Fire Safety Plan for Proposed Bulk Propane Facility- 301 Somme Street, Ottawa, ON

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1 Purpose

The purpose of this document is to prepare a Fire Safety Plan in accordance with Ontario Fire Code for the proposed bulk propane facility at 301 Somme Street in the city of Ottawa, Ontario, Canada. A Risk and Safety Management Plan (RSMP) as required by Technical Standards and Safety Act, 2000 (TSSA), Ontario Regulation 211/01 is provided separately.

2 Facility Description

W.O.Stinson & Son Ltd. (W.O. Stinson) is in the planning stages of developing a new bulk propane filling plant at 301 Somme Street in the city of Ottawa, Ontario, Canada. The facility will consist of a propane filling plant, an outdoor storage yard for propane storage tanks (with product and empty), a card lock (fueling) station, outdoor commercial delivery vehicle parking, a vehicle service building, and an equipment storage building.

On-site fuel storage will consist of the following:

- (4) 228,000-L (60,000 USWG) above-ground bulk propane tanks (for tank filling)
- (1) 7,600-L (2,000 gal) above-ground propane nurse tank (for propane recovery)
- (1) 100,000-L (26,400 gal) underground diesel storage tank (for truck fueling)
- (1) 50,000-L (13,200 gal) underground diesel storage tank (for truck fueling)

Propane operations at the facility will be limited to the bulk storage of propane, and the transfer of propane to and from bulk propane trucks. The majority of propane transfer occurs between the months of October and April. During high-volume propane transfer periods, the estimated daily propane loading/offloading activity would be 12 propane bobtails loading and 4 trailers offloading to the facility. Loading/offloading operations can take place 24 hours/day, with the majority of operations taking place between the hours of 6:00 a.m. and 5:00 p.m. Monday through Friday.

Propane tanks ranging in volumes of 360-L – 7,570-L (120 USWG – 2,000 USWG) will be located outdoors in designated storage areas. The majority of tanks containing propane (ranging from residual to full) are 360-L tanks, while the remaining larger tanks will remain empty while in the storage area.

3 Applicable Codes and Standards

- Ontario Fire Code (National Fire Code of Canada – 2020 as modified by Ontario Reg. 213/07)
- Ontario Building Code (National Building Code of Canada – 2020 with Ontario Amendments)
- Ontario Electrical Safety Code (OESC), 29th Edition
- CSA B149.2:20 – *Propane Storage and Handling Code*
- Technical Standards and Safety Act, 2000 (TSSA), Ontario Regulation 211/01: *Propane Storage and Handling* NFPA 10 – *Standard for Portable Fire Extinguishers*
- NFPA 13 – *Standard for the Installation of Sprinkler Systems*

- NFPA 20 – *Standard for the Installation of Stationary Pumps for Fire Protection*
- NFPA 22 – *Standard for Water Tanks for Private Fire Protection*
- NFPA 24 – *Standard for the Installation of Private Service Mains and Their Appurtenances*
- NFPA 30 – *Flammable and Combustible Liquids Code*
- NFPA 58 – *Liquefied Petroleum Gas Code*
- Fire Underwriters Survey – *Water Supply for Public Fire Protection*
- *Ottawa Design Guidelines – Water Distribution* (as amended by Technical Bulletin IWSTB-2024-05)
- Owner Standards: None Identified
- Insurance Requirements: None Identified

4 Referenced Documents

- Drawing A1.00 – Vehicle Service and Storage Yard Site Plan (Hobin Architecture), dated 2/2025, revision date Mar 06, 2026.
- Site Servicing and Stormwater Management Report (Stantec), dated 8/21/2025, revision date April 7, 2026.

5 Fire Hazards Analysis

For this analysis, the facility has been divided into seven fire areas that break the facility into sections separated by physical distance, function and hazard types. The Fire Areas are identified in **FIGURE 1** below:

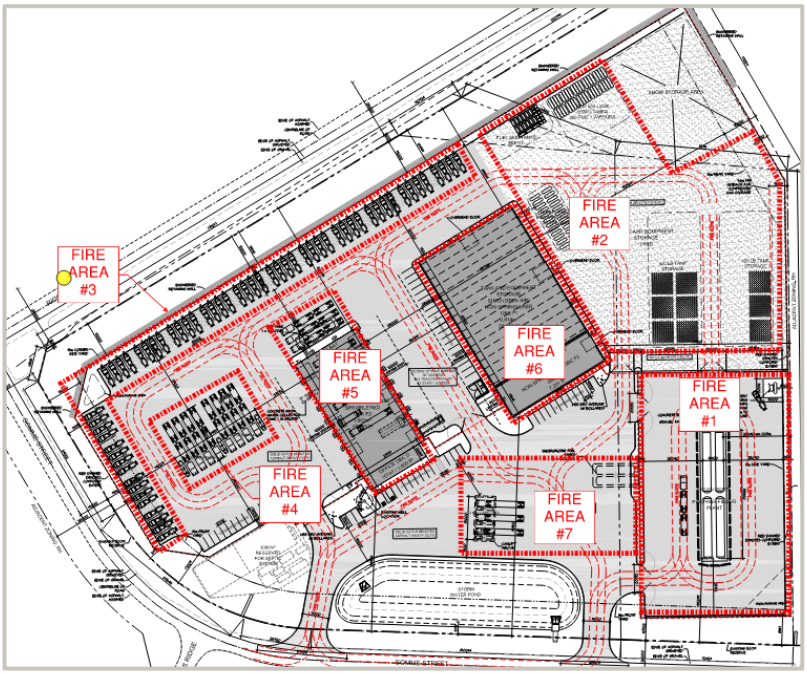

Figure 1: 301 Somme Street Fire Areas

5.1 Fire Area #1 – Propane Bulk Filling Plant

This area contains the bulk storage of propane in (4) 228,000-L (60,000 USWG) above-ground bulk propane tanks. Transfer of propane to and from bulk propane trucks occurs in this area. During the months of October – April, the maximum daily activity within the bulk propane filling plant would be (12) propane bobtails loading propane from the bulk storage tanks, and (4) trailers offloading propane to the bulk storage tanks. This area will also contain (1) 7,600-L (2,000 USWG) above-ground propane nurse tank which will store product drained from 360-L cylinders that have been returned to the site for servicing but still contain product.

The fire hazards present within this area are common to all LPG processing and storage facilities. Accidental release of propane can lead to the following:

- Flash fire following the release, dispersion into the air, and ignition of flammable vapor or vaporizing flammable liquid.
- Exposure to jet fire thermal radiation following the release and ignition of a flammable gas.
- Exposure to pool fire thermal radiation following the release and ignition of flammable liquid.
- BLEVE (boiling liquid expanding vapor explosion) which would be caused by exposure to a fire leading to failure of the storage vessel.

The following table summarizes the fire hazards present within Fire Area #1, and the proposed fire safety measures:

Table 1: Fire Hazards – Propane Bulk Filling Plant

Fire Hazard Description	Proposed Mitigation Strategies
Flammable Gas Release	• Emergency shutdown and isolation systems • Pull-away coupling on transfer hose. • Operations personnel properly trained and certified per CSA B149.2:20 requirements Intrinsically safe electrical components/electrical classification per NFPA 58 • Intrinsically safe electrical components/electrical classification per NFPA 58 • Wiring and equipment meeting requirements of Ontario Electrical Safety Code, Rules 20-060 to 20-070
Flammable Liquid Release	• Emergency shutdown and isolation systems • Pull-away coupling on transfer hose. • Operations personnel properly trained and certified per CSA B149.2:20 requirements. • Spill control in accordance with NFPA 58
Ignited Flammable Gas or Liquid Release	• Hydrants for manual firefighting and tank surface cooling • Portable/wheeled dry chemical fire extinguishers (Type BC) • Tank separation distances per NFPA 58
BLEVE	• Hydrants for manual firefighting and tank surface cooling • Tank separation distances per NFPA 58

5.2 Fire Area #2 – Tank and Equipment Storage Yard

This area contains the storage of propane tanks ranging in volume from 360-L – 7,570-L (120 USWG – 2,000 USWG). The majority of storage in this area will be 360-L tanks that have been returned to the site with some amount of product remaining, and awaiting return to service. This area will also contain storage of new or refurbished tanks which are completely empty of product. Finally, this area will contain storage of skid tanks that are empty of product (diesel/gasoline) but may contain flammable vapors. These tanks will be stored outdoors while awaiting return to service.

The following table summarizes the fire hazards present within Fire Area #2, and the proposed fire safety measures:

Table 2: Fire Hazards – Tank and Equipment Storage Yard

Fire Hazard Description	Proposed Mitigation Strategies
Flammable Gas Release	• Intrinsically safe electrical components/electrical classification per NFPA 58 • Wiring and equipment meeting requirements of Ontario Electrical Safety Code, Rules 20-200 to 20-212
Flammable Liquid Release	• Spill control in accordance with NFPA 58
Ignited Flammable Gas or Liquid Release	• Hydrants for manual firefighting and tank surface cooling • Portable/wheeled dry chemical fire extinguishers (Type BC) • Tank separation distances per NFPA 58
BLEVE	• Hydrants for manual firefighting and tank surface cooling • Tank separation distances per NFPA 58

5.3 Fire Area #3 – Truck Parking

Single axle, tandem and bobtail trucks will be parked in this area. It is assumed that the trucks in this area will not be full of product and therefore will not be considered bulk/pile storage of propane. However, since residual product could be present in these trucks, the fire hazards associated with propane release and ignition are considered here. The following table summarizes the fire hazards present within Fire Area #3, and the proposed fire safety measures:

Table 3: Fire Hazards – Truck Parking

Fire Hazard Description	Proposed Mitigation Strategies
Flammable Gas Release	• Intrinsically safe electrical components/electrical classification per NFPA 58 • Wiring and equipment meeting requirements of Ontario Electrical Safety Code, Rules 20-200 to 20-212
Flammable Liquid Release	• Spill control in accordance with NFPA 58
Ignited Flammable Gas or Liquid Release	• Hydrants for manual firefighting and tank surface cooling • Portable/wheeled dry chemical fire extinguishers (Type BC)

5.4 Fire Area #4 – Truck Parking

Tractor trailers will be parked in this area. It is assumed that the trucks in this area will not be full of product and therefore will not be considered bulk/pile storage of propane. However, since residual product could be present in these trucks, the fire hazards associated with propane release and ignition are considered here.

The following table summarizes the fire hazards present within Fire Area #4, and the proposed fire safety measures:

Table 4: Fire Hazards – Truck Parking

Fire Hazard Description	Proposed Mitigation Strategies
Flammable Gas Release	• Intrinsically safe electrical components/electrical classification per NFPA 58 • Wiring and equipment meeting requirements of Ontario Electrical Safety Code, Rules 20-200 to 20-212
Flammable Liquid Release	• Spill control in accordance with NFPA 58
Ignited Flammable Gas or Liquid Release	• Hydrants for manual firefighting and tank surface cooling • Portable/wheeled dry chemical fire extinguishers (Type BC)

5.5 Fire Area #5 – Vehicle Service Building

The Vehicle Service Building is proposed to be a single-storey, 1,829 sq.m. (19,489 sq.ft.) building, classified as an F2 occupancy per the Ontario Building Code. This building will include vehicle service bays, a vehicle paint bay, and incidental storage of products required for the operation and maintenance of the facility. The building will be utilized for light-duty mechanical work. No servicing of tanks and no welding will occur within this building.

The following table summarizes the fire hazards present within Fire Area #5, and the proposed fire safety measures:

Table 5: Fire Hazards – Vehicle Service Building

Fire Hazard Description	Proposed Mitigation Strategies
Class A, B or C fire	• Portable fire extinguishers (Type ABC) • Automatic wet sprinkler system throughout the building • Hydrants for manual exterior firefighting • Fire alarm pull stations. • Wiring and equipment meeting requirements of Ontario Electrical Safety Code, Rules 20-100 to 20-112 (commercial repair garages) and Rules 20-300 to 20-314 (finishing processes)

5.6 Fire Area #6 – Tank and Equipment Storage Structure

The Tank and Equipment Storage Structure is proposed to be a single-storey, open-air, 3,483 sq.m. (37,490 sq.ft.) building, classified as an F1 occupancy per the Ontario Building Code. This building will be used to store fuel tanks (empty of product) as well as new propane tanks. The building will also be utilized for pump repairs.

The following table summarizes the fire hazards present within Fire Area #6, and the proposed fire safety measures:

Table 6: Fire Hazards – Tank and Equipment Storage Structure

Fire Hazard Description	Proposed Mitigation Strategies
Class A, B or C fire	• Portable fire extinguishers (Type ABC) • Hydrants for manual exterior firefighting • Fire alarm pull stations

5.7 Fire Area #7 – Card Lock, Underground Fuel Storage

This area will contain the Card Lock (fueling station), (1) 100,000-L (26,400 gal) underground diesel storage tank and (1) 50,000-L (13,200 gal) underground diesel storage tank.

The following table summarizes the fire hazards present within Fire Area #7, and the proposed fire safety measures:

Table 7: Fire Hazards – Card Lock, Underground Fuel Storage

Fire Hazard Description	Proposed Mitigation Strategies
Combustible Liquid Release	• Spill control in accordance with Ontario Fire Code • Protection against collision damage (bollards) • Fuel dispensing equipment per Ontario Fire Code • Approved shut-off devices per Ontario Fire Code • Control of ignition sources • Prohibition of smoking • Control of combustible materials • Wiring and equipment meeting requirements of Ontario Electrical Safety Code, Rules 20-002 to 20-014
Ignited Combustible Liquid Release	• Hydrants for manual firefighting • Portable/wheeled dry chemical fire extinguishers (at least two portable fire extinguishers, each with a rating of 40-B:C per Ontario Fire Code)

6 Fire Water Demand Assessment

6.1 Fire-Water For Buildings

The Site Servicing and Stormwater Management Report prepared by Stantec, dated August 21, 2025, calculates the fire flow requirements for each of the two buildings on site, using the methodology prescribed by the City of Ottawa Technical Bulletin IWSTB-2024-05. The results of this calculation are as follows:

Table 8: Fire Water for Buildings – Fire Flow and Volume Summary

Building Name	Calculated Fire Flow (LPM)	Fire Flow Storage Required (L)
Vehicle Service Building	3,600	118,667
Tank and Equipment Storage Structure	9,000	336,458

To meet the above minimum manual firefighting flow and volume requirements, on-site dedicated fire water storage capable of delivering 336,458 L (89,000 gal) must be available at all times and maintained a reliable, clean fire water source. Per discussions with the Ottawa Fire Department, the site must provide a network of manual dry hydrants installed according to Standard W54.

The W.O. Stinson site will be responsible for providing the fire water infrastructure (fire pump and water supply) to meet the automatic wet sprinkler system demand for the Vehicle Service Building. Based on a preliminary fire sprinkler demand assessment, assuming an Extra Hazard Group 2 sprinkler system in accordance with NFPA 13, the required sprinkler system flow demand would be:

Q (sprinkler demand) = 0.4 gpm/sq.ft x most remote 2,500 sq.ft area x 1.15 safety factor
Q (sprinkler demand) = 1,150 gpm (4,350 LPM)

Per NFPA 13, an Extra Hazard sprinkler system must be designed to operate for a minimum of 90 minutes, which would require a fire water storage volume of:

V (sprinkler volume) = 4,350 LPM x 90 minutes = 391,500 L

Since this calculated volume of 391,500 L (for sprinkler system supply) is larger than the 336,458 L (for manual firefighting) calculated above, this becomes the maximum credible fire water storage demand for the facility.

At the request of the City of Ottawa, supplemental fire water for cooling of the bulk propane storage tank area will be included with the Tank and Equipment Storage Shed fire scenario.

Each bulk propane tank is approximately 10 ft. diameter x 77 ft. long and has a total surface area of approximately 2,700 sq.ft. A fire occurring in the Tank and Equipment Storage Shed could potentially expose the west-facing surfaces of (2) bulk propane storage tanks, or a total surface area of 2,700 sq.ft. Applying a 0.1 gpm/sq.ft. cooling water supply to these exposed surfaces, and adding a 10% safety margin to account for overspray and wind losses, the calculated additional cooling water flow rate would be:

Q (gpm) = 0.10 gpm/sq.ft. x 2,700 sq.ft. x 1.10 (safety margin) = 300 gpm (1,140 LPM)

Assuming a maximum fire duration of 90 minutes, the additional fire water storage volume to provide this cooling water supply would be:

Volume = 300 gpm x 90 min = 27,000 gal (102,000 L)

Stantec's recommended design approach is to include provisions in the proposed site plan to accommodate the additional manual firefighting water calculated above (i.e. additional fire water storage, larger fire pumps). During the detailed design phase, every effort will be made to increase separation between fire areas to further reduce or eliminate the need for supplemental vessel cooling in any credible fire scenario.

Therefore, in summary, the site fire water infrastructure should be designed as follows, at a minimum:

- Provide a minimum dedicated on-site, reliable fire water supply of 391,500 L (104,000 gal.) to meet the maximum credible fire water scenario demand. Include provisions for an additional 102,000 L (27,000 gal) if supplemental cooling of the bulk propane storage tanks is determined to be required during the Detailed Design phase.
- Provide redundant fire pumps, sized for a minimum of 5,677 LPM (1,500 gpm) each, to meet the building sprinkler demand plus potential supplemental cooling water demand for the bulk propane storage tanks. Sprinkler hose allowance to be supplied by the Ottawa Fire Department Fire Apparatus. Redundant fire pumps to be supplied at the recommendation of the City of Ottawa.

7 Operational Safety Discussion

In addition to the active and passive fire safety measures proposed in the above sections, operational safety measures also contribute to the overall fire safety of this proposed facility.

W.O. Stinson currently operates two similar facilities at Belgreen and Greely Yard. To date, no reportable fire safety incidents have occurred. This history of fire safety can be attributed to the following hazard mitigation measures currently in place at these facilities (which will be enforced at the proposed 301 Somme Street facility):

1. Staff Training for Response to Incipient Fires:
    - All staff will receive fire extinguisher training and annual training on the site ERPP (emergency shutdown procedures). In the event of a large-scale site emergency, W.O Stinson will develop an Emergency Response Plan to notify personnel and evacuate the site within 4 minutes.
2. Hazardous Event Identification and Communication:
    - All staff will be trained in Emergency Shutdown Procedures and instructed to call 9-1-1 if a hazardous situation is identified. The design of the facility will incorporate a fire alarm communication system which will be coordinated with Ontario Fire Department. During propane transfer, operators will be trained to be at the point of fill and able to access emergency shutoff controls. Additionally, annual emergency drills will be conducted by the staff. All staff that handle propane will be provided with propane-specific training.

Once constructed, the facility will identify muster points for plant personnel during an emergency event or a drill.

3. Control/Monitoring of Safe Propane Storage:
    - Daily documented site inspections will be performed at all areas where flammable and/or combustible materials are stored. Inspections will verify proper storage, spacing and control of combustible materials.

In the unlikely event of a fire at the 301 Somme Street facility, the site design will include required fire department access, fire apparatus turnaround radius, and connections to the dry manual hydrant system spaced throughout the facility so that fire water coverage can be provided to each fire area. Additionally, the facility will maintain signage indicating names, addresses and telephone numbers of people to be contacted in case of fire during non-operating hours.

8 Summary and Recommendations

The following recommendations will help to further develop/refine the fire safety plan for the proposed 301 Somme Street Bulk Propane Filling Plant:

1. Continue to engage with the Ottawa Fire Department to discuss the proposed fire safety strategies and identify any suggested changes or additional requirements.
2. Assess the availability and reliability of the on-site fire water supply.
3. Identify any areas where hot work can potentially occur and continuously implement fire safety strategies including control of combustible materials, fire watch, etc.

END OF FIRE SAFETY PLAN

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