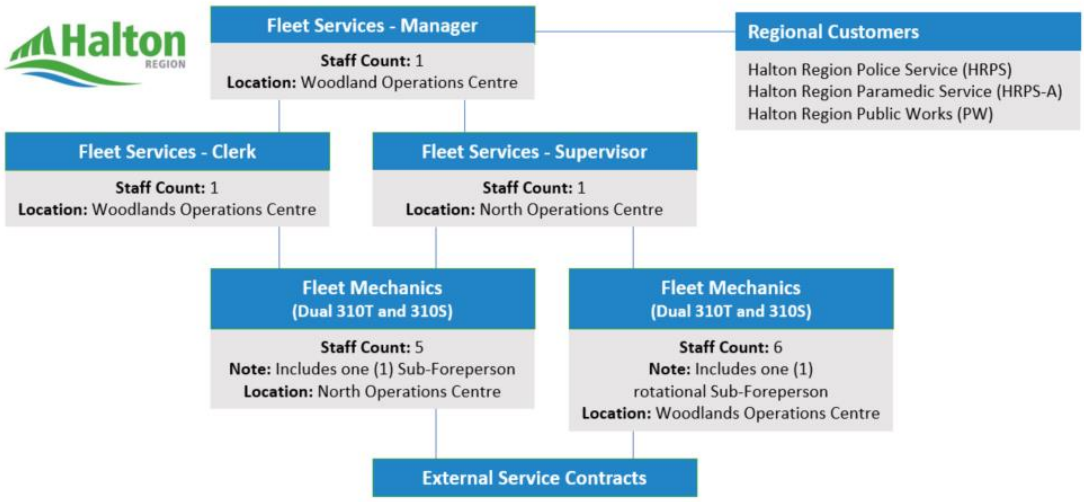


Figure 3 Halton Region Fleet Services - Organizational Chart

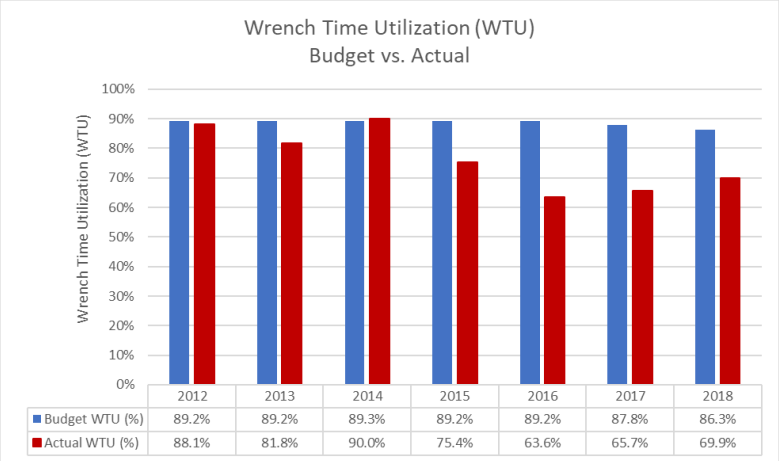
This organizational chart will be compared with peer municipalities to conclude if a similar structure, staffing, roles and resources are in place, refer to Section 7.3.

3.2 STAFFING RESOURCES (UTILIZATION)

Prior to each fiscal year, Fleet Services establishes a budget estimate of billable hours for mechanics which is then used to set the cost recovery rate for fleet maintenance and repair services. Available labour hours are estimated as the annual base hours available per mechanic staff (1,950 hours for an 7:30am to 4pm weekly day shift at 40 hours per week) less statutory holidays, sick days, vacation, shop clean-up time, meetings, WSIB lost time, and other non-productive time. Refer to Section 8.1 for background on the current methodology used to establish this rate.

Mechanics' time is billed and tracked through an SAP work order management system. This enables calculation of the wrench time utilization (WTU) metric in order to measure the amount of productive time actively working on fleet maintenance and repairs. The amount of overtime worked by mechanics is recorded in timesheets, although Fleet Services does not distinguish the cost recovery rate by regular hours or overtime hours. Typically, an estimate

of 43 overtime hours per mechanic is included in the calculation of the cost recovery rate. The following chart compares the budgeted WTU versus actual utilization over the past 7 years using historical data.



	2012	2013	2014	2015	2016	2017	2018
Budget WTU (%)	89.2%	89.2%	89.3%	89.2%	89.2%	87.8%	86.3%
Actual WTU (%)	88.1%	81.8%	90.0%	75.4%	63.6%	65.7%	69.9%

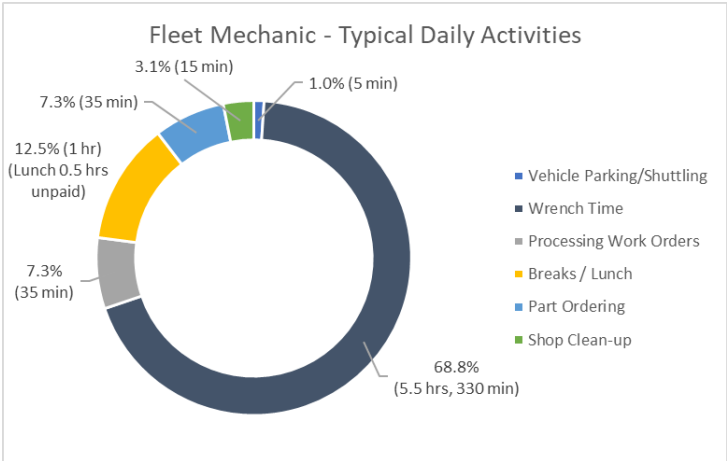


Figure 4 Wrench Time Utilization (Budget vs. Actual) & Daily Activity Breakdown

The actual WTU compares quite favourably to the budgeted WTU in 2012 through 2014. However, in recent years there has been a shortfall in the amount of billable time. This could be due to mechanics taking on other non-billable duties outside typical job functions, such as shuttling vehicles and ordering parts.

On-site observations were completed at both of Halton Region's fleet garages in order to assist in quantifying the time spent on daily activities by fleet mechanics. Discussion was held with mechanics on-site, as well as the Fleet Supervisor, to provide estimates on daily activities.

Overall, the second graphic in Figure 4 shows that approximately 30% of a mechanic's day can be attributed to non-billable time (i.e. part ordering, work order processing and vehicle parking/shuttling). Note that training is often not accurately captured in staff timesheets and is typically allocated to the overhead charge code.

There is an opportunity to focus on these non-billable activities in order to free up more capacity for mechanics to concentrate on billable work and address the annual shortfall in billed labour hours. Billable and non-billable task percentages shown in may not be representative for all mechanics, as some may take more responsibility for work order administration while others focus on shuttling and parking vehicles.

Furthermore, Union duties can take mechanics out of the shop for meetings. Currently, Fleet Services has three Union representatives from their staff of eleven (11) mechanics. Thereby, Union duties can have a significant impact on WTU. Fleet Services should look at whether it is necessary to have three mechanics with Union rep duties as the Public Works staff for Halton Region only has one Union rep for a count of approximately 200 staff. To illustrate this impact, a comparison of mechanics with and without Union rep duties WTU from 2014 to 2018 is shown in Figure 5.

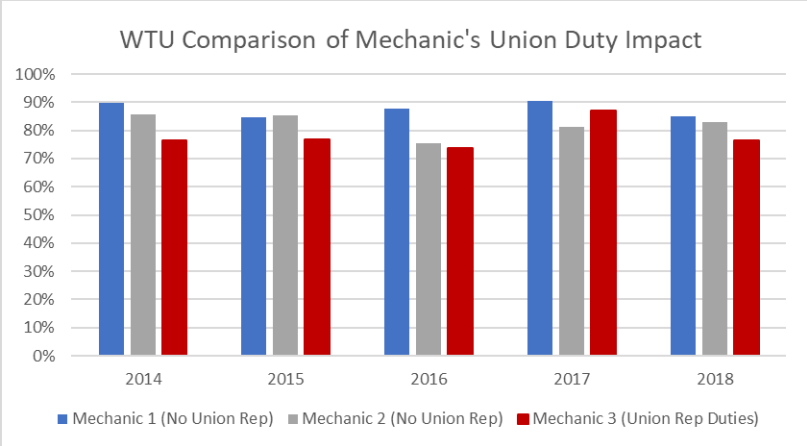


Figure 5 Impact of Union Rep Duties on Mechanic WTU

Note: Union representatives are voted in positions and unless specified in the Collective Agreement there is the potential for multiple representatives to be voted in from the Fleet Services staff of mechanics. Halton Region should review the

Collective Agreement in this regard. Furthermore, Union duties should be provided in advance of the work week so as not to impede workflow and planning from having staff respond to duties outside of the shop.

On average, there is a difference of about 7% in WTU between the mechanics with and without Union rep duties. While this difference may not be entirely attributed to the duties assumed as a Union representative there is still merit for Halton Region Fleet Services to consider whether it is necessary to have three mechanics functioning as Union reps while Halton Region's Public Works has one rep for approximately 200 staff. The impact to gain an additional 7% in WTU for two mechanics, while leaving one mechanic as Union rep, could result in an increase of approximately 270 billable hours per year.

In addition, there are differences expected between the two facilities in WTU. For example, mechanics at the North Operations Centre typically spend more time shuttling vehicles due to the Paramedic vehicles allocated to the facility. At the Woodland Operations Centre mechanics will spend a greater proportion of their time administering work orders due to the Fleet Supervisor taking on this function at the North Operation Centre. On average, there is about an 8% difference in wrench time utilization between the two facilities, as illustrated in Figure 6. This is compared to a typical industry average WTU of 80%.

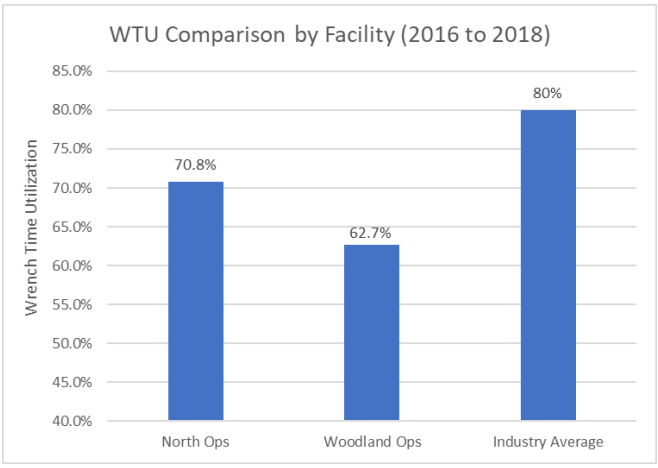


Figure 6 Wrench Time Comparison by Facility

The WTU of mechanics at the Woodland Operations Centre can be lower due to the additional responsibility for processing work orders. As well, the Fleet Supervisor at the North Operations Centre contributes to a more organized shop, workflow processes, and an overall higher utilization of mechanics. Furthermore, one mechanic at the Woodland Operations Centre is a Union president and has to respond to duties and meetings outside of the shop, thereby also contributing to lower WTU.

Another metric relates to the amount of overtime work. Historical data shows that overtime typically accounts for 7% to 12% of mechanic hours billed. Overall, there has been a move by the Region to reduce overtime work of mechanics. As a result, labour time has been redistributed to using external service contracts to purchase fleet maintenance work at outside shops and OEMs facilities. In addition, much of the role of fleet coordinator that existed in Fleet Services up until 2014 has been redistributed to the Fleet Clerk. This redistribution of responsibilities, coupled with the work management process and system requirements, has seen the annual overtime hours accrued by the Fleet Clerk rise.

3.3 TALENT ATTRACTION & RETENTION

Fleet Services has expressed a concern on talent attraction for new staff, primarily fleet mechanics. The current Collective Agreement states that mechanics are to hold dual 310T and 310S licenses, which poses a barrier when attempting to hire new mechanics with only one license. Furthermore, the average age of fleet mechanics sits at around 50 years, which poses a challenge as a portion of the staff will be shortly approaching retirement.

The primary focus should be on the attraction of new apprentice mechanics to help backfill upcoming staff retirements. Halton Region should look to cooperate with local colleges and open house days to engage with new apprentices. An apprenticeship program has been recommended by Union representation and staff have demonstrated support for adding an apprentice mechanic in Fleet Services. However, the Region would still need to meet with the mechanics' Union to address enacting an apprenticeship program.

Furthermore, the requirement for dual licensed mechanics can be explored further as some peer municipalities have also stated this requirement has limited their hiring pool. One peer municipality, referenced in Section 7 now employs single license holders (i.e. 310S or 310T). Regarding the use of mechanics placed on stand-by, the preference would be to have a dual licensed mechanic available to handle any 310S or 310T work. Otherwise one 310S and one 310T mechanic would have to be available on stand-by duty.

4 FLEET MAINTENANCE

4.1 MAINTENANCE MANAGEMENT SYSTEM

Halton Region currently uses an SAP based computerized maintenance management system (CMMS) for data tracking and recording of fleet maintenance. This CMMS requires manual entry of paper form work orders and can result in several inefficiencies. Entry of work orders into the CMMS is primarily the responsibility of the Fleet Clerk. The Fleet Supervisor and sub-forepersons are also responsible to have a working knowledge of the SAP system. A sample of the data fields recorded for work orders is shown below in Figure 7. This data can be exported from SAP in the form of a text file (.txt), which can then be used for analysis on maintenance trends in Excel.

Order	Plnt	Type	Bsc start	Func. Loc.	Description	TotCostAct
1000001231	SD	FM10	13/01/2010	H-F-PL-30-MK	OCC # 09-153972 86,330 KM	3,512.96
1000001232	SD	FM10	13/01/2010	H-F-PL-30-PN	OCC.#10-004198 20,283 KM.	7,597.20
9200024749	SD	FM02	21/01/2010	H-F-PL-30-MK	REPAIR STIFF STEERING 127,222 KM	1,315
9200024750	ND	FM02	22/01/2010	H-F-PL-11-MK	REPLACE WIPER BLADES 126,172 KMS	30
9200024751	SD	FM02	22/01/2010	H-F-PL-20-MK	CHECK BRAKES 51,186 KM	476
9200024752	ND	FM02	22/01/2010	H-F-PL-11-MK	REPAIR TO SEAT LUMBAR 143,292 kms	44
9200024753	SD	FM02	22/01/2010	H-F-PL-HQ-DG-PN	REPLACE 4 TIRES & BALANCE 50,980 KM	869

Order	Description of Technical Object	Equipment	Created on	Act. start	SchedStart	Cost Ctr	MAT
1000001231	FORD CROWN VIC GREY 2008-6684	120770	13/01/2010	13/01/2010	13/01/2010	976684	764
1000001232	FORD CROWN VIC GREY 2009-6760	120846	13/01/2010	13/01/2010	13/01/2010	976760	764
9200024749	FORD CROWN VIC MRKD 2007-6605	120687	21/01/2010	21/01/2010	21/01/2010	976605	779
9200024750	FORD CROWN VIC MRKD 2006-6560	120710	22/01/2010	21/01/2010	22/01/2010	976560	773
9200024751	FORD FREESTAR WHITE 2005-6533	120843	22/01/2010	22/01/2010	22/01/2010	976533	758
9200024752	FORD CROWN VIC MRKD 2007-6601	120710	22/01/2010	22/01/2010	22/01/2010	976601	781
9200024753	DODGE DAKOTA BLACK 2008 6671	120842	22/01/2010	22/01/2010	22/01/2010	976671	760

Figure 7 Sample of Work Order Data

Although the CMMS does possess these data entry fields it can be cumbersome to extract data from work order records for use in data analytics. Areas of improvement which can be implemented for the maintenance management system include the following:

1. **Recording of Labour Time:** List both parts and labour cost separately along with labour hours, this would alleviate the need to cross reference to separate databases.
2. **Kilometres at Event:** The vehicle kilometres at the time of maintenance/repair is recorded in the description field. However, it is difficult to extract this information from the text entry and perform fleet analysis such as reliability on mean kilometres between defect.
3. **Work Order Close:** Labour time is recorded separately and there is currently no field for the work order close date in the system, adding this field along with including time stamps in the “Created on”, “Act. Start” and work order close would further enable metrics such as response time, vehicle downtime and mean time to repair to be calculated.
4. **Multi-Line Work Order Entry:** Currently separate work orders are required for each maintenance activity and there is no transparency on identifying if a work order was the result of two different events or part of the same maintenance service/inspection (i.e. opportunistic repair found during an inspection). Multi-line work order records would greatly increase functionality and analytics of maintenance records.
5. **Paper/Manual Transference of Records:** There is a large amount of manual data entry required to support the maintenance management system. Hard copies of work orders and accompanying invoices are still required to be kept due to a lack of digitalization capability with the current system. Work orders are

issued as printed copies to mechanics and then re-entered with mechanic notes at the time of work completion which creates a risk that data is entered incorrectly or that hard copies are lost.

6. **Real-Time Data Availability:** Hard copy work orders are still being used as a major part of the maintenance management system which can result in delays in communication on the status of vehicles in for repair as real-time data is not available or in a digitalized format.

Overall, there are notable opportunities to improve on the CMMS currently in place. In addition to the maintenance management system, Fleet Services maintains a weekly report on vehicle odometer readings (km) which is issued to user groups (i.e. Police, Paramedics and Public Works) in order to schedule vehicles due for preventative maintenance and inspections. These odometer readings are recorded at the fueling stations and reported by Police and Paramedic Services, which are then uploaded to the maintenance management system to trigger the preventative maintenance program.

4.2 COMPARISON TO AVAILABLE CMMS

4.2.1 PEER CMMS USAGE

Many municipalities and transit agencies in Canada have been using a CMMS for at least 20 years to help in the maintenance and parts management of their fleet. It is recommended that Halton Region issue a Request for Information based on the findings and recommendations from this study to gather information on a CMMS that will be most suited for Halton Region Fleet Services maintenance management. The Request for Information can be followed by a Request of Quotation with a detailed scope of work and requirements to get competitive pricing for a suitable CMMS. Some fleet maintenance CMMS currently available are M5 FleetFocus, Fiix, eMaint and EMDECS.

All of the abovementioned CMMS are cloud-based, which means data can be accessed and input from anywhere, using any internet connected device such as smartphones, tablets, and computers. There are several other CMMS apart from the abovementioned which offer similar features that can be explored by Halton Region. Some of the benefits which can be realized from an updated CMMS include:

1. Automated notifications for scheduled repair, including parts request
2. Prioritize repairs based on vehicle criticality
3. Anticipate technician and parts availability
4. Business intelligence with dashboards, interactive displays, and detailed reporting
5. Anticipate preventative maintenance to coincide with repairs (i.e. opportunistic maintenance)
6. Manage multiple repair locations
7. Track internal and external repairs

4.2.2 COST ESTIMATE FOR IMPLEMENTATION OF CMMS

Based on early discussions with CMMS providers such as eMaint and EMDECS, providers are not able to establish a firm estimate for the cost of developing and implementing a CMMS for Halton Region Fleet Services. This is due to the varied nature of development and training involved during the implementation stages. The marketplace for CMMS has changed and providers have now moved from a fixed purchase price model to a software as a service (SaaS) business model where users pay a monthly subscription to access the CMMS services.

Depending on user requirements, the CMMS provider can incur the cost of development and implementation which cannot be estimated at this stage. Based on a discussion with BrightOrder executives, a high-level estimation for EMDECS based on the size and requirements of Halton Region Fleet Services was established. EMDECS can cost anywhere between $3,000 to $4,000 per month for 15 to 20 users with 3 to 4 administrators. Likewise, eMaint's Enterprise plan can cost $3,150 per month for 20 users[3] (excluding tax). Similarly, Toronto based CMMS provider Fiix can cost $1,200 per month for 20 users[4].

These figures can help present a business case for a CMMS upgrade for Halton Region Fleet Services. Based on an estimated savings of 20 minutes per work order with efficiency improvements from an enhanced CMMS this can result in an additional 2,700 hours of available productive time[5]. This availability of wrench time can be billed at the opportunity cost of Halton Region Fleet Services cost recovery rate of $115.51/hr (i.e. $308,000 in time savings) amounting to a net cost savings of approximately $260,000.

4.3 MAINTENANCE POLICY REVIEW

4.3.1 VEHICLE TO MECHANIC RATIO

As the Region's fleet size has grown over time, another metric to look at regarding maintenance policy is the vehicle-to-mechanic ratio. An increased demand for mechanics can put a strain on labour resources and create the need to use external service contracts to help manage periods of peak workload.

A typical benchmark for the vehicle-to-mechanic ratio is 55:1 to 60:1 for regional counties and cities[6]. Halton Region has historically been close to this range. However, growth in the fleet size over the past two years now has the vehicle-to-mechanic ratio at 65:1, refer to Figure 8.

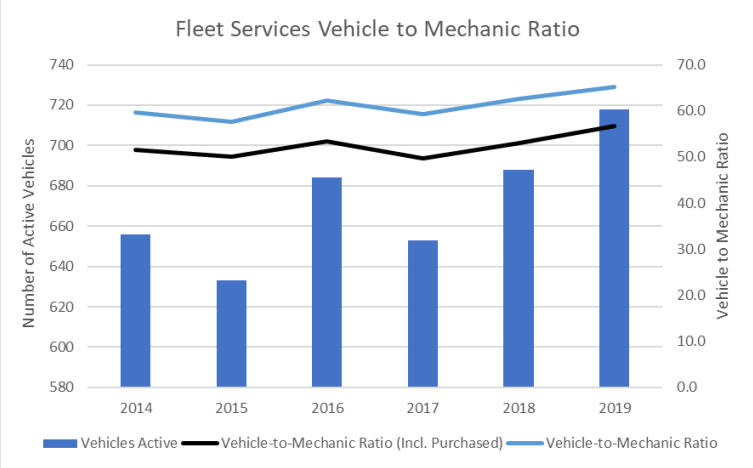


Figure 8 Vehicle to Mechanic Ratio

While accounting for purchased labour through external fleet maintenance service contracts the vehicle-to-mechanic ratio is reduced to the range of 50:1 to 57:1. It is estimated that the value of Halton Region's service contracts are 50% parts and 50% labour. The labour portion of the service contract value is divided by the external shop rate of $77 per hour. One (1) mechanic is able to provide an estimated 1,600 hours of billable work per year, which results in an equivalent mechanic FTE count from purchased external services.

[3] https://www.emaint.com/cmms-pricing/

[4] https://www.fiixsoftware.com/cmms/pricing/

[5] Based on 260 working days less stat holidays, vacation, floater and sick days (~220 days)

[6] Government Fleet, How to Calculate Technician-to-Vehicle Ratios, January 10, 2011, Available at: https://www.government-fleet.com/146908/how-to-calculate-technician-to-vehicle-ratios

4.3.2 MINOR REPAIRS

During site observations and through discussion with Fleet Services mechanics it was brought forth that minor repair activities are not all charged to user groups (i.e. Police, Paramedics and Public Works). Examples of these minor repairs and maintenance work that are done as "freebies" include windshield wiper replacement, light bulb replacement, tire pressure checks and fluid top-ups (i.e. washer fluid, engine oil).

Although these activities can take less than 30 minutes to perform over time this can amount to a sizeable portion of cost recovery for Fleet Services that is not being captured. Sometimes these minor repairs are done while the vehicle is already in the shop for maintenance, however, minor repairs are also accommodated as unscheduled. It is difficult to quantify the dollar value that is currently lost in the cost recovery model because work orders may not always be opened to capture and record associated labour time and, in some cases, parts/consumables cost.

Based on available work order records from 2018, Fleet Services spent $23,170 on minor repairs, refer to Table 7. It is recommended that Fleet Services open work orders to track these minor repair items by asset and user group for inclusion in cost recovery.

Table 7 Estimate of Police Fleet Minor Repairs 2018

Minor Repair	Work Orders	Average Cost	Annual Total
Wiper Replacement	132	$ 69	$ 9,170
Light Blub Replacement	129	$ 109	$ 14,000

4.3.3 TIRE, OIL, WIPER BLADES & FLUIDS SERVICE WORK

Currently, all fleet maintenance and repair work is completed by mechanics with dual 310S and 310T licences. There is an opportunity to assign a scope of maintenance work not requiring these qualifications to a lower wage group staff (i.e. apprentice mechanic). This scope of work commonly includes tire changes, oil changes, windshield wiper replacements, fluid top-ups, and light bulb replacements. A lower wage group staff can be hired to do this work or it can be delivered as part of an apprenticeship program, thereby training the next generation of fleet mechanics and reducing labour expenses.

Based on work orders generated of this scope in 2018 there are approximately 1,200 labour hours available; equating to 0.75 FTE. The following table demonstrates the cost savings that can be realized if this work was completed by an apprentice mechanic versus a licensed mechanic.

Table 8 Apprentice Mechanic Cost Savings

Tire, Oil & Fluids Service Work	Labour Hours	Labour Rate[7]	Total Cost
Mechanic (310T and 310S)	1,200	$ 40.34	$ 48,400
Apprentice Mechanic	1,200	$ 18.19	$ 20,000

Annually there is approximately $28,400 savings in labour expense. Note that to implement this recommendation Fleet Services would need to negotiate approval from the mechanics' Union. Note that the Police user group (HRPS) also allocates a portion of their internal labour resources to minor repair work which could otherwise be performed by Fleet Services. For 2019, this portion of work is estimated at 870 hours (0.5 FTE). This reassignment of work to Fleet Services can also enable Police Services to focus on more value-added work including vehicle commissioning.

[7] Mechanic's rate includes 21.95% Fringe & Benefit mark-up

5 PARTS & MATERIALS PROCESSES

5.1 MATERIALS MANAGEMENT SYSTEM

Regional Stores is structured under the Finance and Procurement department of Halton Region, separate from Fleet Services. The Stores department has a charge back based on the quantity of stocked inventory and use of services (i.e. number of parts issued). This charge back is applied directly to the user group (i.e. Public Works) and does not get charged to Fleet Services.

To support Fleet Services and the maintenance of vehicles, Stores manages an inventory of 646 stock keeping units (SKUs) at the North Operations Centre and 576 SKUs at the Woodland Operations Centre for a total of 1,222 SKUs, and an estimated inventory on hand value of $315,330[8]. Stores operates as an open stockroom where mechanics can freely enter, search for parts stock in inventory, and fill out a slip to document the parts picked, see Figure 9.

Figure 9 Halton Region Stores Area

Furthermore, mechanics are responsible for picking their own parts and knowing the SKU along with the applicable vehicle make and model of the part needed. As a best practice Stores staff should have access to lists of required parts for the types of services that are being scheduled, and parts to be picked as part of a Stores services counter.

There is no standard procedure or reporting of inventory shrinkage or inventory controls to ensure that parts picked by mechanics or other staff are accurately captured in the materials management system. The open stock keeping area contributes to this lack of visibility. This has been identified as part of the Stores internal audit and process development is currently on-going. Through converstation with staff from Regional Stores, an estimate of 7% inventory shrinkage was provided[8]. The best practice of a Stores counter service with restricted access and inventory monitoring, through the use of purchase requisitions which note the part numbers, description, quantities and date issued, would help provide tighter controls on inventory management. This finding is another point identified in the Stores internal audit.

Several other municipalities offer counter service from their Stores department. At these peer stockrooms a purchase requisition which is typically filled out by mechanics to request parts and is submitted to the Stores staff in exchange for the requested parts. Stores then notes the parts and quantities picked in the materials management system. Furthermore, an inventory request form is typically used which mechanics can fill out to issue a request for Stores to begin stocking a non-inventory part.

For monitoring inventory levels, visual checks are done periodically. However, there is no standard procedure for establishing min/max inventory levels or to incorporate seasonality effects into inventory management. The seasonal impact to inventory levels by stocking more frequently used items depending on summer or winter driving conditions should be explored (i.e. increase stock of wiper blades and washer fluid). These seasonal impacts can potentially lead to vehicles withheld from service if parts are not stocked due to an increased demand for specific inventory. The methodology gap for establishing inventory min/max levels has also been identified through the Stores audit and process improvements are on-going.

Currently, there are no standing meetings (i.e. weekly, monthly or quarterly) between Fleet Services and Stores to discuss inventory and other concerns. This communication gap can result in inefficiencies between Fleet Services and Stores. One such gap relates to mechanics placing orders directly with vendors for parts not stocked in

[8] Email "Fleet Services Information Requested", October 30, 2019

inventory. This practice lacks a feedback loop with Stores so that frequently ordered parts could be requested and stocked. The Stores department has expressed interest in establishing collaborative meetings with Fleet Services.

5.2 MECHANIC PART ORDERING

As mentioned previously, mechanics often take responsibility for ordering non-inventory parts directly with vendors to expedite repairs. In this process the Stores department is bypassed and there is a lack of a formal communication process to inform Stores whether frequently ordered parts should become stocked inventory.

The majority of part orders placed by mechanics are completed by means of an open purchase order while a p-card system is used for more infrequent purchases. The p-card essentially works the same as a credit card, in as that purchases are made from the vendor and an invoice for the parts received is sent every 30 days, refer to Figure 10.

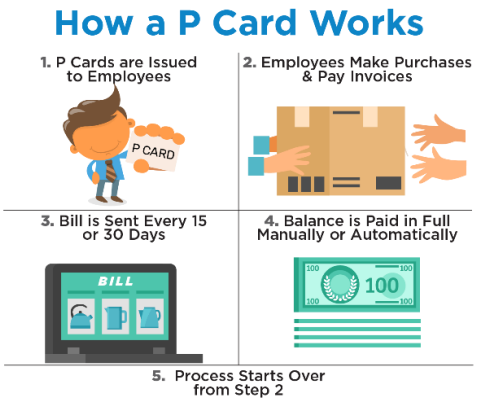


Figure 10 How P-card Works

The main issue with the use of a p-card system is that there can be a lack of accountability on the price paid for parts because mechanics can directly contact a single vendor to place the order. Best practice would be to submit a non-inventory parts request form to Stores, then Stores would assume responsibility for contacting multiple vendors to source the best price available for the part and place an order with the vendor, after which the part would become stocked inventory.

Furthermore, with mechanics ordering parts there can be a gap created on tracking part warranties and core parts. As a best practice, these responsibilities are typically managed by the Stores department in municipal fleet management. Bypassing the Stores department to order parts directly removes this accountability and traceability that should be maintained within Stores.

Fleet Services has expressed that it is important for the Stores department to continue building knowledge and experience related to automotive specific parts in order to conduct alternative part sourcing with vendors. This is important to not only ensure the best price available, but also to ensure that purchased parts meet the functional needs of the vehicles maintained by Fleet Services.

6 OTHER FLEET SERVICES

The maintenance of Regional fleet vehicles for Public Works, Paramedics, and Police Services is the core business for Halton Region Fleet Services. However, as brought forth through the stakeholder workshops, Fleet Services also has a breadth of other service offerings which differ depending on the user group. Table 9 shows the complete matrix of other fleet services across the various user groups.

Table 9 Fleet Service Matrix by User Group

Service Offering	Public Works	Police (HRPS)	Paramedics (HRPS-A)	Peer Municipality
Vehicle Needs Assessment	✓	Partial Work	Partial Work	✓
Fleet Capital Planning	✓	✗	✗	✓
Vehicle Procurement	✓	✗	✗	✓
New Vehicle Commissioning	✓	Partial Work	Partial Work	✓
Fleet Maintenance (Core Business)	✓	✓	✓	✓
Failure/Root Cause Analysis	✓ (Informal)	✓ (Informal)	✓ (Informal)	✓ (Informal)
Vehicle Decommissioning	✓	Partial Work	Partial Work	✓

Public Works is the only user group that utilizes Fleet Services for all offered services. Police and Paramedics both manage their own fleet capital planning, replacement programs, vehicle commissioning, and vehicle decommissioning due to a lack of capacity in Fleet Services. However, sometimes Fleet Services assists Police and Paramedics with a portion of their commissioning and decommissioning work. Fleet Services is also available for consultation to these user groups regarding the needs assessment of new vehicles and general technical advice.

The general practice of Fleet Services in other municipalities offers the same portfolio of services as Halton Region. However, the service offering is an “all or nothing” approach. Fleet customers do not pick and choose from the service offerings. For example, there is the case with a peer municipality where emergency services (i.e. Police, Fire and Paramedics) also manage their own fleet capital planning, procurement, commissioning and decommissioning but they are also responsible for their own fleet maintenance. Whereas, the Fleet Services in this municipality provides complete service to Public Works, Parks and Recreation, Construction and Road Works as well as Sanitation.

For Halton Region the discrepancy of services provided to the different user groups does not align well with the methodology of having a single avenue of cost recovery through the shop charge back rate. There can be a misalignment on managing the total lifecycle costs of fleet assets because one user group can be responsible for the purchase decision while Fleet Services assumes responsibility for the maintenance of the asset. Fleet Services end-to-end involvement on the lifecycle of a fleet vehicle would be a more favourable approach.

Furthermore, Fleet Services operating on the basis of an hourly shop charge back rate enables user groups to be selective on what type of fleet maintenance is handled by Fleet Services. Thus, they may only elect to use Fleet Services for work where internal efficiencies is not as high. In addition, there is no benefit captured by an efficient workforce because cost recovery is tied directly to labour hours spent (i.e. if a mechanic can do the same work in less time Fleet Services actually will have a lower cost recovery rather than capitalizing on the efficiency of a productive workforce).

7 BEST PRACTICES IN FLEET MANAGEMENT

7.1 BACKGROUND OF INTERVIEWS

To help source best practices in fleet management WSP prepared a benchmarking survey to engage with three local area municipalities in Southern Ontario. The objectives for selecting relevant peers were identifying municipalities with a similar fleet make-up and customers (i.e. Police, Paramedic Services and Public Works) and having a similar fleet size and breadth of services offered. Peer municipalities were also selected based on membership to the Municipal Benchmarking Network (MBN). MBN reflects the results of eleven single tier and five upper tier municipalities representing six provinces as of their 2017 report.

Disclaimer: The levels of service can differ in each municipality thereby, this can impact the ability to make direct comparisons between peer municipalities.

7.2 GENERAL STATISTICS

A comparison of general statistics between Halton Region and the peer municipalities surveyed are provided in Table 10. Of the three peers, only Municipality C provides fleet services to EMS user groups (i.e. Police and Paramedics). Halton Region has historically had large cost recovery shortfalls up to a maximum of $580,000. However, peer municipalities have had better performance on actual versus budget costs. Recently, Municipality A has performed 5% under budget while Municipality B had a 0.05% budget surplus.

Municipality B has a similar concept as Halton Region with an hourly shop charge back rate. Halton Region calculates its fleet services hourly rate as a ratio of the total annual overhead costs to the estimated number of available billable mechanic hours. This can create shortfall when mechanics do not have as many billable hours as budgeted. Although Municipality B uses an hourly cost recovery rate they also apply a 10% contingency premium. Other peers have 100% charge back to each user group based on actual costs incurred or separate cost recovery streams for capital programs, fleet maintenance and overhead cost.

Another note in terms of cost recovery is the large facility overhead expense incurred by Halton Region Fleet Services. In the 2019 budget this accounts for $589,774 which averages to about $19.55 per sq. ft. By comparison Municipality A, which has a similar fleet size to that of Halton Region, has a facility overhead cost of around $16 per sq. ft.

Table 10 Benchmarking General Overview of Fleet Services, Budget Structure & Performance

General Statistics:	Halton Region	Municipality A	Municipality B	Municipality C
Fleet Size	718	681	1,470	731
Fleet Size to Regional Population	1:800	1:589	1:371	1:822
User Fleets	Public Works Paramedic Services Police Services	Public Works Construction/Road Works Sanitation Parks & Recreation **Fuel Only:** Emergency Services (Police, Fire, EMS)	Public Works Construction/Road Works Sanitation Water/Waste Water	Police Services Paramedic Services Public Works Construction/Road Works Sanitation Regional Airport Corporate Services
Number of Facilities	2	3	8	3
Facility Size (sq. ft)	**Total:** 28,900 sq. ft	**Total:** 63,500 sq. ft **Maintenance Area:** 22,900 sq. ft	**Total:** 499,330 sq. ft **Maintenance Area:** 63,585 sq. ft	**Total:** 63,000 sq. ft **Main Shop:** 35,000 sq. ft **Maintenance Area:** 30,000 sq. ft
Facility Overhead Expense ($)	North Ops Centre: $338,342 Woodland Ops Centre: $251,342 **Total:** $589,774	**Total:** $1,012,125	N/A	$261,000[9] (Main Shop)
Approximate Facility Cost ($ per sq. ft)	$19.55 per sq. ft	$15.93 per sq. ft	N/A	$7.46 per sq. ft[10]

[9] Lease rate at main shop (2019), repair shops at airport and waste centre are not charged to Fleet Services as a facility overhead expense as they are paid for the respective user groups.
[10] Note that this does not include program equipment (i.e. hoists, cranes, etc.). Municipality C manages program equipment in their budget, separate from this facility lease/charge back from Facilities Management to Fleet Services. Halton Region's facility overhead includes hoist, crane inspections and replacement.

General Statistics:	Halton Region	Municipality A	Municipality B	Municipality C
Distance Between Facilities (km or min)	25 km (30 min)	25 km (30 min)	Varies depending on facility and time of day	Airport Facility 6 km (5 to 10 min) Waste Facility 20 km (20 to 30 min)
Frequent Shuttling of Vehicles Between Facilities (Yes/No)	Yes	Occasionally (dependent on work)	Occasionally (dependent on work)	Occasionally (dependent on work)
Fleet Mechanics	11	29	29	10
Total Number of Maintenance Bays	20 bays	65 to 70 bays	48 bays	26 bays
Total Number of Hoists	12 hoists	8 hoists (6 vehicle hoists, two 4-post lifts)	27 hoists	14 hoists
Budget & Historical Performance:				
Annual Budget for Fleet Services	**Fleet Services Budget:** $4.2 million (2019) **Fuel Consumption:** $2.28 million (2018)	**Fleet Services Budget:** $14.9 million (2019) ($5 to 6 million Capital Replacement Program, $3.5 million Fuel Budget, $6.5 million Operating Budget for Maintenance) **Note:** Includes providing fuel services	**Fleet Services Budget:** $9.7 million	**Fleet Services Budget:** $4.5 to 5 million **Note:** User groups pay for fuel directly.
Contracted Services	$414,000	$45,000	$4.3 million	$1.6 million
Notes on Historical Performance	Historically $300,000 to $600,000 shortfall	5% under budget last 3 years **Note:** Fuel prices impact budget performance (i.e. lower fuel prices)	Missed 2018 budget by 0.05% currently on track to breakeven for 2019	15 plus years ago, variances were excessive. Budget accounting was generally a shortfall for Fleet Services. Over the past 10 years, small variance in shortfall/profit. In each case this is brought back to breakeven, credits or debits are issued as per the balance sheet to user groups
Budget to Fleet Size Ratio[11]	$5,850 per vehicle	$9,544 per vehicle	$6,560 per vehicle	$6,156 to $6,840 per vehicle

[11] Operating budget for fleet maintenance used, does not include budget for fuel and capital replacement programs.

General Statistics:	Halton Region	Municipality A	Municipality B	Municipality C
Cost Recovery Model	The annual Fleet Services cost recovery model is based on all overhead costs (i.e. building maintenance, utilities, office administration, staff wages, equipment, supplies, etc.) divided by the estimated number of available billable mechanic hours for the upcoming year (1,950 hours for 7:30am to 4pm, 5 days per week shift, less stat holidays, sick days, vacation, shop clean-up time and meetings)[12].	Annual internal rental rate system. All assets are assigned and charged full cost recovery for the costs associated with the historical experience of the vehicle /equipment. Internal rental rate includes maintenance, fuel, capital replacement (depreciation) and indirect costs. Costs are an average of three years of actual cost experience.	All direct costs charged to user groups plus 10% mark-up. Fleet maintenance charge back rate at $102/hr. All fleet capital planning charged at direct cost.	Three tier charge back model: 1. **Capital Reserve:** providing replacement schedules for user group fleet vehicles. Any surplus in the actual versus budgeted cost of new vehicle procurement is put into a capital reserve fund. 2. **Shop Rate:** encompassing mechanic and related overhead cost recovery 3. **Management Recovery:** covering administrative costs (i.e. Fleet Manager, Fleet Clerks, Supervisors, related equipment and facility space). This cost recovery is distributed to user groups on a per vehicle basis to keep user groups accountable for their fleet size.
Other:				
Capital Reserve Fund	Police Services currently maintains a capital reserve fund for vehicle replacement.	Budget savings from fuel purchasing 50% is reimbursed to user groups and 50% is allocated to a capital reserve fund.	**No Response**	Capital reserve fund in place, no further details provided.
Continuous Improvement/Cost Saving Programs	Revision to Public Works fleet PM service interval from 5,000 to 8,000 km for PM-A and amalgamation of PM B+C at 48,000 km to increase availability of mechanics for other billable work.	Lean 6-sigma training for managers Bar coding development for inventory and work orders along with 5s practices for stockroom management. Kronos mobile app development for tracking repair times and payroll, eliminate inefficiencies of timesheet	Pre-written detailed quote from contracted vendor after inspection and pre-work initiation.	Centralization of Fleet Management Program & Processes: 1. Corporate fleet capital replacement plan/process (including police) 2. Business case/functional requirement process 3. Central fleet rental pools & repurpose vehicle programs 4. Utilization management, needs versus wants and fleet right-sizing

[12] Typical estimate of 1,500 to 1,650 billable hours per mechanic.

7.3 GOVERNANCE STRUCTURE, STAFFING & FEES

There are some clear distinctions between the organizational structure and staffing of Halton Region's Fleet Services in comparison to peer municipalities. These differences are presented in Table 11. Halton Region can look at the contrast in staff positions and organizational structure to consider changes to their Fleet Service. One area would be employing maintenance support staff such as a Parts Runner or Shop Attendant to help cover the non-billable duties current done by mechanics and detracting from their wrench time utilization. This could also be incorporated in the form of an apprentice mechanic which would also aid succession planning as current mechanics approach retirement. Further benchmarking comparisons are presented in Table 12.

Table 11 Comparison of Fleet Services Organizational Structure

Area of Difference	Halton Region	Municipality A	Municipality B	Municipality C
Fuel Systems	Segmented responsibility between Fleet Services, Plant Maintenance and Stores over fuel systems.	Fleet Services entirely responsible for fuel ordering, infrastructure and maintenance.	Fleet Services entirely responsible for fuel ordering, infrastructure and maintenance.	Stores department manages fuel ordering, software and inventory levels. Facilities manages infrastructure and maintenance.
Staff Training	No dedicated supervisory position for staff training	• Supervisor Technical Trainer (1.0 FTE) • Training Specialists (2.0 FTEs) • To train on standard operating procedures, maintenance and shop safety practices.	• Superintendent Regulatory Compliance & Driver Training (1.0 FTE) • Driver Development & Safety Development Officer (2.0 FTEs) • For driver and staff safety training	• No dedicated supervisory position for staff training. • Standard operating procedures for staff training currently in development following Fleet Management Review
Maintenance Supervision	• Fleet Services Manager (1.0 FTE) • Fleet Supervisor (1.0 FTE) • Sub-Foreperson mechanic (1.0 FTE) • Rotational Sub-Foreperson (1.0 FTE)	• Manager Fleet Maintenance (1.0 FTE) • Supervisor Fleet Maintenance (5.0 FTEs)	• Superintendent Fleet Maintenance (1.0 FTE) • Forepersons (4.0 FTEs)	• Supervisor Fleet Management (1.0 FTE) • Forepersons (2.0 FTEs)
Maintenance Support Staff	Mechanics take on non-billable duties, supported by: • Fleet Clerk (1.0 FTE)	Additional staffed positions: • Welder/Fabricator (4.0 FTEs) • Washer/Lubricators (4.0 FTEs) • Parts Runner (1.0 FTE) • Clerical Staff of Finance Department	Additional staffed positions and Stores department is part of Fleet Services: • Part Clerks (4.0 FTEs) Shop Attendant (1.0 FTEs) • Vehicle Operations Clerk (1.0 FTE) • Vehicle Service Coordinator (1.0 FTE)	• Fleet Clerk (1.0 FTE) • Fleet Management Coordinator (1.0 FTE)
Capital Planning	Managed by the Fleet Services Manager (1.0 FTE) and user groups.	Dedicated Manager Fleet Planning (1.0 FTE) and supporting staff: • Specialist Fleet Planning (1.0 FTE) • Asset Management Systems Coordinator (1.0 FTE) • Fleet Analyst (1.0 FTE)	Superintendent Capital Planning & Contract Management (1.0 FTE) and supporting staff: • Senior Analysts (3.0 FTEs) • Fleet & Contract Analyst (1.0 FTE) • Fleet Vehicle Coordinator (1.0 FTE)	• Fleet Services Manager (1.0 FTE) • Supervisor Fleet Planning & Performance (1.0 FTE)
Stores Department	Structured under Finance department, separate from Fleet Services	Structured under Finance department, separate from Fleet Services	Structured within Fleet Services	Structured under Finance department, separate from Fleet Services
Services Provided	• Public Works • Paramedic Services • Police Services	• Public Works • Emergency Services (only fuel services provided)	• Public Works	• Police Services • Paramedic Services • Public Works • Sanitation • Regional Airport

A comparison of staff counts, licensing requirements, key staff ratios and WSIB claims are presented in Table 12. One point of interest is the licensing requirements for mechanics. Halton Region requires that mechanics hold dual 310T and 310S licenses, and this is similar to the majority of peers surveyed. However, Municipality C has revised this requirement and now permits mechanics to hold a single license, either 310S (light-duty) or 310T (heavy-duty). Municipality C has cited that historically the dual license requirement severely limited their hiring pool for new staff and has since dropped this requirement. Furthermore, Municipality A has an apprenticeship program in place which can be beneficial to establishing a hiring pool for new staff. Currently, Municipality A has two apprentice mechanics on staff. Another point highlighted through this comparison is the recommendation for Halton Region to appoint the sub-foreperson as a permanent assignment at Woodland Operations Centre so that Fleet Services will have dedicated supervisor at each garage. All other peer municipalities have Fleet Supervisor or foreperson positions established at each of their facilities. Other differences include management positions dedicated to capital planning, contract management, staff training, and safety. The latter could help reduce the impact of WSIB incidents which have historically had a large impact on Halton Region's Fleet Services budget.

Table 12 Benchmarking Governance Structure, Staff & Resources

Staff Resources:	**Halton Region**	**Municipality A**	**Municipality B**	**Municipality C**
Supervisor at Each Facility	No	Yes	Yes	Yes
License Requirements for Fleet Mechanics	310T and 310S	310T and 310S	310T and 310S	New candidates must have either 310S for light-duty or 310T for heavy-duty at time of hire. Dual license requirement dropped due to limiting hiring pool.
Average Age of Fleet Mechanics	50 years	45 years	**No Response**	35 to 40 years
Fleet Services Manager(s)	1	3	1	1
Fleet Maintenance Supervisor(s)	1 (North Ops Centre)	5	1	2
Foreperson(s)	1 (mechanic functions as rotational sub-foreperson)	0	4	2
Fleet Licensed Mechanic(s)	11	29	29	10
Apprentice Mechanic(s)	0	2 (currently pending)	0	0
Administrative/Clerical Staff	1.0	0 (finance dept. staff utilized)	3 (Vehicle Operations Clerk 2.0 FTEs and Vehicle Service Coordinator 1.0 FTE)	1
Welder/Fabricator(s)	0	4	0	0
Vehicle Washer/Lubricator(s)	0	4	0	0
Parts Runner	0	1	1 (Shop Attendant)	0
Understaffed Position(s)	Fleet Mechanics	Fleet Analyst	Fleet Mechanics (Currently hiring 1.0 FTE)	Adequately Staffed
Apprenticeship Program in Place or Staffed	No	Partial apprenticeship program. On the job apprenticeship for either 310T or 310S. Starting apprentices will have one license and get work experience for the other.	No	No
WSIB Incidents	29 days (absence), 78 days (modified work) in 2018 Previously as high as 168 days (absence), 402 days (modified work) in 2017	Approx. 10 incidents annually (1 to 3 lost time incidents) 3 Occupational Illness claims (2018) on hearing loss. Mandatory hearing protection at all times, PPE use and training introduced (2018).	2 incidents totalling 71 days (2019 year to date, YTD)	Zero to 1 incident per year. Lost time typically 1 to 2 weeks.
Working Hours/Shifts	7:30am to 4pm (Monday to Friday)	Two 8 hour shifts at all locations **Day Shift:** 8am to 4pm **Afternoon Shift:** 4pm to 10pm (rotation schedule 2 weeks mechanic on day shift then 2 weeks on afternoon shift)	Monday to Friday. 7am to 3pm day, 3pm to 11pm winter Summer hours afternoon go to four 10 hr shifts 24/7 support available for winter ops or emergencies	Monday to Friday. 7:30am to 4:30pm (split shift) 7:30am or 8:30am staggered split shift start time
Lunch/Breaks	**Breaks:** 15 min mandatory (2x) (paid) **Lunch:** 30 min (unpaid)	**Breaks:** 15 min mandatory (2x) (paid) **Lunch:** 30 min (unpaid)	**No Response**	**Breaks:** 20 min mandatory (2x) (paid) **Lunch:** 30 min (unpaid)
Vacation/Sick Days	**Vacation:** 3 to 5 weeks (dependent on seniority) **Sick Days:** 8 days	**Vacation:** 3 to 6 weeks (dependent on seniority) **Sick Days:** 12 days	**No Response**	**Vacation:** 2 to 6 weeks (dependent on seniority) **Sick Days:** varies up to 15 days

7.4 FLEET MAINTENANCE

The fleet maintenance practices of Halton Region and peer municipalities are compared in Table 13. Halton Region has recently moved to a 5,000 km service interval for their Public Works fleet while peer municipalities schedule service every 3 months or at a 8,000 km service interval for all fleet vehicles. By comparison, Halton Region has a relatively high vehicle-to-mechanic ratio at 57:1 which demonstrates a need for external service contracts to help manage fleet maintenance. Municipality A and B have vehicle-to-mechanic ratios on the order of 20:1 to 30:1. Halton Region's vehicle-to-hoist ratio and vehicle-to-maintenance bay ratio are similar to some of their peers. There is also a trend for municipalities to contract out some of their heavy-duty fleet maintenance based on the need for specialized repairs and tooling. Another point of interest is that Municipality A has a dedicated supervisory position for developing and training staff on standard operating procedures. This includes fleet maintenance as well as safety procedures.

Table 13 Benchmarking Maintenance Policy

Maintenance Policy:	**Halton Region**	**Municipality A**	**Municipality B**	**Municipality C**
Vehicle-to-Mechanic Ratio	65:1 57:1 (incl. purchased labour)[13]	23:1 21:1 (incl. purchased labour)[13]	50:1 32:1 (incl. purchased labour)[13]	90:1 30:1 (incl. purchased labour)[13]
Vehicle-to-Hoist Ratio	60:1	85:1	55:1	64:1
Vehicle-to-Maintenance Bay Ratio	36:1	10:1	31:1	35:1
Preventative Maintenance Service Interval	5,000 km (Police & Paramedics) 8,000 km (Public Works)	Every 3 months	Annual Ministry of Transportation (MTO) Inspections, further detail on intermediate inspection intervals not provided	PM A at 180 Days or 8,000 km (can vary depending on vehicle type)
Standard Repair Times Established	No	Estimated repair time noted against work orders by supervisor at the time the work order is opened (manual entry and estimated times are subjective)	Currently under review	Yes
Standard Procedures	Standard Procedures for PM-A, B and C level inspections	Technical Trainer staffed to develop and maintain standard operating procedures and work instructions. Orientation manuals, Occupational Health & Safety, regulatory training. Standard Procedures for PM-A, B and C level inspections	Currently under review	Currently in development
Summer/Winter Tire Program (Yes/No)	At request of user group (currently for Police Services)	At request of user group	No	Yes (some Police vehicles) Tend to move all fleets towards "All Weather/Season Tire"
Emergency Repairs	Charged at standard $115.51/hr rate	100% charge back to user group	Charged at standard $102/hr rate	Overtime rate factors are applied
Service Contracts in Place:				
Estimated Annual Value ($)	$413,890 (2019)[14]	$450,000	$4.3 million	$1.6 million
Scope of Service Contracts	Autobody repairs, light duty OEM parts and repair, med/heavy duty vac/sewer truck parts and repair	Major med/heavy duty truck OEMs for parts and service (i.e. International, Mack, Navistar)	Mechanical service, tires, lifting, Aerial device inspection repair collision, paint and body repair, fabrication & mobile welding, towing & recovery service, vehicle up fitting, Fuel site service, shop equipment repair.	Heavy-duty waste/refuse truck maintenance service contracts.
Tire Service Contract (Yes/No)	No	Yes ($366,000)	Not specified	Not specified
Inventory Management & On-demand Service as part of Tire Service Contract	No	Yes	Not specified	Not specified

[13] Includes external service contracts for additional labour resources. Service contracts estimated at 50% parts and 50% labour in value with external shop rate at $77/hr and one FTE mechanic providing 1,600 labour hours annually.
[14] Estimated 50% parts and 50% labour, Halton Region Fleet Services – Email November 26, 2019

7.5 SUPPLIES, MATERIALS AND DISPOSAL

For some peer municipalities' their Stores department is structured within Fleet Services while others have Stores structured separately and reporting to Finance, similar to Halton Region. However, best practice employed by all peers is that a counter service is run by the Stores department. The peer municipalities surveyed have much lower estimated inventory shrinkage, partially due to tighter controls and stockroom counter service, which is a recommended best practice. Excessive shrinkage levels can indicate problems with inventory control such as damage, miscounting, theft, and incorrect units of measure.

Municipality A holds monthly standing meetings between Fleet Services and Stores. This is considered a best practice which can streamline the transactions between Fleet Services and Stores. Halton Region can also consider conducting monthly/weekly meetings between Stores and Feet Services to reduce the inefficiencies in the area of parts management. Peer municipalities have stated that in some cases mechanics take responsibility for ordering non-inventory parts. In this case it is generally due to automotive technical expertise being required over and above that of the stock keepers. As a best practice, Stores should handle and keep track of all parts ordering. A non-inventory parts request form should be submitted to Stores, then Stores staff would assume responsibility for contacting multiple vendors to source the best price available for the part and place an order with the vendor, after which the part would become stocked inventory. There is also an opportunity for Halton Region to state the warranty period on work orders, for vehicle, subsystem and component warranty. This would help identify which parts are under warranty and then can be pursued by Stores for warranty claims. Municipality A follows this best practice and is currently working to further implement aftermarket warranty tracking at the subsystem and individual component level. Further notes on the benchmarking comparison are provided in Table 14.

Table 14 Benchmarking Stores Interaction with Fleet Services

Stores (Parts & Materials Supplies):	**Halton Region**	**Municipality A**	**Municipality B**	**Municipality C**
Open Stockroom or Counter Service	Open Stockroom	Counter Service (Part Clerks complete transactions)	Counter Service (Part Clerks complete transactions)	Counter Service (will pickup/deliver parts to other facilities when necessary)
Est. number of stock keeping units (SKUs) handled for the fleet	1,222	**N/A**	8,000	**N/A**
Est. Value of Inventory on Hand ($)	$315,330	$555,600	$1.3 million	**N/A**
Est. Annual Fleet Part Expenditure ($)[15]	$453,555 (2018)	$1.8 million	**N/A**	**N/A**
Est. Annual Inventory Shrinkage ($)	7%	$2,700 (0.15%)	0.01%	**N/A**
Preventative Maintenance Part Kits (Yes/No)	No	No	No	PM kits are done mainly for remote shops (Airport/Waste) as supporting these services is done with mobile staff.
Warranty Tracking Process	Informal, initiated by mechanics	Warranty period stated on work orders. Desire to implement more aftermarket part warranty tracking.	Warranty period stated on work orders. Mechanic will report to Foreperson, depending on warranty work it may be sent to vendor.	Current CMMS does not setup and track warranty. Fleet Management does analysis and claims based on vehicle/parts warranty information available, plus work order history reviews.
Approach to Managing Part Obsolescence	Informal	Reconciled Monthly	Informally managed as vehicles approach retirement, min/max reorder points are adjusted to eliminate re-orders.	Fleet Management and staff will jointly establish with Stores management the levels required to meet the demands. Secondly, as new fleet assets come into the fleet and old assets retire, Fleet staff work with Stores staff to make the appropriate adjustments.
Fleet Fuel Management	**Fleet Services:** responsible for data system and collection (fuel usage monitoring). **Stores***:* responsible for ordering fuel and capital costs of infrastructure. **Facilities:** responsible for equipment maintenance.	**Fleet Services:** manages, owns and maintains the infrastructure and is responsible for ordering bulk fuel.	**Fleet Services:** manages, owns and maintains the infrastructure and is responsible for ordering bulk fuel. The one exception is one off-site CNG fuel station managed by an external vendor.	**Facilities:** manages the infrastructure (i.e. tanks, pumps, etc.) **Stores:** manages the fuel inventory and software system

[15] Annual Fleet Part Expenditure does not account for contracted work and the value of parts used under maintenance service contracts.

8 COST RECOVERY MODELS

8.1 CURRENT METHODOLOGY

The current cost recovery model used by Fleet Services is based on the premise of a total cost recoverable budget. In this methodology, all overhead costs (i.e. building costs, staff wages, equipment, supplies, etc.) are aimed to be recovered through an hourly rate charged for all fleet maintenance. The hourly rate is determined as the annual budgeted expenses divided by the anticipated available labour hours for the staff of eleven (11) fleet mechanics.

The available labour hours are estimated as the annual base hours available per mechanic staff (1,950 hours for 7:30am to 4pm weekly day shift 40 hour work week) less statutory holidays, sick days, vacation, shop clean-up time, meetings, Workplace Safety & Insurance Board (WSIB) lost time and other non-productive time. This calculation typically results in an estimate of 1,500 to 1,650 billable hours per mechanic.

In 2018, there was a change in the organizational structure for Halton Region, as Stores which previously reported to Fleet Services resulted in the Fleet Manager's salary being split between Stores and Fleet Services. Regional Stores is now structured under Finance, thereby creating the need for the additional cost of the Fleet Manager's salary to be absorbed into the cost recovery model of Fleet Services in the hourly charge back rate.

This hourly charge back rate, currently set at $115.51 per hour (2019), is held constant throughout the budgeted year. Furthermore, this hourly rate is consistent for all user groups (i.e. Public Works, Police Services and Paramedic Services) despite Fleet Services delivering vehicle procurement and capital budgeting services to Public Works while for Police and Paramedics this work is carried out by the user group themselves. Note there is no separate rate based on the type of work provided by Fleet Services (i.e. no specific rate for fleet technical advisory with procurement, vehicle specification development, root cause analysis, or preparing capital budgets).

For vehicle rental rates an annual rate is set based on the budgeted vehicle costs (i.e. parts, tires, fuel, washing, licenses and permits, etc.) divided by the number of vehicles in the fleet according to MBN classification (i.e. light duty municipal vehicles, class 227).

8.2 PUBLIC WORKS ACTIVITY BASED COSTING

Through the series of stakeholder engagement meetings with the Region the cost recovery model of the Region's Public Works department was raised as a point of interest and for the potential to implement a similar approach for Fleet Services.

Public Works offers road, water and wastewater infrastructure repair, and maintenance services amongst other work to the Region. Until 2015, the Public Works department had operated under a budgetary cost recovery model, similar to the current model used by Fleet Services of applying a charge back rate and budgeting labour hours to capital projects. After 2015, Public Works made the change to an "Activity Based Costing" approach. This method achieves full cost recovery billing on a monthly basis for actual incurred costs allocated to capital projects.

This approach has been very successful for the Public Works department, ensuring full cost recovery and eliminating discrepancies in budgeted versus actual hours. Furthermore, Compass by ADP is utilized by Public Works to track labour hours against capital projects and other tasks. This system can be particularly useful for managerial staff to track time taken by tasks (i.e. procurement advisory, capital planning, administrative meetings, etc.), as there is often a large variety in daily work.

8.3 BUDGETARY REVIEW

8.3.1 HISTORICAL PERFORMANCE

Halton Region's annual 2019 budget for Fleet Services is approximately $4.2 million which includes overhead cost as well as maintenance and repair expense for vehicles.

The largest component of the budget pertains to interdepartmental charges while labour resources, salaries and wages are $1.1 million. Labour is a variable expense and can be highly impactful to the breakeven potential of cost recovery because the cost recovery methodology is also tied to an hourly labour rate.

Fringe benefits are another notable cost which includes employer contributions to the Canadian Pension Plan, Workplace Safety and Insurance Board (WSIB) premiums, dental and health care plans, as well as travel and life insurance. This has been a relatively stable part of the budget, close to $300,000 annually.

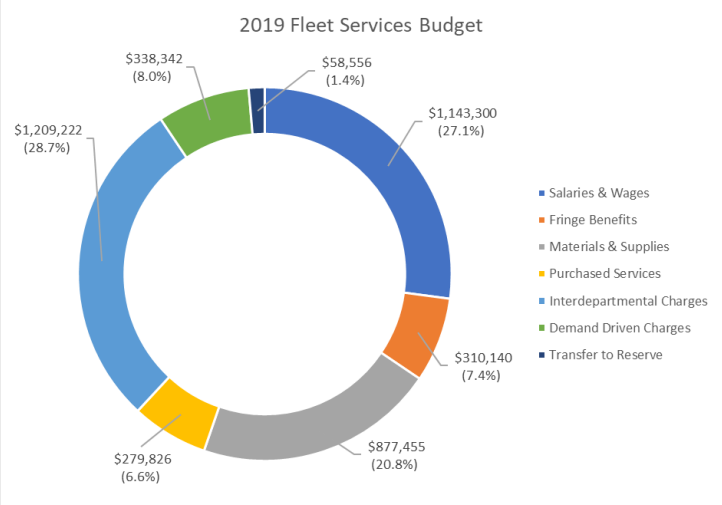


Figure 11 Fleet Services Budget 2019

Note that purchase services in this budget does not cover external service contracts for fleet maintenance. Purchased services in Figure 11 covers budget for inspections of on-site equipment (i.e. hoists and fuel system)[16] and other administrative services.

The following discussion focuses on how labour resources and associated costs have historically impacted the potential for Fleet Services to breakeven on their cost recovery. Shown in Figure 12 is the historical performance of the Fleet Shop cost centre. In 2014 Fleet Services achieved a budget surplus of $20,000, while since this time there has been a large shortfall in cost recovery ranging from $300,000 to as high as $580,000 each year. Note that for 2019 this is year-to-date (YTD) as of October 2019 when the data was provided.

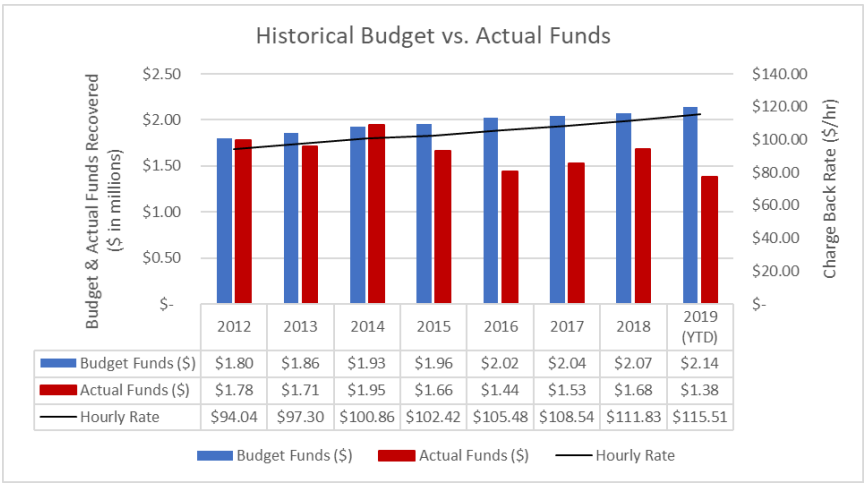


Figure 12 Historical Budget Performance & Charge Back Rate Trends

The recent performance trend of budgetary shortfalls from 2015 onwards can be tied back to billable hours. With only a modest increase in the cost recovery rate (i.e. 3% per year on average) the other factor is the amount of time billed by mechanics. An annual shortfall in actual billable hours ranges from a deficit of almost 3,000 hours in 2015 to a deficit of 5,500 hours in 2016. Post 2014, the annual deficit in billable labour time is

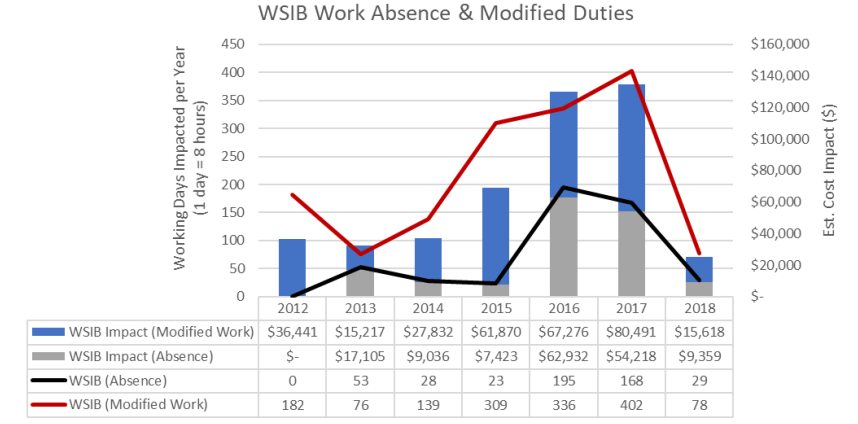
[16] Email, Halton Region – November 25, 2019

around 4,500 hours per year. This deficit can be traced back to operational efficiencies and mechanics taking on non-billable duties mentioned throughout this report. Section 3.2 gives an overview on the percentage of a mechanic's day spent on non-billable work (i.e. work order administration, shuttling vehicles and part ordering).

Other notes are from 2012 to 2014 Fleet Services has one additional Fleet Coordinator staff, in 2014 one additional mechanic was employed and mechanic overtime has trended notably lower since 2015, refer to Section 3.2.

8.3.2 WSIB IMPACT

Another impact to Fleet Services budget is work place injury, resulting in WSIB claims, lost time and/or modified work duties which consist of office work only or redeployment to another Regional business unit. This impact in some cases results in the need to backfill positions. The need to backfill a mechanic has happened once since 2013. The historical impact of workplace related injury is shown in Figure 13.



	2012	2013	2014	2015	2016	2017	2018
WSIB Impact (Modified Work)	$36,441	$15,217	$27,832	$61,870	$67,276	$80,491	$15,618
WSIB Impact (Absence)	$-	$17,105	$9,036	$7,423	$62,932	$54,218	$9,359
WSIB (Absence)	0	53	28	23	195	168	29
WSIB (Modified Work)	182	76	139	309	336	402	78

Figure 13 WSIB Work Absence & Modified Duty

In 2017, there were 402 days of modified work duty assigned to mechanics and 168 days of work absence due to workplace injury, while in 2016 modified work duty totaled 336 days and work absence was 195 days. The cost recovery deficit in these two years are the highest in recent years with a shortfall of $520,000 in 2017 and $580,000 in 2016, thereby presenting a strong correlation between WSIB incidents and cost recovery.

Fleet Services should make a strong effort to understand the root cause of WSIB impacted work and how to mitigate these workplace injuries. Any amount of lost time or modified duty can be highly impactful to budget performance as it incurs additional costs related to training and backfilling staff, as well as the lost efficiency.

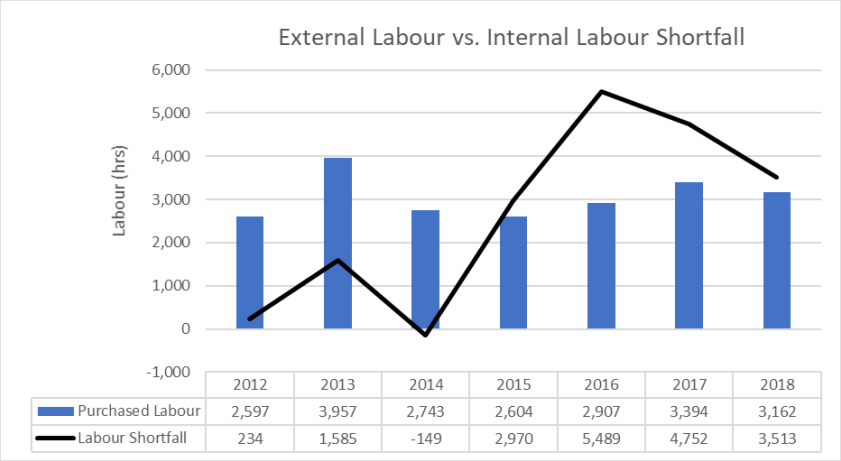
Peer municipalities have introduced training programs, mandatory use of personal protective equipment (PPE), and locked access shop areas in order to mitigate the number of workplace injuries. In the case of Municipality A, this resulted in a training program, increased signage, and mandatory hearing protection zones to combat leading causes of workplace injury.

8.3.3 SALARIES, WAGES & SERVICE CONTRACTS

The largest budgetary expense, salaries and wages, has remained relatively consistent over the years. Notable takeaways are that the salary of the Fleet Manager is now partially included in the Fleet Services budget. As well, although the number of mechanics and Fleet Services expense for mechanic wages has remained stable, the number of billable hours has decreased since 2014, thus impacting cost recovery.

One potential avenue to improve the cost recovery model is to analyze which job functions currently carried out by mechanics can be assigned to lower wage group staff not requiring a 310T or 310S license (i.e. tire and oil changes). This would consequently improve the cost recovery margin and enable mechanics to focus on core fleet maintenance and repair activities which can improve wrench time utilization.

Fleet Services employs several service contracts to help manage peak workload and cover specialized repair work. The department has historically spent between $200,000 to $610,000 annually on service contracts, inclusive of parts and labour. However, the use of these service contracts also impacts cost recovery as they are an additional budgetary expense and essentially purchase labour resources externally rather than assign work to mechanics in-house. There are from 2,600 to almost 4,000 hours in equivalent labour hours purchased through service contracts[17]. Figure 14 shows the comparison of external labour purchased through service contracts against the internal shortfall of billable labour hours.



	2012	2013	2014	2015	2016	2017	2018
Purchased Labour	2,597	3,957	2,743	2,604	2,907	3,394	3,162
Labour Shortfall	234	1,585	-149	2,970	5,489	4,752	3,513

Figure 14 External Purchased Labour vs. Internal Labour Shortfall

As the annual shortfall in billable labour time has ranged between 3,000 to 5,500 hours from 2015 to 2018, bringing a large portion of this contracted work back in-house would improve the budget cost recovery closer to breakeven. To accomplish this, non-billable duties currently taken on by mechanics would need to be assigned to other staff. Note that not all contracted work can be brought back in-house, such as specialized vehicle repairs.

Furthermore, the charge back rate has on average increased about 3% per year and is not indexed to the fleet size. Since 2014, the fleet has grown from 656 to 718 vehicles, posting an increase of 9.5%. Over this time the number of fleet mechanics has remained fixed at 11 FTEs.

The growth of the fleet should be considered in the cost recovery model because an increase of fleet size without a corresponding increase of in-house mechanics can make it more difficult to manage work load. As a result, external service contracts tend to be used which consequently detract from a cost recovery model that is indexed to in-house labour time billed.

In conclusion, Fleet Services should look at moving away from an hourly cost recovery charge back rate due to the following considerations:

1. Reduce the risk of labour impacts to cost recovery (i.e. WSIB work absence and modified duties). This detracts from the amount of efficient labour hours available to do billable work which in turn affects the cost recovery as it is tied to a per hour rate.
2. Enable the cost recovery model to capitalize on work efficiencies. If the same amount of work can be completed in less time this should be realized as a benefit to Fleet Services and not a gap in cost recovery.
3. A cost recovery model based on in-house labour time billed is not indexed to growth in the fleet size. Approaching cost recovery on a per vehicle basis may be more appropriate to capture this growth.

In the next section, viable alternative cost recovery models are presented which can be trialed by Fleet Services in order to improve the cost recovery methodology and move toward breakeven cost recovery results.

[17] Estimated 50% parts and 50% labour, Halton Region Fleet Services – Email November 26, 2019, External Shop Rate $77/hr used to decompose Service Contract into purchased labour hours

8.4 COST RECOVERY SCENARIOS

There are several avenues to perform fleet maintenance that Fleet Services can take depending on the urgency of repair, scope of work, and availability of in-house mechanics. Each impacts the ability of cost recovery for Fleet Services. The process map of how this work flow is assigned is shown in Figure 15. As Fleet Services has a fixed charge back rate of $115.51 per hour regardless of the type of work, the most cost-effective avenue is for fleet maintenance to be completed within regular work hours.

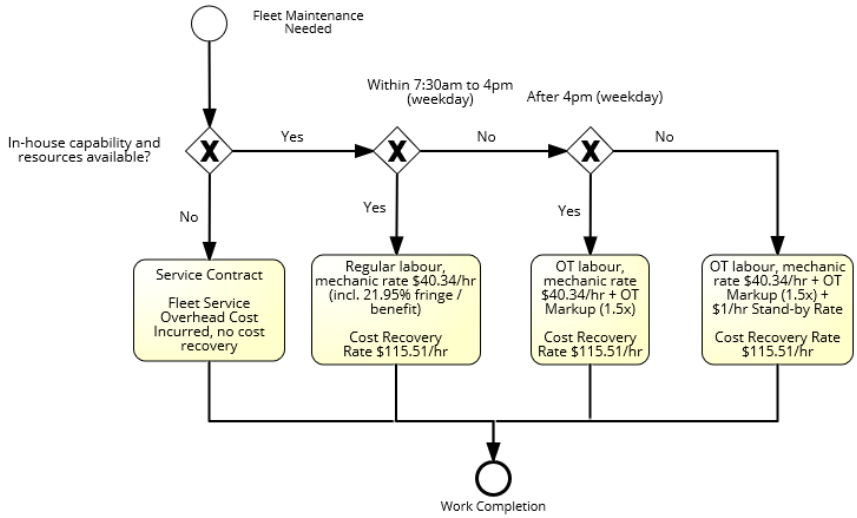


Figure 15 Process Flow of Fleet Maintenance Delivery Options & Revenue Impact

Overtime maintenance work and emergency maintenance are both less cost-effective in cost recovery as there is an additional cost to pay mechanics the 1.5x overtime rate and the $1 per hour stand-by rate. This erodes the cost recovery margin.

The use of external service contracts offers no cost recovery because Fleet Services still incurs overhead cost and the external service provider receives the benefit of the cost recovery margin.

The current methodology of having Fleet Services cost recovery tied to an hourly shop rate is also disadvantageous because there is no benefit of capitalizing on the efficiency of mechanics. For example, if a maintenance scope of work can be completed in less time (i.e. brake replacement done in 2 hours compared to a standard time of 3 hours), there is no benefit received for this efficiency as the cost billed to the user group is still indexed to an hourly rate. The next section explores the viablility of different options to improve the cost recovery methodology of Fleet Services as well as efficiency improvements.

8.4.1 MODELING COST RECOVERY SCENARIOS

As discussed in Section 8.4 the least favourable approach in terms of cost recovery with the current hourly rate structure is the use of external fleet maintenance service contracts. There is an opportunity to bring a majority of contracted service labour back in-house to increase billable labour time and aid cost recovery under the current model. This section illustrates the performance of three scenarios over a term of 5 years:

1. **Business-as-Usual (BAU):** forecasting how the current cost recovery model, shortfall of billable hours, and budget deficit will continue. The number of mechanics has remained constant over the past 5 years at 11.0 FTEs while the fleet size has grown. This growth is expected to proportionally increase the non-billable duties taken on by mechanics. Furthermore, the use of external labour through service contracts is expected to continue to grow to cover fleet maintenance needs.
2. **Bring Contracted Service In-house:** bring contracted services (75%) back in-house and increase the mechanic staff count. Specialized repairs would still need to be completed externally.
3. **Single Service Contract Provider:** assign existing contracted services (100%) to a single fleet maintenance service provider who would staff mechanics on contract at one of the Region's facilities.

The performance of each scenario comparing the use of external service contracts against the alternative of in-house fleet maintenance is shown in Figure 16. All scenarios still demonstrate a cost recovery shortfall. However, the option showing the greatest benefit is to bring existing contracted service back in-house and increase the staff count

of mechanics. The model estimates that bringing contracted services back in-house is expected to reduce the annual deficit to between $200,000 to $250,000 annually.

The next approach is to consider implementation of additional cost saving and efficiency improvement recommendations which are summarized in Table 15. The recommendations which have been applied are denoted, in order to show the revised cost recovery output in Figure 17.

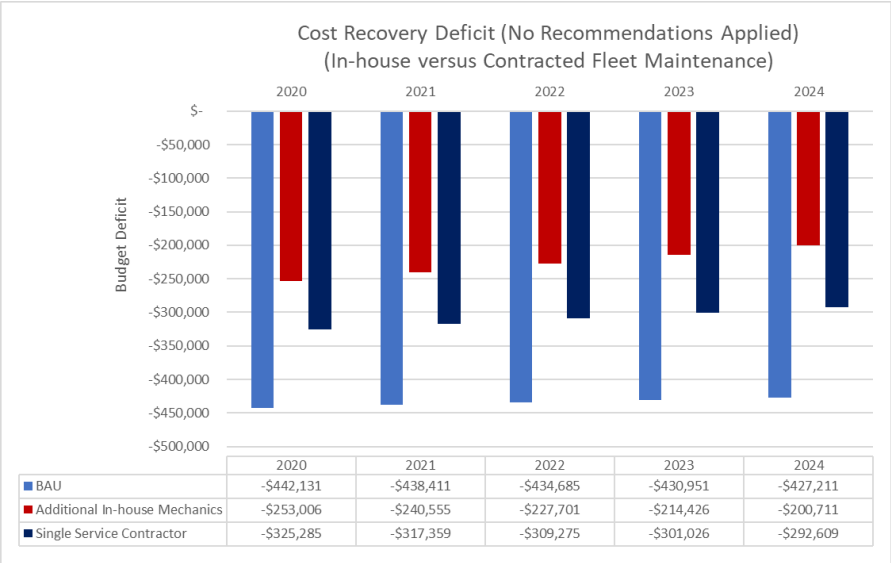


Figure 16 Cost Recovery Scenarios Forecasted Budget Deficits

The CMMS upgrade would need to be explored further. While the impact of an improved system is estimated (i.e. reduction of administrative data entry and transference between paper copies), and a high-level quote of an improved system is used to present the business case for this recommendation, Halton Region would still need to engage with market providers to understand implementation, integration and customization needs. Due to uncertainty in the cost savings estimate it is omitted from this analysis.

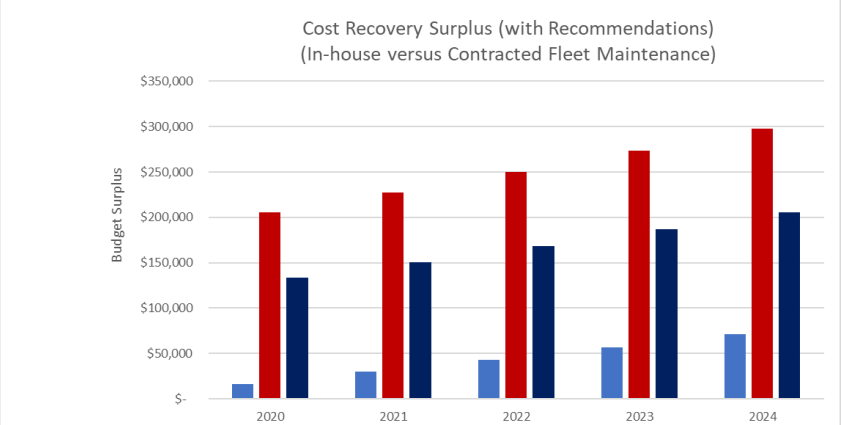
Table 15 Cost Savings, Efficiency & Recovery Improvements

No.	Opportunity	Cost Recovery, Cost Saving Impact
Cost Savings Applied		
1.0	Tire / Oil Change / Wipers / Fluids Work	$28,000
2.0	Shuttling Vehicles / Parts Runner	$21,300
3.0	Mechanics with Union Rep Duties	$31,200
4.0	Part Kits	$5,240 to $27,250
5.0	Mechanic Part Picking	$52,000 to $105,000
6.0	Non-Inventory Part Ordering	$123,500 to $247,500
Cost Recovery Improvements Applied		
1.0	Charging for “Freebie” Repairs	$23,000
2.0	Allocation of Police In-house Minor Repairs	$65,300

Implementing all recommendations in 2020 is expected to generate a cost recovery surplus of just over $16,000 for the BAU scenario with further cost recovery improvements under the alternative scenarios. The results presented in Figure 17 use the median of the range of potential cost recovery improvement.

Bringing contracted services back in-house is estimated to show the greatest benefit to the Fleet Services budget, by contributing the most to the goal of budget neutrality.

The largest impact is from the recommendation for Stores to assume sole responsibility for ordering non-inventory parts which would thereby free up mechanics for wrench time duties and aid cost recovery. Fleet Services would have to coordinate with internal stakeholders, primarily the Stores department on enacting a set of these recommendations (i.e. Mechanic Part Picking, Part Kits and Non-Inventory Part Ordering).



	2020	2021	2022	2023	2024
BAU	$16,344	$29,692	$43,248	$57,018	$71,006
Additional In-house Mechanics	$205,469	$227,547	$250,232	$273,544	$297,506
Single Service Contractor	$133,190	$150,744	$168,658	$186,943	$205,608

Figure 17 Cost Recovery Scenarios with Additional Recommendations Applied

8.5 ALTERNATIVE MODELS

8.5.1 VEHICLE LIFECYCLE APPROACH

Halton Region can look to change their cost recovery model and move from an hourly shop charge back rate to a monthly vehicle rental rate encompassing the lifecycle costs of each vehicle type. A similar approach is currently used by Fleet Services on a subset of vehicles/equipment using 3 years of historical SAP work order data to determine the annual cost of different vehicle/equipment classes and assign rental rates proportionally based on the total number of that class in the fleet. However, the lifecycle approach takes a more comprehensive perspective with use of historical data. The following components contribute to the total cost of ownership (TCO):

1. **Procurement:** Capital expenditures for fleet vehicles. Commissioning costs are also included. Based on the most recent procurement and commissioning records of similar vehicles.
2. **Operation & Maintenance:** Cost of parts, labour, consumables (i.e. bulk fluids, batteries, etc.). Fuel cost and vehicle insurance.
3. **GHG Emissions:** Cost of GHG emissions based on Federal carbon pricing scheme applied per tonne.
4. **Rehabilitation & Overhaul:** Not applicable (no fleet overhaul program).
5. **Disposal:** Salvage value of vehicles.

These costs are used along with the vehicle lifecycle and an estimate of average annual vehicle utilization to build up the total cost of ownership (TCO) which is then converted back to an equivalent annual cost (EAC) based on the lifecycle of the vehicle. In the case where Fleet Services does not provide a particular service to a user group (i.e. vehicle commissioning) this cost can be deducted from the total lifecycle cost and reimbursed to the user group.

Variable lifecycle costs such as maintenance and fuel would need to be validated through the use of this cost recovery model. Forecasting lifecycle costs based on the average vehicle utilization for a particular class (i.e. class 214 Police Cars) assumes that, although some vehicles will be over utilized and some under utilized, on average the cost recovery will breakeven because the total average utilization will converge to the lifecycle model assumption.

The following sections detail the lifecycle costs of three of Halton Region's most populous fleet vehicle types, light-duty pickup trucks (class 227, 228), police cruisers (class 214) and ambulances (class 209). These models also factor in the lifecycle cost of vehicle emissions at $40 per tonne based on the Federal pricing scheme. Table 16 shows the breakdown of how the total lifecycle cost and equivalent annual cost (EAC) for each vehicle type can be decomposed into a monthly charge back vehicle rate.

Table 16 Vehicle Lifecycle Charge Back Summary

	Model Input/Assumption		
Parameter	**Pickup Truck (class 227, 228)**	**Police Cruiser (class 214)**	**Ambulance (class 209)**
Lifecycle (years)	7	5	5
Est. Total Cost of Ownership (TCO) ($)	76,991	82,564	248,300
Number of Fleet Vehicles	80	185	44
Option 1 – All Inclusive of Capital, Fuel, Maintenance & Other Costs			
1. Equivalent Annual Cost (EAC) ($)	11,000	16,513	49,660
1. Monthly Charge Back ($/vehicle)	917	1,376	4,138
1. Total Charge Back ($/year)	0.73 million	3.05 million	2.18 million
Alternative Charge (Option 2 – Less Capital Cost)			
2. EAC (less capital) ($)	4,496	7,826	16,312
2. Total Charge Back (less capital) ($)	0.36 million	1.45 million	0.72 million
Alternative Charge (Option 3 – Less Capital Cost & Fuel)			
3. EAC (less capital + fuel) ($)	1,637	2,430	1,783
3. Total Charge Back (less capital + fuel) ($)	0.13 million	0.45 million	0.08 million

To fully assess the impact of this recommendation a pilot of the methodology would need to be launched (i.e. two or three vehicle types) in order to validate the use of historical data and lifecycle modeling assumptions against the cost recovery from charging a monthly vehicle rental rate. A contingency factor (i.e. 10%) could also be factored into the vehicle cost recovery rates to help account for this variability.

Furthermore, Fleet Services would need to assume full responsibility for fleet fueling (including purchasing fuel) in order to implement this model. Any surplus of cost recovery can also be assigned into a capital reserve fund to finance replacement of shop equipment (i.e. hoists).

8.5.2 ACTIVITY BASED COSTING

Another option to changing the cost recovery model of Fleet Services is the activity based accounting (ABC) model adopted by Public Works. This methodology, described in Section 8.2, can achieve full cost recovery. Halton Region has already demonstrated success using this methodology for Public Works and would have experienced staff available in-house to aid the transition of Fleet Services to also use this model.

Note that this cost recovery model does not result in any organizational savings. However, charges are properly allocated to users thereby resulting in 100% cost recovery for Halton Region Fleet Services, as invoices would be issued monthly to user groups.

There is potential for Fleet Services to consider launching a one-year pilot of Activity Based Costing and the Compass job system. The currently fixed charge back rate can be tracked and segmented by user group (i.e. parts, materials, labour cost for Police Services, Paramedic Services and Public Works) and by service (i.e. vehicle maintenance, capital planning, procurement advisory).

8.6 RECOMMENDATIONS

The best option with the current cost recovery model is for Fleet Services to consider bringing externally contracted fleet maintenance back in-house (~75%) and increase the staff count of mechanics. Several other cost savings and efficiency improvement recommendations have been made which are capable of bringing the BAU cost recovery model to a breakeven result. Cooperation with the Stores department is essential to enacting these recommendations, which includes Stores offering a counter service, part kitting and non-inventory part ordering.

Table 17 compares the pros and cons of the cost recovery models discussed in this report. WSP's recommendation is for Halton Region to pilot the Activity Based Costing approach based on the success demonstrated with the Region's Public Works department and the use of this model with other peer municipalities. This approach follows a clear methodology assigning costs and would allow the Region to focus on other holistic cost saving opportunities.

Table 17 Summary Cost Recovery Models

No.	Cost Recovery Model	Advantage(s)	Disadvantage(s)
1.0	Fleet Maintenance Shop Charge Back Rate (currently used by Halton Region, reference Section 8.1)	Historical use by peers has demonstrated ability to achieve breakeven budget recovery.	Indexed to an hourly rate which does not allow efficiencies in fleet maintenance to be rewarded. Risk to cost recovery if there is a shortage of available labour hours.
2.0	ABC Model (reference Section 8.2)	Full cost recovery is achieved.	Increased administrative costs for finance to track and invoice expenses to user groups.
3.0	Lifecycle Vehicle Rental Rates (reference Section 8.5.1)	Efficiencies in fleet maintenance and reduced lifecycle costs are rewarded in cost recovery structure.	Reliance on historical data quality for calculating vehicle lifecycle costs. Assumption that variable lifecycle costs (i.e. fuel and maintenance) will converge to the calculated average cost.

9 GREEN FLEET OPPORTUNITIES

9.1 PRIOR GREEN VEHICLE EXPERIENCE

Through the feedback received in conducting stakeholder workshops with Halton Region the commentary has been that the organization is fairly risk adverse towards the adoption of new technology. However, they are open to small scale testing and piloting green vehicles[18]. The Region has demonstrated interest in pursuing green technology and a move to reducing GHG emissions with prior experience including pursuit of a quote and installation of an EV charging station in the parking area of the Regional headquarters and testing of anti-idling technology on two Public Works vehicles.

Stakeholders recognize a need to shift towards more sustainable vehicles and are keen to learn of the various options in the market place which could serve their fleet demands. Common feedback from the stakeholder workshop revolved around interest in establishing a rotational or pool vehicle program to pilot new green fleet vehicles such as natural gas, battery electric, and/or hybrid vehicles. This vehicle pool would cover commonly used administrative and support type vehicles which can be shared by multiple user groups. There is also interest from the Region to have this vehicle pool available to help cover the expensed mileage from employees using personal vehicles.

Police and Paramedics operate as critical services and have expressed restraint on the adoption of alternative propulsion vehicles for police cruisers and ambulances. The preference is vehicle simplicity for ensuring reliability of fleet operations. However, for non-critical support vehicles in their respective fleets, such as logistical and administrative vehicles, the Region would be open to the consideration of alternative propulsion options. Table 18 highlights user group sentiment and concerns towards green fleet technology.

Table 18 User Group Sentiment & Comments on Green Fleet Adoption

User Group	General Comments / Green Fleet Sentiment
Paramedics (HRPS-A)	• Concerned about reliability, performance and range anxiety of transitioning to alternative propulsion types for front-line vehicles in the short-term (i.e. ambulances, cars and SUVs). • Auxiliary system load required for powering medical equipment on-board ambulances would be a concern at this time for battery electric vehicles. • Have been engaged with Oxford County to learn more about their pilot of gasoline-hybrid ambulances. • Open to consideration of various alternative propulsion types for administrative and support fleet vehicles (i.e. non-service critical). • Overall, the need to reduce fleet GHG emissions is clear, moving away from fossil fuels. There is a desire to stay informed of new vehicles and technologies coming available in the market.
Police (HRPS)	• Aiming to introduce hybrid police vehicles in 2020/2021. • Concerned about reliability, performance and range anxiety of transitioning to alternative propulsion types for front-line vehicles in the short-term (i.e. police cruisers and patrol cars). • Currently a limited, niche market for alternative propulsion police vehicles.

[18] Note that the elimination of the Cap and Trade program in Ontario with passed legislation in October 2018 has also impacted Halton Region's move toward greener vehicles. Purchases of electric and hybrid vehicles which were previously subsidised through a Provincial rebate program as an incentive for fleets to cut GHG emissions is no longer in place.

User Group	General Comments / Green Fleet Sentiment
Public Works	• Frequent off-site location of vehicles would pose a challenge for battery electric vehicle charging as well as refueling with CNG. • On-site usage of vehicles as a mobile office space (i.e. running auxiliary heating/air conditioning and other equipment) would compromise the range of battery electric vehicles. • Open to consideration of various alternative propulsion types for non-service critical vehicles. • Overall, the need to reduce fleet GHG emissions is clear, moving away from fossil fuels. There is a desire to stay informed of new vehicles and technologies coming available in the market. • Would like to know more about the emerging market for heavy-duty battery electric vehicles (i.e. trucks and vans).

9.2 TRIPLE BOTTOM LINE ASSESSMENT

In 2016, Fleet Services constructed a simple business case on expensed mileage reimbursements paid out to staff. The annual expense was $833,345 for around 1.7 million kilometres reimbursed at $0.47/km. This section highlights a cost benefit analysis (CBA) of a pilot green vehicle program considering battery electric and natural gas vehicles in comparison to standard gasoline vehicles used in the fleet. Vehicle capital and operating costs are considered as well as infrastructure capital (i.e. charging/fueling stations).

Note: Estimating the requirements and costs associated with upgrading Regional facilities to host CNG vehicles is outside the scope of this study. For the pilot it is assumed any CNG vehicles will be parked and refueled outdoors.

For model inputs, vehicle OEM data was used for the capital purchase cost and fuel/energy efficiencies. Historical fleet maintenance data from Halton Region's fleet was used to develop the baseline maintenance cost profiles ($/km) for each vehicle type, while CNG and BEV cost profiles were estimated based on maintenance cost saving factors applied to the baseline profiles. Data was used from Natural Resources Canada for GHG emission factors as well as vehicle fuel economies.

The cost effectiveness of the electric vehicle pilot can be further enabled through pursuit of the various grants and funding opportunities. Table 19 lists how these grants can be applied to cover vehicle and infrastructure costs.

Table 19 Grant/Funding Applied to TBL Model

Grant/Funding	TBL Impact (2019$)
FCM Grant for Pilot Project Funding	50% of eligible costs up to **$175,000**
Transport Canada Vehicle Incentives	**$5,000 per battery electric**, fuel cell or long-range hybrid vehicle
NRCan Funding	**50%** of total project costs up to $50,000 per charging/fuel station
Enbridge CNG Program	Covers incremental cost of vehicles, training, tooling and infrastructure modifications

The triple bottom line results of the vehicle pilot program with these grants and funding applied is shown in Figure 18. Using the grants and funding in Table 19, the capital cost of the battery electric scenario is substantially lower, estimated at around $635,000. The pilot cost for CNG fleet is also reduced with Enbridge covering the incremental capital cost of CNG vehicles, training, tooling and infrastructure. Therefore, the total estimated cost for either of these pilot options is lower than the $1.17 million for the expensed fleet mileage equivalent.

Note: The results of this CBA will not scale directly with further adoption of vehicles as consideration would need to be made on facility and infrastructure upgrades to accommodate the scale of alternative propulsion vehicles in the fleet. For example, ventilation, roof design and gas detection systems would need to be considered for hosting CNG vehicles indoor. As well, with the installation of a large number of charging stations on-site, power demand

requirements, energy storage, and transformer upgrades would need to be considered. This type of facility and infrastructure assessment is outside the scope of this study.

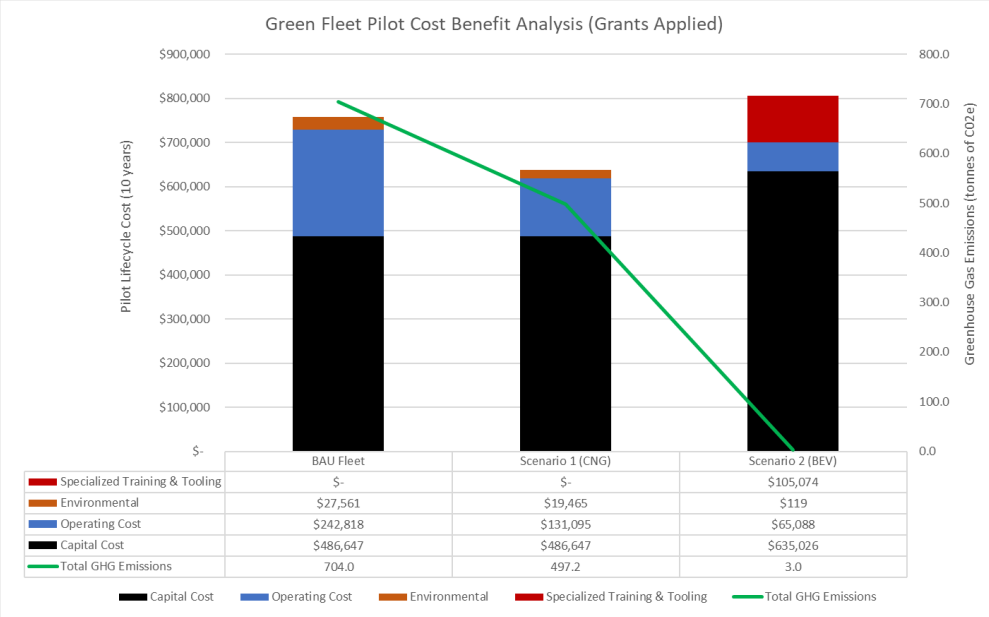


Figure 18 Green Fleet Pilot Program - Cost Benefit Analysis (Grants Applied)

By leveraging available grant funding and the Enbridge CNG program, the CBA results show that the CNG pilot is the most cost-effective option for GHG reduction. An electric vehicle pilot is also cost effective, with grants applied, reducing GHG emissions at a cost of $68.88 per tonne.

9.3 GREEN FLEET CONCLUSIONS

Comparing results of the CBA for the green vehicle pilot to an annual mileage expense equivalent to $120,000 (240,000 km, 30,000 km per vehicle at $0.50 per km), the EAC for the CNG pilot would cost approximately $63,700 and the BEV pilot would cost about $80,500. This would result in savings of $56,300 and $39,500 respectively for the CNG and BEV alternatives. These findings are summarized in Table 20 with grant and funding opportunities applied. Note the negative cost of GHG reduction for CNG indicates cost savings and lower emissions.

Table 20 CBA Summary of Green Vehicle Pilot

Option	EAC	Cost Saving Potential per year	GHG Reduction (tonnes per year)	GHG Reduction Cost ($ per tonne)
Expensed Mileage Equivalent	$ 120,000	N/A	N/A	N/A
CNG Vehicle Pilot	$ 63,700	$ 56,300	20.6	- $ 579.40
BEV Pilot	$ 80,500	$ 39,500	70.1	$ 68.88

Furthermore, an in-depth feasibility study and pilot project can focus on specific aspects of fleet management to isolate areas of improvement. For example, the pilot project funding would not only enable Halton Region to develop proof-of-concept, but also test the vehicle lifecycle approach. A green pilot project or in-depth feasibility study focusing on developing a vehicle lifecycle approach can assist with identifying how the Region can realize cost savings over a period of time.

A pilot roadmap and set of recommended key performance indicators have been provided to Halton Region which can facilitate the implementation of the pilot program. In addition, market scans of viable vehicle alternatives have also been shared. Halton Region should continue to engage their fleet user groups to discuss this opportunity while looking at grant and funding opportunities.