



FIRE SERVICES MEMO

MEMO

DATE: December 17, 2024

SUBJECT: Wilmot Fire Department Fire Apparatus Design Standards

RECOMMENDATION:

THAT THE FIRE DEPARTMENT MEMO be received for information as part of the 2025 budget process.

SUMMARY:

During the special council meeting on Monday December 9, 2024, Council requested additional information regarding fire apparatus purchases by Wilmot Fire Department. This report outlines steps taken, efficiencies, design standards, best practices, and regulations.

BACKGROUND:

On March 4, 2024, council approved the 2024 Township budget which included two (2) fire apparatus, a mid sized rescue for Station 2, and tanker for Station 1 Baden. Since the Covid Pandemic ended, fire apparatus costs have escalated exponentially, timelines continue to impact fire apparatus deliveries. For example, a pumper takes two (2) years from date of order, a tanker will take two (2) years, and an aerial will take up to three (3) years. These timelines are contingent on the specific manufacturer, type of apparatus, availability of suitable stock-built apparatus, and other factors. There are considerable backlog of fire apparatus builds which attribute to the delays and has created issues with the used industry. Like the automobile industry, Covid created challenges for the new car production. This issue highly inflated the value of used cars and continues to challenge buyers today. In some cases, used cars started to approach new car values. Today, the auto industry is slowly catching up with new car deliveries, however, used vehicles continue to be priced proportionally higher and includes the same significant impacts to used fire apparatus.

Fire apparatus is not mass produced and a shorter list of available fire apparatus builders in comparison. They are extremely complex and require significant time and expertise to build. It requires considerable time on staff, working with industry, EVT's, NFPA, CSA, ULC standards,

and speaking with other departments to arrive at a final design specification that is RFP ready. The backlog will require several years to correct itself. In the meantime, this has also created issues with the used fire apparatus industry. Fire departments are holding onto apparatus longer than anticipated due to the backlog. Good quality used apparatus is bidding to unprecedented dollar values. This issue makes it difficult to justify purchasing a 10- to 15-year-old apparatus that may go for 50%, 60%, or even 70% of the value of new. Purchasing used will include some risks and will be covered in the body of the report.

REPORT:

Purpose built versus conventional:

For years, a fire truck chassis was just a method of getting the fire equipment from the fire station to the incident. Today, with many lessons learned the cab and chassis portion of the fire truck has evolved to where they have become a critical item from the past practice of a simple cab, body, and pump. Although a purpose-built chassis is more expensive than a commercial chassis, there are some significant advantages in choosing a purpose-built chassis over commercial. This narrative does not cover every element of the debate between the two choices, rather, we provide the most obvious discussion points. Moreover, we outline the importance of safety, cost of ownership, long term investment, and the realistic needs for firefighters to work from a well-made, safe apparatus to deliver the required services to the community.

Rather than adapting a commercial chassis to meet the special needs of a fire truck, a purpose-built chassis is designed and built specifically for the fire service needs. A fire truck chassis is used and has some very different demands than a commercial chassis. Commercial chassis have continued to modernize as well with smart cab designs. However, these advancements close the financial gap between purpose built and conventional and still have a several design disadvantages over purpose-built chassis. The purpose of this narrative is to outline the many benefits of purpose built versus conventional as it compares to the fire service. It is not to say the commercial chassis choices are wrong or cannot be used in the fire service. It is to point out the many advantages of purpose built versus conventional chassis and why most, not all, fire departments in North America choose purpose-built chassis. It should be noted that many fire departments in Waterloo Region and surrounding areas have moved away from Commercial Chassis purchases to purpose-built chassis purchases to ensure enhanced safety to firefighters, longevity, cost of ownership, and appropriate uses are met.

A commercial chassis is designed and built to meet the general needs of many different vocations. Although there are many vocations conventional chassis can be used in, they are much the same in their use and design, a driver making pick up and deliveries during a normal workday. A fire chassis on the other hand has many unique demands and requirements. Also, a fire chassis not only has to meet the same Provincial and Federal Highway Safety Standards and regulations as a commercial chassis but also includes NFPA standards and others.

One of the biggest advantages of a purpose built over a commercial chassis is safety. Purpose built fire chassis have better visibility, turning radius, braking, meet more stringent crash worthy standards and have better centers of gravity than their commercial counterparts. Purpose built chassis are specifically designed for the fire service and no other vocations. Purpose built chassis bring several years of experience with design features which typically translate into a more reasonable cost of ownership experience over the life of the apparatus.

A commercial chassis is designed and built for a life span of between six to ten years on average, this could be stretched to 15 years in the fire service. The life expectancy of a commercial chassis is dependant on several factors such as, annual mileage, service cycles, driver behaviour, type of use, and more. This is not to say that a conventional chassis will not last longer, we are merely sharing the average in the industry. Fire Apparatus are typically low mileage and will not experience the demands of day-to-day deliveries, stop and go traffic, and the expected wear and tear of these requirements. These facts do require fire departments to look at conventional chassis options and compare them to other important factors. Depending on amount of use, fire department placement and maintenance, a purpose-built fire chassis is expected to have a useful life of 15 to 20 years or more. Purpose built fire chassis are designed with this longer use life in mind. This ties into the overall cost of ownership values and how the fire department factors these elements. As an example, a fire department at a very busy fire station may replace or move a purpose built fire apparatus every 10 years to surplus or to a less busy fire station. Conventional chassis would not suit the general needs of a department and would not stand up to the wear and tear of a busy fire station demands.

It is very important that we consider several factors when making the comparison. A fire truck chassis is never relaxed. Unlike normal use of a commercial chassis that gets loaded and unloaded many times a day, a fire truck chassis is always under load. This places incredible demands on the chassis which conventional chassis are not typically designed for. Important to note that there are several add on features available to conventional chassis builds. Firemax is one example of a chassis improvement that more suits the fire service, however, this does close the gap in the price discussion and would not meet the rigors of a purpose built-built platform.

A purpose-built fire chassis offers a greater safety factor for the user than a commercial chassis. Time is important in getting the firefighter ready to perform their duties once on scene. The ability to immediately don SCBA in the apparatus, once stopped and safe to do so saves time and ensures that the firefighter will be properly equipped with all their gear. Time is also a critical factor if the responders must quickly enter a dangerous area to make a rescue or rapid-fire attack. Doors are full height and swing fully open. A fully dressed firefighter with SCBA requires additional space to egress the apparatus.

Purpose built chassis are designed to give the user the room to store their gear and get suited inside the apparatus. Interior room is superior, seating can be configured for forward or rear facing, spaced for additional comfort or the installation of interior components, storage or work areas. Headroom is superior too, raised roof products afford enough head room to allow firefighters easier, unfettered maneuverability. Seat can house SCBA, which provides quick

access and eliminates the need for firefighters to exit the apparatus, access a compartment to don SCBA. This may require additional time when every second counts.

The electrical system of a fire chassis has a much greater demand than any other chassis on the road. Today we are seeing alternators in the 330-to-400-amp range. Most commercial chassis come with alternators in the 90-to-120-amp range and special options for larger alternators, but these are not in the base design and increase the build cost. The electrical system of a purpose built is designed for use with emergency lighting, audio warning and radio equipment. Builders hook into the panel in pre-designated points, they do not break into wiring with additional joints, splices, etc. Wiring to the body, light bars, pump module, etc. is by design so it makes for a much neater, trouble-free apparatus.

Purpose built chassis engines are certified for cooling during driving or pumping situations. Obviously almost any chassis cools well running down the road but are not designed to keep the engine cool when running full horsepower while stationary. Purpose built chassis are designed to run at full horsepower standing still and pumping, in all climates and weather conditions. Also, the cabs are insulated for heat and noise which is important both when responding to the scene and once on site. During all climate conditions the cab can be used for firefighter rehab when they need to warm up or cool down, depending on the season.

Maneuverability has always been an issue with any chassis. A purpose-built chassis allows the truck to be built on a shorter wheelbase. This boils down to the relationship of the wheelbase of the purpose built against a commercial chassis. Wheel placement of a purpose built allows the manufacture to offer a chassis that turns sharp, keep a much shorter wheelbase (in relationship to the cab/axle) and yet provide a much larger, more comfortable cab. This is especially important since fire apparatus are tasked with a variety of different roadways, driveways, and other unexpected obstructions.

The fire service is doing more EMS and rescue than ever before. This new demand on the fire service requires them to carry expensive medical equipment. This requires special compartments that must be locked and kept in a clean environment. This may require the compartments to be in the cab rather than the body. This now makes the interior room of the cab more important. Defibrillators, suction devices, and other medical equipment must be in a climate-controlled environment and have access, in some cases, to power to keep them always charged and in a ready state.

When you examine all the benefits of a purpose built over a commercial chassis, weigh the cost difference over the life of the vehicle and the added advantages the purpose built provides the extra money to move up to a purpose-built chassis the price difference becomes less of an issue. Warranty on purpose-built chassis is typically longer duration and, in some cases, the warranty may be the life of the apparatus and transferable if sold to another department. This reduces the overall cost of ownership to the department. NFPA standards are updated every 5 years, if Council were to choose to purchase used fire apparatus, say 10 years old, two updates have occurred to the standard on that used apparatus alone. With the pace of

technology and the importance of firefighter safety, purchasing appropriate apparatus has never been more important.

Why does Fire Apparatus cost so much:

Fire apparatus has gone through significant changes over the last several decades. Technology, ergonomics, safety standards, purpose built, efficiencies, extended warranties, serviceability, compartment design, storage, clean cab, and many more features are now used in fire apparatus designs. Post Covid has placed tremendous financial pressures on all fire apparatus builders for aluminum, parts, and other factors, forcing prices up to 40% higher. These costs are past onto the end users and simply put, no municipality was warned nor prepared for these significant cost increases. This has placed tremendous financial pressure on capital forecasts. To further provide some scope, provided below are some, by no means all, of some basic design requirements as provided by NFPA 1901 and others. It should be noted, like most standards, these are the minimum and the standards are in place to find a reasonable balance between cost versus safety, operational needs and several other factors.

Design standards must include the following:

- CAN/ULC S515 Standard for automobile fire fighting apparatus
- Design standards, at minimum, include NFPA 1901 Standard for Automotive Fire Apparatus and must include the following chapters:
 - Administration
 - Referenced Publications
 - Definitions
 - Chassis and Vehicle Components
 - Low Voltage Electrical Systems and Warning Devices
 - Driving and Crew Area
 - Body, Compartments, and Equipment Mounting
 - Fire Pumps and Associated Equipment
 - Auxiliary Pumps and Associated Equipment
 - Water Tanks
 - Foam Proportioning Systems
 - Command and Communications
 - Third party inspections such as ISO/IEC 17020, General criteria for the operation of various types of bodies performing inspection, or ISO/IEC 17065, Conformity Assessment: Requirements for bodies certifying products, processes and services.
 - ANSI/NEMA Z535.4 or ISO 9244
 - FAMA TC010 Standard Product Safety Sign Catalog for Automotive Fire Apparatus.
 - ANSI/UL 969 Standard for Marking and Labeling Systems
 - FAMA TC008, Graphical Symbols for Automotive Fire Apparatus.
 - Vehicle Data Recorder

- Rollover Stability – remain stable to 26.5 degrees in both directions as per SAE J2180 Tilt Table Procedure for Measuring Static Rollover Threshold for Heavy Trucks
- Weight and Load distribution as per gross axle rate and gross vehicle weight with no more than 7 percent variation on side-to-side total tire load per axle
- Fire Apparatus Performance Requirements
- Fire Apparatus Highway Performance Requirements
- Serviceability Requirements
- Pre and Post Delivery Testing Requirements
- Fire Apparatus Documentation
- Fire Apparatus Familiarization and Training Requirements
- Specified and Required minimum Equipment per type of Pumper Fire Apparatus
 - Example, a Pumper shall have at minimum, the following items
 - Ground Ladders, One straight ladder equipped with roof hooks, One Extension Ladder, One Folding Ladder
 - Minimum of 6 M of suction hose or 4.5 M of supply hose
 - Fire Hose and Nozzles and shall include:
 - 800 ft (240 m) of 2½ in. (65 mm) or larger fire hose
 - 400 ft (120 m) of 1½ in. (38 mm), 1 in. (45 mm), or 2 in. (52 mm) fire hose
 - One handline nozzle, 200 gpm (750 L/min) minimum
 - Two handline nozzles, 95 gpm (360 L/min) minimum
 - One smooth bore or combination nozzle with 2½ in. shutoff
 - that flows a minimum of 250 gpm
 - Miscellaneous Equipment:
 - One 6 lb (2.7 kg) flathead axe
 - One 6 lb (2.7 kg) pickhead axe
 - One 6 ft (2 m) pike pole or plaster hook
 - One 8 ft (2.4 m) or longer pike pole
 - Two portable hand lights
 - One approved dry chemical portable fire extinguisher with a minimum 80-B:C rating
 - One 2½ gal (9.5 L) or larger water extinguisher
 - One self-contained breathing apparatus (SCBA) complying with NFPA 1981 for each assigned seating position, but not fewer than four, mounted in brackets fastened to the apparatus or stored in containers supplied by the SCBA manufacturer
 - One spare SCBA cylinder for each SCBA carried, each mounted in a bracket fastened to the apparatus or stored in a specially designed storage space
 - One first aid kit
 - Four combination spanner wrenches
 - Two hydrant wrenches

- One double female 2 1/2 in. (65 mm) adapter with National Hose (NH) threads
- One double male 2 1/2 in. (65 mm) adapter with NH threads
- One rubber mallet, suitable for use on suction hose connections
- Two salvage covers each a minimum size of 12 ft x 14 ft (3.7 m x 4.3 m)
- Two or more-wheel chocks, mounted in readily accessible locations, that together will hold the apparatus, when loaded to its GVWR or GCWR, on a hard surface with a 20 percent grade with the transmission in neutral and the parking brake released
- One traffic vest for each seating position, each vest to comply with ANSI/ISEA 207, *Standard for High-Visibility Public Safety Vests*, and have a five-point breakaway feature
- that includes two at the shoulders, two at the sides, and one at the front
- Not less than five fluorescent orange traffic cones not less than 28 in.
- Not less than five illuminated warning devices such as highway flares, unless the five fluorescent orange traffic cones have illuminating capabilities
- One automatic External Defibrillator (AED)

The information provided as presented is a small sample of a more extensive list required by NFPA to build and provision fire apparatus. It would require several pages to outline all requirements, but we felt this provided a good sample.

Safety versus money invested:

One of the biggest advantages of a purpose built over a commercial chassis is safety. As mentioned, purpose-built fire chassis have better visibility, turning radius, braking, meet more stringent crash worthy standards and have better centers of gravity than their commercial counterparts. Simply put, purpose-built chassis are designed specifically for the fire service and no other vocations. Purpose-build chassis consider a variety of weight factors such as seating, tanks, pumps, piping, fuel tanks, equipment, and more that contribute to the overall chassis loads. They also balance the load to ensure vehicle stability and safety when stopping, Commercial chassis may consider some of these elements but, remember, these trucks are built for general duties, not firefighting duties. Firefighters are trained to drive and operate the fire apparatus. However, they are responding in all weather hazards/conditions under tremendous stress. Sadly, sometimes fire apparatus is involved in collisions. We include placing firefighters in purpose built, fire apparatus with increased safety as a critical factor. Part of council's job is to take all reasonable precautions to protect workers, purchasing safer vehicles would be one of those tactics. Rollover protection, rigid cab construction, air bags, roof crush testing that exceeds commercial truck specification. Crew safety is a science,

purpose-built interiors are designed to optimize safety. Items such as proper seats that accommodate the bulk of a dressed firefighter (there is an entire section just on seats alone), extra long seatbelts, seats placed forward or rear facing only (never on the side), helmet holders, interior equipment mounting requirements (no equipment permitted to be loose inside the cab), driver compartment, access to controls, communications, and more.

The provided items listed is very short in comparison to NFPA 1901 Apparatus requirements but illustrates how technical these purpose-built vehicles are. The women and men with Wilmot Fire risk a great deal every time they enter the roadway to protect our community not to mention the toolbox they bring to incident.

Used versus New:

Used Fire Apparatus: There are some departments who have never been able to afford a new apparatus, and given today's unprecedented cost increases, additional, unexpected, unplanned pressures have been placed on all fire services in Ontario. Looking into a used apparatus that's newer and in better condition than the one that's planned to be replaced may be a consideration but be very cautious. Council sets the level of service, currently the Establishing and Regulating Bylaw does include purchasing used fire apparatus. Council must consider all factors should they decide buying used fire apparatus is an option. With the considerable increases in the used fire apparatus market, no warranty, and fire departments have been hanging onto apparatus longer, we are unlikely to be any further ahead, maybe, possibly worse off.

The used fire apparatus market had been relatively stable price-wise for many years, with a slight increase during the period of 2007–2010 because of a combination of the economy, several regulations on diesel engine emissions and changes to NFPA 1901: Standard for Automotive Fire Apparatus. Furthermore, prior to the pandemic, the availability of used fire apparatus and the subsequent sales of these vehicles didn't experience any considerable year-to-year fluctuations.

Unfortunately, the extended delivery times for new apparatus has affected the availability of high-quality used apparatus (a decrease of as much as 40 to 60 percent) and the cost of these apparatus has increased a considerable amount (at an all-time high). These pressures have made the used apparatus option much less desirable. Other considerations, there are some design flaws in older fire apparatus, no warranty, parts may be less available or not available, repair times may cause delays, safety features do not meet today's standards, and we never really know what we are buying. To provide some examples, using Brindlee Mountain, an online used apparatus purchasing platform with a very high rating, we looked at a range of 2014 pumpers. They ranged in price from \$345,000 US to \$600,000 US the day we viewed the site. Based on the value of the Canadian dollar that places the range from \$500,000 to \$850,000 Canadian dollars. Several used apparatuses tend to be higher mileage with no warranties and purchased as is. There may be import fees, transfer fees, requirements to meet Canadian emission standards, safety costs, and more. If we purchase a 10 year old apparatus we would only

have, at best, another 10 years. With uncertainty with the used industry, should we encounter maintenance issues, we may not get full life out of a used apparatus. This may factor into a significantly higher cost of ownership to the township. We looked online to other Canadian and Ontario Fire Truck sites. In most cases, the apparatus listed were 15 years or older. Pricing on some were in the range of \$50,000 to \$100,000 but the trucks were typically well used, high mileage, no warranty, and would not suit the departments needs. Upon further investigation and a couple of phone calls, some of the models listed or considered stock had prices as high as \$850,000 Canadian for pumpers and found one aerial, 2015 model at 1.4 million. This illustrates the used market on such a critical piece of equipment may not be the best solution available. Another troubling discussion point, we could look for a used aerial, however, we require a new fire station. If we wait for the new fire station to be completed in 2027 and then look for a replacement aerial, there is a risk that one is not available. Based on apparatus builders, they do not see the used industry changing or coming down in price anytime soon. Should this occur, we would be faced with possibly waiting another 2 to 3 years to obtain a new aerial and at a much higher cost (add a minimum of 5% plus exchange on the Canadian dollar per year).

New Fire Apparatus: As outlined in the used fire apparatus section, Council is tasked with making informed decisions that do not compromise levels of service to the community. As recommended by the Fire Chief, a new purpose build fire apparatus is the best solution to maintain a sound, safe, well maintained fire apparatus fleet. It is agreed that this option comes at a considerable cost to the community. However, the community has expectations, deliver a high-quality emergency service. This was outlined in a recent poll conducted for the Townships Strategic Plan. We offer a very affordable volunteer fire model which allows investment in good quality apparatus and equipment for use by firefighters to deliver the expected service to the community.

The new purpose-built apparatus offers several advantages such as meeting and exceeding the NFPA 1901 standards. It is important to highlight standards are the minimum. Wilmot Fire strives to meet the standards but does not look to exceed the standards. Exceeding standards comes with a much higher price tag. Given we are a volunteer service, exceeding standards does not make a sound economic choice.

Purpose built fire apparatus meet all NFPA standards, CSA standards, and a long list of others. They come with considerable protection to firefighters in the cab such as front and side impact air bags, strict roll over standards and roof crush protection. They tend to be more durable, larger axles, tires, with much better warranties, specific features that improve the cost of ownership that commercial chassis will not have. They incorporate wider and higher doors that are fully open to allow bulky firefighters to enter and egress the fire apparatus. Typically, commercial chassis can only accommodate, safely, 5 seats in the cab, where purpose-built can safely accommodate up to 8 seats, depending on configuration and department needs. Exterior storage on custom cabs is typically more ample. Examples of these options might include EMS cabinets behind the front seats and large storage areas in extended length areas of the cab. These options cannot be designed into a commercial cab, although commercial

apparatus still provides plenty of space to mount reels and does offer some lower storage compartments.

If you require a tighter turning radius on your unit, a custom cab would be recommended due to the cab forward design. The heights of commercial and custom chassis are comparable, although commercial tends to come in slightly lower on average. If height is an issue for your station, this may be an important consideration.

The electrical system in a commercial chassis is designed to accommodate many uses. This requires the truck builder to modify wiring to meet the extreme demands of fire apparatus. Purpose-built wiring systems meet the needs of fire apparatus and stands up well to the rigors of repeated fire ground operations. Road contaminants such as moisture, ice melters, and others may penetrate and cause issues with some commercial chassis. That's not to say it cannot occur with purpose-built, merely, less likely due to the strict standards they are required to meet.

Most custom chassis are made with bent or extruded aluminum, while commercial chassis are more likely to utilize formed metals and fiberglass. These construction differences lend to the long-term benefits of purpose-built chassis.

While most conventional chassis can meet NFPA 1901 standards, they do require workarounds and compromises to meet some of these important standards. Purpose-built meet the standards without workarounds or compromises and come off the production line ready to be equipped and placed into service.

Why the Wilmot Specification:

The Wilmot Fire Department has invested a tremendous amount of committee-based staff time arriving at the current specifications. The committee has spent time looking at a variety of options and configurations. They identified existing and future needs of apparatus as compared to the township and known growth expectations. They have looked at efficiencies, how to reduce cost of ownership, initial investments, while ensuring firefighter safety, cancer prevention, operational efficiencies, suitable equipment storage, and more.

Pumpers now have enclosed pump panels. Yes, this configuration is more expensive, however, this now places the pump operator inside, out of the weather and smoke conditions. Without this, pump operators are subjected to freezing cold, rain, wind, heat, or other weather-related conditions for hours on end in some cases. Being inside keeps the operator sharp, paying close attention to water flowing to handlines inside dangerous conditions that firefighters must rely on. Pump operators are away from fire ground noise, able to concentrate on radio communications that are vital to overall operations. Further, inside the cab keeps the operator away from potential fire ground smoke contaminants. Should conditions become extreme, the pump operator may be required to wear SCBA to protect themselves. Inside the cab will provide them with a controlled environment using less air over a period which extends tank replacement cycles and a more efficient operation.

Heavy walk around rescues have replaced walk in rescues for Station 1 and 3 due to their proximity to the 4-lane busy highway 7&8. First, and foremost, walk in rescues have questionable safety standards in the rear. With 4, 6, even 8 seats in the back in some cases, safety is always a priority. The seats have seatbelts but may be oriented in a manner that could lead to unexpected injuries or firefighter entrapment in worse case scenarios. The rear box does not meet any form of crash test or crush test standards. Moving these firefighters inside a purpose-built chassis where safety is a priority was an easy choice. With the demands of today, the walk in style rescues did not provide sufficient storage space for equipment. Rescues require bulk storage space for large quantities of wood cribbing, as an example, used to stabilize vehicles. Not just passenger vehicles, cribbing may be required for semi-trucks that are fully loaded, busses, coaches, fuel trucks, and many more. This requires a great deal of space where this type of material can be safely stored and appropriately load balanced due to the weight on the apparatus. Considerations for future needs are anticipated into the design with the goal of achieving a full 15-to-20-year life, depending on circumstances.

The existing 75 ft aerial is now 25 years old and no longer meets the coming needs of the community. Should this aerial need immediate repair, we are unsure at this time if any parts would be available due to the original manufacturer going out of business in 2012. As per the 10-year capital planning budget, we now require a 100 ft aerial to suitably service the community needs. This additional length ties to taller buildings as intensification continues, employment lands are developed and requires a new fire station that is suitable in size to accommodate the larger apparatus and the pressures of a growing community. There is nothing unique or more elaborate about this apparatus request over another fire department.

These are just a few of many examples when deciding on fire apparatus designs for Wilmot.

Identified Efficiencies:

Earlier we mentioned the time commitment from our truck committee. During the many hours of discussion and research we continue to look at ways to bring down costs to the community, especially when we are now faced with price increases of up to 40% for fire apparatus and waiting times of up to 3 years post Covid. Some examples, minimum width seats, shorter cab lengths, aluminum dash (instead of composite), aluminum bodies (instead of stainless steel), body wraps (instead of paint), and much more.

Specifically, we purchased the two heavy rescues to look after the four-lane highway corridor and the entire township. Station 2 will be purchasing a medium duty rescue that meets the needs of the community/department but reduces the purchasing price from a heavy rescue in the range of \$300 to \$350 thousand dollars. This apparatus will place firefighters in the safety of the apparatus cab and provide a suitable work platform to carry all needed equipment. Having one smaller rescue in the community also provides some flexibility where the heavy rescues may not suitably fit.

Station 1 currently has two 1500-gallon tankers. It was decided that we should eliminate one tanker. Design a single tanker to meet the needs of the township, 2500 gallons, purpose-built chassis. This will reduce the long-term costs of ownership to one truck, saving the township approximately \$300,000 (possibly more) on the build cost to a single apparatus and the on-going annual maintenance requirements of two. This tanker will carry very close to what two carried but will be designed with additional, suitable storage options and built-in safety features that we strive to provide for our valued firefighters.

Station 3 aerial is at the end of life and requires replacement. In our initial discussions, we started to specify an aerial with a platform (bucket at the end of the ladder, Wellesley, Woolwich, Blandford-Blenheim have them), however, after looking at the economic climate, time to build, and community needs, we scaled back, removed the platform and remained with a 100 ft straight ladder. Aerial ladders of this nature are more common in the fire service industry, and we would likely find a stock built truck that would suit our needs. These decisions will undoubtedly save the community approximately \$400,000.

As outlined by FUS, we are required to maintain 3 front line pumpers at an age range of 15 years old. For every three pumpers we are required to have a secondary front-line apparatus. To meet these requirements and balance life expectancy of fire apparatus, Wilmot Fire rotates front line apparatus to reserve and so on throughout the stations as follows. Every 5 years we purchase a new pumper as per our fleet capital schedule. Once a pump reaches 15 years, it will move into the secondary position at Station 1. Once the next 15-year-old pump arrives, it will move the secondary pumper (now 20 years old) to Station 2 and slot in for the next 5 years as a secondary pumper at Station 1. Once the secondary pumper reaches 20 years old, it moves to Station 2 and fills the role of a hydrant, training, and additional back up to the community. This pumper will remain in service for the remainder of its useful life of 25 years. Wilmot keeps all pumpers for a total of 25 years as they rotate through the stations to ensure full value of purchases.

We continue to maintain equipment and reuse whenever possible and safe to do so. We have some portable pumps in our fleet that are 25 years old, as an example. For front line equipment such as hose and nozzles, we have utilized a phased in approach to meet equipment replacement cycles over a 3-year period, replacing at each station annually. Council has approved the replacement cycle for nozzles and hoses. Our existing inventory of hose and nozzles was approaching 20 plus years and was in desperate need of replacement. We will replace some equipment when purchasing the new apparatus. This gives us the opportunity to renew equipment and save taxes on purchases.

We continue to work with our neighboring fire departments with Group purchasing. Two examples, SCBA, were purchased by several fire departments. We conducted thorough reviews of the various SCBA brands. Seven fire departments conducted a review, determining the best brand option using a scoring system. This information was used to create the RFP and was successful in obtaining the best product for several departments over a 3-year period, ensuring the best price and value. The township departments were successful in creating a Bunker gear specification that suited our needs. This collaboration allowed us to reduce the

price of bunker gear and finalize a 3-year contract with the vendor. We continue to find efficiencies whenever possible and meet several times annually to discuss opportunities.

To further increase our potential savings, we have proposed we bundle the two-fire apparatus approved in 2024 with the two requested in 2025 (pending council approval), go out to RFP and maximize/leverage this large purchase with all available vendors. We have traditionally used the Canoe buying group and will continue in the future, however, in this case including all available vendors makes the most sense and will, undoubtedly, provide us with the best purchasing leverage.



Photo to illustrate the difference between an aerial ladder (left side) and a platform aerial (right side)

Risk to level of service

The National Fire Protection (NFPA) recommends that front-line fire apparatus should be evaluated for replacement after 15 years of service, and reserve apparatus should be considered for replacement after 20-25 years of service. This is outlined in the NFPA 1911 Standard for Inspection, Maintenance, Testing, and Retirement of In-service Fire Apparatus.

This is further reinforced by Fire Underwriters Survey (FUS) who grades municipalities in Ontario and informs the insurance industry on grading which dictates rates to homeowners. For each fire hall with a Dwelling Protection Grade 3A (Wilmot falls under this category), fire apparatus must include a minimum of one triple combination pumper rated at not less than 3000 LPM (625 lpm at 150 psi) and designed in accordance with:

- Underwriters' Laboratories of Canada (ULC) S515 Automobile Fire Fighting Apparatus, or
- National Fire Protection Association (NFPA) 1901 Standard for Automotive Fire Apparatus

Credit for fire apparatus will be based on evidence of reliability indicators including the listing of apparatus by ULC, design specifications, fire pump service test records, age, maintenance history, etc. Apparatus is evaluated from the perspective of the capacity to provide structural fire protection. To be credited, apparatus must be stored in a suitably constructed and arranged fire hall. Purchasing and maintaining an appropriate, safe fire fleet is considered a level of service. Council sets the level of service based on recommendations from the Fire Chief, regulations, and industry. Should the level of service be reduced, there may be consequences to the property owners such as higher insurance rates as determined by FUS.

Fire Underwriters Survey evaluates the capacity of the fire department to provide required fire flows through the apparatus within the fire department fleet. If apparatus is ULC listed¹ and of an appropriate age, then it can receive full credit. If apparatus is designed to meet all of the requirements of NFPA 1901 and has been tested and evaluated for its compliance with NFPA 1901, by an accredited agency, then it can also receive full credit.

If the apparatus does not meet one of the two above criteria, then some credit between 0-100% would be applied to the apparatus within the calculation of fire insurance grades.

- This credit is based on an analysis of the reliability of the apparatus with respect to its capacity of continuously provide emergency response and all related intended purposes (as specified in ULC S515 and/or NFPA 1901):
 - Apparatus design standard and specifications.
 - Age of apparatus.
 - Results of apparatus acceptance and service testing (including, but not limited to, weight, road and pump performance tests);
 - Accident history.
 - Out of service history.
 - Frequency of testing and indications of apparatus reliability; and
 - Frequency of maintenance and indications of apparatus reliability

Numerous standards dictate how aerial apparatus requirements and needs are determined. The use of reasonable levels of response will be referenced throughout the FUS document. In essence, what is considered appropriate and affordable in reasonable circumstances is given that emergency services must always be ready with reliable equipment that meets the minimum needs and circumstances of the community. Aerial ladders are normally intended to provide primary protection operations for forcible entry, utility shut off, ladder placement, ventilation, salvage and overhaul, lighting, master fire streams, and rescue.

Response areas with 5 buildings that are 3 stories or 10.7 metres or more in height or areas with basic fire flows that are greater than 15,000 LPM, or any combination of these criteria, should have an aerial device. The length of the ladder is determined by the height of the tallest building. With 6 story buildings, and some existing industrial buildings, the need for a 100 ft aerial is required. Another referenced document, NFPA Fire Protection Handbook, 20th Edition states that:

High-Hazard Occupancies (schools, hospitals, nursing homes, explosive plants, refineries, high-rise buildings, and other high-risk or large fire potential occupancies); will have at least four pumpers, two ladder trucks (or combination of apparatus with equivalent capabilities), and other specialized apparatuses as may be needed to cope with the combustible involved; not fewer than 24 firefighters and two chief officers.

Medium-Hazard Occupancies (apartments, offices, mercantile and industrial occupancies not normally requiring extensive rescue and firefighter forces); will have at least three pumpers, one ladder truck (or combination apparatus with equivalent capabilities) and other specialized apparatus as may be needed or available, not fewer than 12 firefighters and one chief officer.

Conclusions:

We have outlined the complex task of building an appropriate fire apparatus for the community that considers all factors and is in line with the current council approved E&R Bylaw. We touched on some efficiencies with equipment purchasing and apparatus purchasing. While this discussion seems lengthy, it is by no means comprehensive. More importantly, Council sets the level of service to the community, once set they are required to provide the appropriate apparatus, equipment, and staff levels to deliver the identified service levels. These requirements come with other responsibilities such as FUS requirements, regulations, guidelines, and standards that may be measured against liability. Wilmot has had a fire department for many years, successfully delivering similar services that we deliver today. Purchasing an appropriate fire apparatus is simply maintaining the status quo. Should Council choose not to move ahead with some or all these necessary purchases, communication to the community will be required outlining the reduction in the level of expected service. Unfortunately, several considerable pressures have occurred pushing fire apparatus and equipment costs upwards of 40%. This is unprecedented and no municipality was prepared for this significant financial impact, however, public safety was outlined as the number one priority by the community during the strategic plan exercise. Public safety is about more than just equipping our firefighters with the tools they need on the job – it's about ensuring they are looked after, supported, and maintain morale with proper equipment and training. Wilmot Firefighters place service over self each day, facing dangerous and extremely stressful situations to protect the township.

The Fire Leadership team continues to meet regularly to discuss capital and operational strategies and efficiencies with the goal of maintaining the current requirements of the Council approved E&R Bylaw.

Standards Referenced:

- National Fire Protection Association (NFPA) 1901 Standard for Automobile Fire Fighting Apparatus
- Occupational Health & Safety Act and Ontario Regulation 714/94 - Firefighters - Protective Equipment Regulation
- NFPA Fire Protection Handbook, 20th edition
- CAN/ULC S515 Standard for Automobile Firefighting Apparatus
- Section 21 Guidance Notes (Ministry of Labour)
- Fire Underwriters Survey