

TOWN OF KINGSVILLE FIRE DEPARTMENT
MASTER FIRE PLAN

ORGANIZATIONAL RISK ANALYSIS

APPARATUS AND EQUIPMENT

A key component of providing effective emergency fire and rescue response is having up-to-date, well maintained apparatus and equipment. The purpose of this report is to:

- Summarize the current apparatus and equipment of the department.
- Describe the check, test and maintenance procedures for apparatus and equipment currently in place.
- Outline the replacement program in place for major apparatus.
- Identify any gaps between current apparatus and equipment in the department and recognized standards.

Apparatus Fleet:

Fire departments typically utilize several different types of apparatus based on function:

- Triple Combination Engines are equipped with a pump, water tank and fire hose. These trucks also carry self contained breathing apparatus, spare air cylinders, generators and lighting equipment, nozzles of various sizes, ground ladders, portable fire pumps and assorted other tools.
- Triple Combination Engine-Tankers are also equipped with a pump, water tank and fire hose. They carry the same equipment as an engine. The primary difference is that the water tank of an engine-tanker is larger than one on an engine and can be used for hauling water to locations that are not protected by hydrants. To facilitate these operations, engine-tankers are equipped with quick fill and quick dump devices on their water tanks.
- Quintuple combinations which include a pump, water tank, hose, and ground ladders plus an aerial ladder or platform which provides the capabilities of rescue, elevated fire attack streams, a safe working platform for roof operations, and gaining access to upper levels.
- Rescue trucks which primarily carry self contained breathing apparatus, medical equipment, generators and lighting equipment, vehicle extrication equipment, water/ice rescue equipment, high angle rope rescue equipment, hazardous materials supplies, spare air cylinders and a host of other assorted small tools.

- Brush trucks which have a small pump and tank and are used for “off road” operations such as brush fires and field fires.
- Rescue boats which are used for water operations.
- Support vehicles for the use of administrative and fire prevention staff.

The current apparatus of the department is as follows:

Unit	Type	Description	Year	Stn	Pump (gpm)	Tank (gal)	Ladders (ft)
122	Engine-Tanker	International-Dependable	1988	N	840	950	59
123	Engine-Tanker	Freightliner-Fort Garry	2001	N	1050	1000	48
124	Rescue	Freightliner-CMax	1996	N	-	-	10
212	Support	Ford Explorer 4 X 4	2004	S	-	-	-
215	Brush	Chevrolet-Tacweld	1976	S	30	200	-
216	Engine-Tanker	Freightliner-Fort Garry	1996	S	1050	1000	48
217	Support	Ford F150 4 X 4	2006	S	-	-	-
218	Engine	Spartan-Fort Garry	2006	S	1050	780	48
219	Quint	HME Grumman	1991	S	1750	175	102 (Aerial) 145 (Ground)
220	Rescue	Spartan-Rosenbauer	2008	S	-	-	10
221	Boat	Super-Duxx 15'	2009	S	-	-	-

Engine 218, Engine-Tanker 122 and Engine-Tanker 123 are all equipped with on-board Class A foam systems. Engine 218 and Rescue 220 are equipped with 8,000 watt hydraulically operated on board electric generators. Aerial 219 is equipped with 12,000 watt diesel powered on board electric generator.

Municipal council has adopted a fleet management program for the replacement of major fire apparatus. The program is based on a piece of fire apparatus remaining in front line service for 20 years and reserve service for an additional 5 years. Funds have been put into reserves each year in order to maintain the replacement program such that additional funds from taxation are not required in

a year when a new piece of apparatus is purchased. Major apparatus replacements have been accomplished with the use of an apparatus committee at each respective station, which is formed when a piece of apparatus is to be replaced, under the direction of and reporting to the fire chief. The committee provides a draft set of specifications for approval, meets with apparatus suppliers to obtain information and assists the chief with the process. This has resulted in functional and practical pieces of apparatus that have been priced within budgetary requirements.

It has also been identified that some of the need for apparatus replacement is due to the result of growth. As such, funds from development charges have also been provided as part of the fleet replacement program.

The municipality recently received the report of the Fire Underwriters Survey which was completed in the summer of 2008. One of the recommendations of their report was as follows:

Extensive experience in evaluating municipal fire departments has demonstrated to Fire Underwriters Survey, that fire apparatus should be purchased new from recognized manufacturers and listed in accordance with ULC. Apparatus should be kept on first alarm for twenty (20) years of service, and then retired to reserve status for the next five (5) years. At the end of the reserve period, apparatus should be replaced with new equipment. The Town of Kingsville currently borders on becoming a medium sized community, and careful consideration will have to be made in the event of growth. As the town gets closer to a population of 25,000 residents, the life cycle for fire apparatus will decrease to fifteen (15) years as a first line piece of apparatus and an additional five (5) years as a reserve apparatus.

Based on their recommendation, it may become necessary to revisit the fleet management program as the population of the municipality nears 25,000. As well, the current fleet program is based on the replacement of the aerial truck on a 30 year cycle. Clearly, this time frame will not be accepted by the Fire Underwriters.

Recommendation #1: That the fleet management program which has been successfully been utilized in the past be continued for future planning and, further, that it be revised to reflect a front line service life of 15 years followed by 5 years of reserve service for apparatus as the population of the municipality nears 25,000. It will be necessary to analyze population growth on an annual basis over the span of this plan in order to determine when a population of 25,000 will be reached and determine a revision date for the fleet management replacement program based on that projection.

Recommendation #2: That the fleet management program be altered to reflect the replacement of the aerial truck upon completion of 25 years service (in 2016).

Recommendation #3: That the Fire Chief consult with the Director of Finance to determine what development charges may be applied toward future apparatus replacement and, once determined, that the Director of Finance ensure that the Development Charges Bylaw is amended to reflect the same.

Apparatus Maintenance:

All Kingsville Fire Department apparatus and equipment are checked and tested on a weekly basis by a rotating group of five-six personnel (squad) at each station. Records of these inspections are maintained by the Station Chief at each station. Minor repairs which are identified on these check nights are completed, where possible, by the squads. Where it is identified that a repair requires the services of a technician, it is noted on the check sheet and forwarded to the Station Chief and the Fire Chief for follow-up. While the squads take care of minor maintenance issues, The City of Windsor Fire Department Mechanical Division performs all preventative maintenance and regular repairs on apparatus. Their technicians maintain and repair all apparatus to National Fire Protection Association standard 1911. The annual preventative maintenance and testing carried out by these technicians include:

- Annual mandatory Ministry of Transportation commercial truck inspection.
- Pump operation and capacity testing.
- Testing of all ground ladders to N.F.P.A. 1932
- Functional testing of all self contained breathing apparatus.
- Apparatus fluid testing analysis.
- Servicing all small engines (generators, hydraulic tool power units, portable pumps, power saws, positive pressure ventilation fans).
- Oil and lubrication as required.
- In the case of the aerial truck, an annual inspection and a full non-destructive test every five years per N.F.P.A. 1911.
- Annual testing of electrical generators and a five year full load test of all generators in accordance with N.F.P.A. 1911.

The technicians of the Mechanical Division of the Windsor Fire Department operate in accordance with N.F.P.A. standard 1071 and three are certified Master Emergency Vehicle Technicians. They are available on a 24-7 emergency basis and have attended fire scenes and each respective station for emergency repairs on several occasions in the past.

Self Contained Breathing Apparatus:

Self contained breathing apparatus, also know as "airpacks", is worn by firefighters working in hazardous atmospheres in order to provide them with breathable air. They are considered to be one of the most critical pieces of equipment in terms of firefighter safety. Due to changes in N.F.P.A. standards for breathing apparatus over the years, the department was equipped with several styles. In 2007 municipal council approved the replacement of all existing breathing apparatus utilizing a lease to own program through Mine Safety Appliances and all breathing apparatus was replaced. At present the department has 34 sets of 30 minute (2216 p.s.i.) breathing apparatus and 4 sets of 60 minute (4500 p.s.i.) breathing apparatus. The 60 minute sets are carried on the rescue trucks at each station and are used by the Rapid Intervention Team-2 personnel assigned to firefighter rescue at any scene where breathing apparatus is used. There are 115 thirty minute cylinders (34 on breathing apparatus and 81 spares) and 8 sixty minute cylinders (4 on breathing apparatus and 4 spares). The air cylinders must be hydrostatically pressure tested every 5 years and have a serviceable life of 15 years. At the present time, there are six spare cylinders purchased annually in order to provide for this service life on a rotating basis. The fire department software program is used to track required testing and retirement of each individual cylinder. As described in the Communications risk analysis, the tracking of all personnel working in breathing apparatus is now accomplished using the computers on the south station engine and rescue and the north station engine. This system allows the monitoring of each breathing apparatus in use for air pressure, low air pressure warning, high heat warning and loss of motion warning. This information can be downloaded for each individual firefighter for any given call. The air cylinders are filled using a compressor and air fill cascade system located at the south fire station. This system is rated at 2500 p.s.i. and is capable of filling the 30 minute cylinders only. The Leamington Fire Department is currently providing filling services for the 60 minute cylinders. The compressor and air cascade system at the south fire station were purchased in 1984. The compressor is serviced and checked annually by a qualified technician and mandatory air samples are taken every six months for analysis by a recognized laboratory. The current long range capital purchase forecast includes a new 4500 p.s.i. air compressor and cascade system in 2011. The addition of this system, if approved, would enable the department to refill the 60 minute cylinders and would enable each station to have air filling capabilities provided the current compressor and cascade system remains serviceable.

Recommendation #4: That the 4500 p.s.i. compressor and cascade fill system identified in the long range capital forecast with an estimated cost of \$70,000 be included in the 2011 capital budget for consideration and further, that the current compressor and cascade fill system remain in use as long as it is reasonably serviceable and the semi-annual air quality testing provides positive results.

An additional requirement of the self contained breathing apparatus program is facepiece fit testing under Canadian Standards Association Z95 which mandates a respiratory protection program including an administrator. This involves an annual testing of each firefighter to ensure that breathing apparatus facepieces are providing a proper fit and not allowing any contaminants into the mask. This test is currently done using a Portacount ® fit testing machine which is rented from the Windsor Fire Department on a per use basis. The test results are kept in a computer database. We currently have two Kingsville Fire Department staff that are qualified to operate the machine.

Fire Hose:

Fire hose is used to supply water to engines from hydrants and static sources (ponds, lakes etc.) and then from the engine to the fire for purposes of fire attack. This is accomplished through several types of hose:

- 6" or 2 ½" suction hoses used to draft water from static sources such as ponds and lakes.
- 4" supply hoses used to moved water from fire hydrants to engines or between engines (in relay pumping operations).
- 2 ½" and 1 ¾" fire attack hoses.
- 1" forestry type attack hoses for brush and field fires.

The total amount of hose carried on apparatus by the department (by type) is as follows:

- 80' of 6" hard suction hose.
- 80' of 2 ½" hard suction hose.
- 5050' of 4" supply hose.
- 3450' of 2 ½" attack hose.
- 4400' of 1 ¾" attach hose.
- 200' of 1" forestry hose.

Some of the older 2 ½" hose is still serviceable but requires drying prior to being placed back on the apparatus in that it is constructed of natural fibres that will mold and mildew if packed wet. To that end, spare hose in the amount of 2400' of 1 ¾" and 1150' of 2 ½" is available and stored in the stations so that apparatus can be refilled with hose immediately following a call.

At the present time funds are included annually in the fire department operating budget to ensure replacement of fire hose on a rotating basis. Annual testing of fire hose is recommended by agencies such as the Fire Underwriters Survey to verify that fire hose is in serviceable condition. New hose is tested at the factory prior to shipping but some of the older hose in service has not been tested since 2002.

Recommendation #5: That a program be instituted whereby the fire hose inventory for the Kingsville Fire Department is pressure tested to the rated pressure of the hose on an annual basis and further, that each length be clearly marked as to its test date.

Extrication Equipment:

Extrication equipment is utilized to provide access to and facilitate removal of persons trapped by vehicle collisions, farm implements and industrial machinery. It consists of a large assortment of hand tools, hydraulic tools and other support equipment. The inventory of major extrication equipment, excluding hand tools and small tools, at each station is as follows:

EQUIPMENT	SOUTH STN	NORTH STN
Hydraulic Power Unit-2 tool	1	2
Hydraulic Power Unit-single tool	1	0
Combination Spreader-Cutter	1	1
Spreader	1	1
Cutter	1	1
Rams	3	1
Air lifting bags	2	2

With the exception of the air lifting bags, which are scheduled for replacement during the current budget year, the major extrication equipment is in excellent operating condition and it is not anticipated that any additional replacement of equipment will be required during the time span that this master fire plan encompasses. Extrication operations will be enhanced with the addition of updated software for the onboard truck computers to replace the existing software and "auto cribbing" which are currently included in the 2010 capital budget projection. The software provides information on each specific vehicle model in terms of battery location, airbag location, gas shock strut location and lag time for air bag activation following disconnection of battery power. The software loaded on the computers at this time is outdated and not as user friendly in the field as the new proposed software. Cost for the new software is

projected to be \$3000. Cribbing is utilized to stabilize a vehicle in order to prevent further injury to trapped occupants during extrication operations. The current practice is to utilize wood to build a "platform" in various locations under the vehicle depending on its orientation and location. The "auto cribbing" sets are spring loaded devices that will enable personnel to quickly perform this task at an entrapment. The total estimated cost to provide 2 pairs to each station is \$5000.

Recommendation #6: That the extrication software and auto cribbing proposed in the 2010 capital budget with an estimated cost of \$3,000 and \$5,000 respectively be included in the budget deliberations with the recommendation that they be added to the extrication equipment currently carried by the department.

Medical Equipment:

Each apparatus on the department is equipped with a medical response bag and oxygen administration equipment. The rescue trucks at each station are equipped with an automatic external defibrillator. The current capital budget includes the replacement/upgrade of these two defibrillators this year. The current defibrillators will provide us with a trade in allowance. An additional defibrillator, which is used for medical standbys at community events, is slated to be replaced with an upgrade in the 2010 capital budget. We are currently provided with funds of \$1000 per year per defibrillator by the County of Essex Emergency Medical Service for defibrillator maintenance and upgrade. As well, all consumable medical supplies are replaced by the Essex County E.M.S.

Recommendation #7: That the defibrillator upgrade replacement proposed in the 2010 capital budget at an estimated cost of \$3,400 be included in the budget deliberations with the recommendation that it be added to the medical equipment currently carried.

Rope Rescue Equipment:

The Kingsville Fire Department operates a High Angle Rope Rescue team which is trained and equipped to N.F.P.A. standard 1983. There are six team members at each station for a total of 12. The rope rescue equipment is currently dispersed between the two stations. Any rope rescue response will involve the rope team members from both stations responding with their equipment. Funds in the amount of \$5000 have been included in the current budget year to provide the extra equipment necessary for the jurisdictional station to start operations

prior to the arrival of the other station. The additional equipment will also facilitate training at each station. The introduction of wind turbines in the municipality for generation of electricity will potentially increase the number of calls for the rope rescue team. The department has already been contacted by another municipality in the county to determine if we can provide this service as the turbines are erected in their area. There is a possibility that the wind turbine companies will provide some funding to augment the equipment and training of the high angle rope rescue team.

Recommendation #8: That the Fire Chief communicate with wind turbine electrical power generation companies as they locate sites within the Town of Kingsville to determine if they will partner in providing funds for additional training and equipment for the Kingsville Fire Department High Angle Rope Rescue Team in order to provide rescue services to their sites.

Other Motorized Equipment:

In addition to the hydraulic extrication power units, which are all gasoline powered, the department operates the following motorized equipment:

EQUIPMENT	SOUTH STN	NORTH STN
Chain Saw	1	1
Ventilation Saw	1	1
Circular Power Saw	1	1
Portable Generator (2500-3500 watt)	1	1
Portable Generator (5000-6500 watt)	0	1
Positive Pressure Ventilation Fan	2	2
Negative Pressure Smoke Ejector	2	1
Portable Fire Pump	3	2
Floating Portable Fire Pump	1	0
Boat Motor	2	0

All of the above noted equipment is in good working order and it is not anticipated that any will require replacement during the time span that this master fire plan encompasses. There is one 35 year old portable pump at the south station which is used for backup purposes only and can be retired rather than repaired should it fail.

Air Monitoring Equipment:

The department currently is equipped with one Mine Safety Appliances Orion four gas detector at each station for air monitoring purposes. These devices monitor oxygen percentage, hydrogen sulphide levels in parts per million, carbon monoxide levels in parts per million and percentage of lower explosive limit for flammable gases. We also have a calibration device located at the south station and each gas monitoring unit is calibrated weekly for accuracy. The current budget includes a single gas carbon monoxide detector for each station in the small capital account.

Thermal Imaging Cameras:

Thermal imaging cameras "see" heat rather than light and thus can be used to provide firefighters with images inside a burning structure which may be filled with smoke. These devices speed rescue of trapped occupants, assist in locating hidden fires, provide a tool to measure the effectiveness of fire control operations, enable interior personnel to identify approaching flashover conditions, assist in locating overheated motors and light ballasts on "smoke odour" calls, and enable personnel to determine the liquid level in tanks among a host of other applications. The development of these devices revolutionized fire service operations. The Kingsville Fire Department currently has one of these devices located at each station and they have functioned well. Both cameras are still serviceable at this time and will remain in service, barring catastrophic damage, for the time period this master fire plan will cover. It would be desirable to equip each station with a second camera in order to enable a second fire attack team to be afforded the protection the camera provides during interior fire operations. To that end, two additional cameras have been proposed for the 2010 capital budget.

Recommendation #9: That the two proposed thermal imaging cameras in the 2010 capital budget at an estimated total cost of \$20,000 be included in the budget deliberations with the recommendation that they be purchased.

Protective Clothing:

The protective clothing ensemble worn by firefighters is manufactured and maintained in accordance with N.F.P.A. standard 1971 with the exception of

boots which are manufactured in accordance with the Canadian Standards Association. Protective clothing consists of the following elements:

- Helmet including ear flaps.
- Bunker coat.
- Bunker pants.
- Balaclava (flash hood).
- Gloves.
- Boots.

The N.F.P.A. standard states that protective clothing has a maximum service life to ten years. The Kingsville Fire Department currently has the bunker coat and bunker pants on a six year cycle with 9-10 sets being purchased each year as part of the operating budget. With the exception of helmets, the other components do not last for the ten year period and are replaced on an "as needed" basis. Consideration should be given to ensuring helmets are replaced prior to the ten year life span. Each station is equipped with a front loading washing machine in order to clean bunker gear as necessary. Bunker gear which is contaminated beyond the capabilities of the washing machines is sent to a certified agency for cleaning. All protective clothing is visually inspected by staff every six months. These inspections are documented on a standard form and records are stored using the fire department software program. Bunker coats and pants are sent to a certified inspection agency on an annual basis. These inspections are documented by the company as well as in the fire department software program.

Recommendation #10: That tracking of purchase dates for fire helmets be instituted utilizing the fire department software program and, further, that funds be included in the operating budget annually commencing in 2010 to replace helmets on an ongoing rotational basis.

It bears noting that draft changes to the N.F.P.A. standard for bunker gear include testing as well as inspection. Should this standard be adopted, there may be additional expenses to repair or replace bunker gear on a more frequent basis as stringent testing may reveal defects that are not normally detectable with a regular visual inspection.

Conclusion:

The intent of this report was to focus on the major equipment of the department. There is a host of other smaller equipment utilized that is replaced on an ongoing basis in the capital and small capital budgets. A survey of this equipment has shown that there are no issues regarding its age or operability at this time.