



Town of LaSalle

Three Station Fire Service Model Analysis

Final Report

January 2022 - 21-3052



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Acronyms, Abbreviations, Definitions

DC	Development Charge
FPSMP	Fire Protection Services Master Plan
GIS	Geographic Information System
LFS	LaSalle Fire Service
NFPA	National Fire Protection Association
OFM	Office of the Fire Marshal
OHSA	Ontario Health and Safety Act

Introduction

The objective of this study was to assess the emergency response capabilities of the initial arriving apparatus from each existing or potential fire station location within a three station fire service delivery model for the defined urban area of the Town of LaSalle. Three different scenarios of station locations were analyzed, including testing specific properties provided by the Town of LaSalle and model-selected locations.

Each scenario maintained Station #1 at the existing Fire Station Headquarters location at 1900 Normandy Street. Scenario 1 tested two additional station locations: the old arena property at 2170 Front Road and a location within the Vollmer Complex property. Scenario 2 used a GIS-based Location Allocation Tool (within Esri's Network Analyst extension) to select the two additional station locations that would provide the best modelled coverage of the Town's urban area. This resulted in proposed locations on Front Road, near Front Road Park, and Laurier Parkway, just west of Disputed Road. Scenario 3 included the old arena property at 2170 Front Road and a proposed site location on Laurier Parkway, slightly west of the location proposed in Scenario 2.

In addition to other factors the analysis presented within this report applies the most prevalent industry best practice performance measure for fire station location analysis (i.e. NFPA 1710) that includes the initial responding apparatus arriving on scene within a four minute travel time. Achieving this performance measure would typically reflect staffing of this initial responding apparatus with a crew of four full-time firefighters. Therefore it has been assumed that this apparatus is staffed with four firefighters. As the staffing of this initial responding apparatus is a core element of this performance measure this report also includes information regarding the LaSalle Fire Service (LFS) current staffing model and options for the Town as it considers the future of fire protection services within the community.

This report is structured into five additional sections:

- Background;
- Approach and Methodology;
- Results, Analysis and Discussion;
- Staffing Practices and Considerations; and
- Conclusions.

2.0

Background

In August of 2019, the Town of LaSalle's Fire Protection Services Master Plan (FPSMP) was adopted by Council. Since that time, the Town has been working to implement the recommendations and action plan included within the master plan. This includes Council Recommendation #7: That consideration be given to developing a Fire Station implementation strategy to transition to the proposed Scenario #4 Fire Station Location model presented within the proposed Fire Protection Services Master Plan.

The Scenario #4 model within the FPSMP proposed two stations, the first one located in the area of Matchette Road and Laurier Drive, and in the future, relocating Fire Station #1 (Headquarters) to the Disputed Road location in one of the proposed development areas. This recommendation was consistent with the future fire station locations recommended by the 2008 Fire Master Plan.

One of the short-term steps required to implement the recommended two station model was purchasing property in the area of Matchette Road and Laurier Drive for the purpose of constructing the future proposed Fire Station #2. Finding and securing property in the location required for the recommended location of Fire Station #2 has proven challenging and not yet been possible. Following attempts at purchasing, and consideration of expropriating, land in the area of Matchette Road and Laurier Drive, the Town is now investigating alternate options for future fire station locations. Consideration of a three station model that maintains the existing station location and adds two new fire stations is the purpose of this study. Based on the most recent available planning and development information, future planned growth and intensification in the LaSalle Town Centre District, located within the response area of existing Station #1 indicates there are benefits to maintaining the existing station in its current location. The analysis within this report considers the most recent planning information available regarding the future build-out of the Town of LaSalle's defined urban area. The use of this long-term planning horizon aligns with the asset lifecycle of fire station facilities. The aim of a three station model is to provide the Town with planned locations for fire stations that will align with the future needs of the Town's forecasted future growth and development.

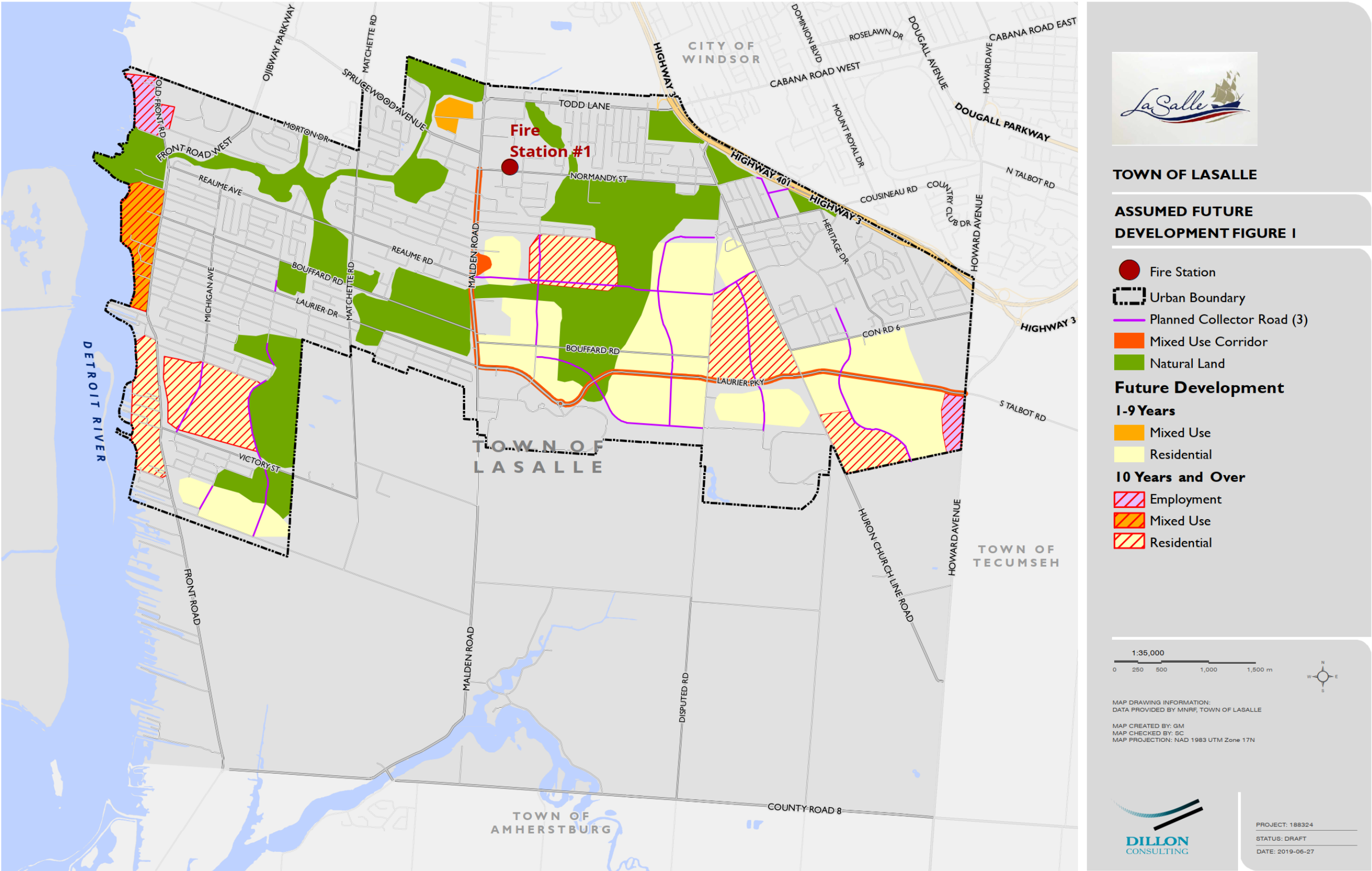
As referenced within the FPSMP there are several factors to consider when planning for future fire stations, including the fire suppression deployment model (including use of full-time and volunteer (paid-on-call) firefighters), the four minute travel time coverage for the initial responding apparatus, and the percentage of historical emergency calls covered within a four minute travel time. The analysis within this report has considered the same three factors as applied within the FPSMP with a primary focus on the four minute travel time of the initial arriving apparatus from each of the proposed station location options. The scope of this study did not include analysis of initial response staffing levels, depth of response performance or volunteer firefighter response coverage from the proposed fire station locations.

Planning for municipal fire stations should also consider future community growth and the type of growth planned such as commercial, industrial or residential. The FPSMP station analysis assessed future community growth over the next 10 and 20 year planning horizons. The future community growth analysis presented within this report was updated with current available information.

2.1 Growth and Development

The FPSMP fire station location and emergency response analysis was qualitatively informed by future growth and development plans and projections, based on the best available information at the time. As part of the process, Town staff identified future development areas based on two time horizons within a long-term 20-year outlook: one to nine years; and ten years and over, and each of these future development areas were assigned corresponding land use designations. The assumed development parcels, by horizon and type of proposed land use are presented below in **Figure 1**.

Figure 1: Assumed Future Development from the 2019 FPSMP



Source: 2019, Town of LaSalle Fire Protection Services Master Plan (Figure 20), Dillon Consulting

Figure 1 Notes:

1. Town staff identified future development areas for the purposes of this FSMP. The identified development areas are based on the best available information and the current known development potential over a 20 year horizon. The actual timing and location of future development will depend on a range of factors including servicing capacity, market demand, and developer interest.
2. For the purposes of the analysis in the F.S.M.P, the land uses of the development areas shown on this figure has been simplified. Please refer to the F.S.M.P. for more detail on the permitted uses in these areas as they pertain to the Official Plan land use designations.
3. Access to existing development and future development to provide emergency response coverage is driven by road network connectivity. In order to assess future station location options, it was necessary to assume a future road network. The Official Plan Schedule D - Transportation Plan reflects the best available information regarding the planned collector road network. The future model assumes a full build-out of the planned road network reflecting a long-term horizon. The Town is currently undergoing a Transportation Master Plan which will provide further detail and direction on the timing of transportation infrastructure needs. The configuration and timing of the future road network will also be informed by how future development manifests.

2.1.1 Updates to Future Growth and Development Considerations

The 2020 Development Charge (DC) growth projections estimate a 20 year (2039 horizon) net population increase of approximately 13,100 people in the Town of LaSalle, requiring an estimated 5,700 new residential units. The DC forecast for Town buildout (beyond 2040) projects an increase of approximately 27,000 people and the need for approximately 11,800 residential units.

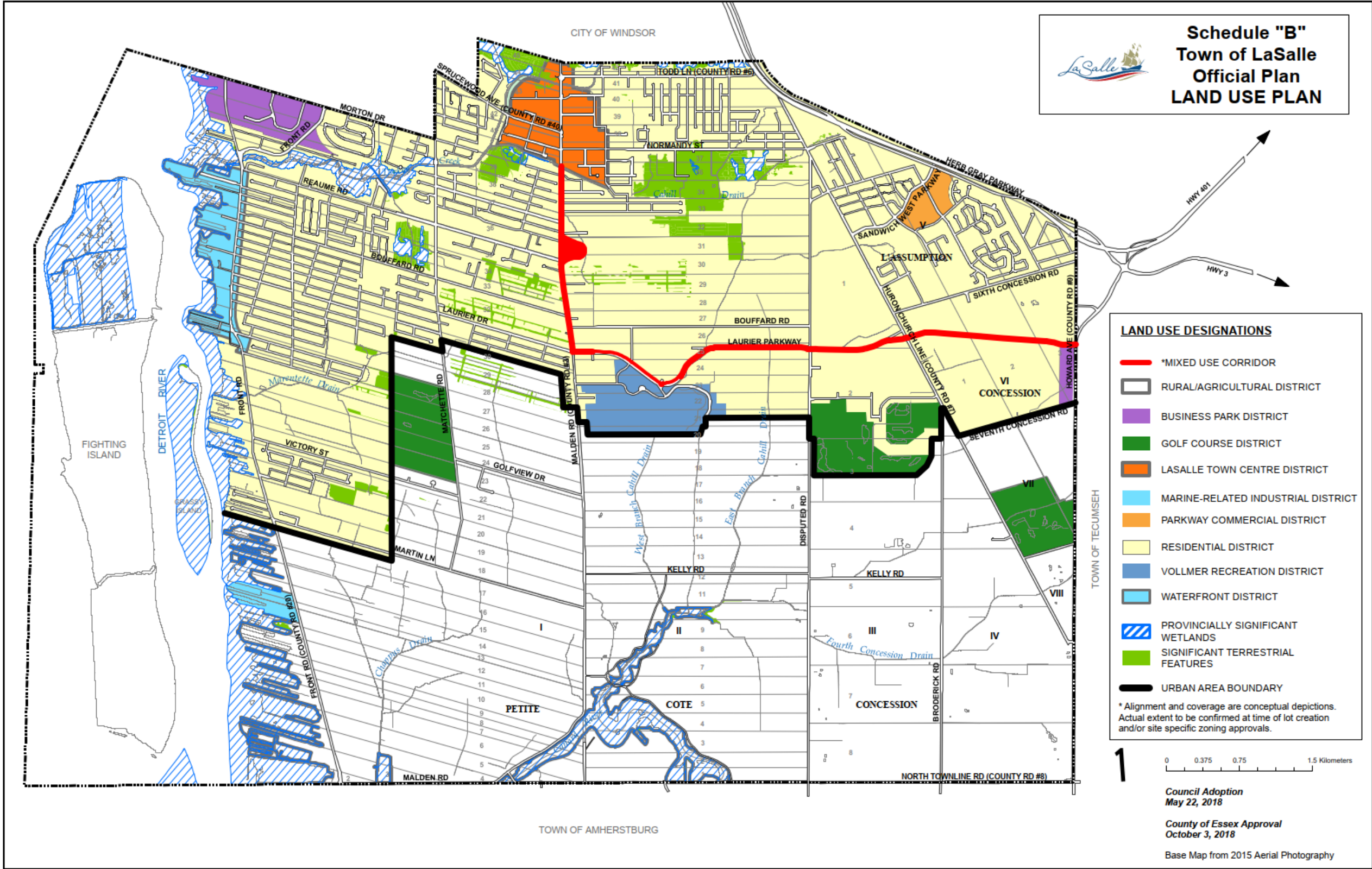
Future growth and development, including the projected future residential growth identified through the DC forecast, is anticipated to occur within the Town's remaining Greenfield areas (e.g. Greenfield Designated Residential areas) and as infill type development/redevelopment (i.e. intensification), within the defined urban area. In order to address future development areas beyond those identified within the FPSMP, the GIS-based mapping included in this study show an overlay of the Greenfield land parcels. There is substantial overlap between the existing Greenfield areas and the future development parcels identified within the mapping, however, the two datasets combined provide the best available information about the potential locations (and types) of future development within the long-term planning horizon (i.e. buildout) considered for fire station location planning.

The Town is anticipating that a significant amount of infill type development/redevelopment (i.e. intensification) will be taking place in the Town Centre District, the Waterfront District and along the Malden Road Mixed Use District in the years ahead. These districts are indicated in Schedule "B" of the Town of LaSalle Official Plan Land Use Plan, included below as **Figure 2**. This will be driven by the demand for smaller and more affordable housing units, a relevant trend anticipated to continue into future years. At the time of preparing this study, no firm details are available regarding scale and timelines for intensification development. Town staff have provided estimates based on recent activity levels that assume an average of 50 to 100 higher density (smaller) residential units being built annually in these districts going forward.

2.2 Future Road Network

Current available details regarding the planned future road network were obtained from the Town of LaSalle at the time of study preparation. This new data was used to update the GIS-based emergency response model previously developed for the 2019 FPSMP analysis. Existing and planned roads are depicted within the maps of each scenario analyzed in the sections below.

Figure 2: Schedule "B" Town of LaSalle Official Plan - Land Use Plan



Source: 2018, Schedule B Town of LaSalle Land Use, Town of LaSalle

3.0 Approach and Methodology

The following section outlines the approach and methodology for the subject study, including the performance benchmark applied within the station location analysis.

3.1 Approach

This study was approached as additional station location analysis, building upon the results and analysis presented within the 2019 FPSMP report. The scope of this study does not include analysis of initial response staffing levels, depth of response or volunteer firefighter response coverage from the proposed fire station locations.

The GIS-based station location / emergency response model prepared for the master plan was updated for the subject study. The updates included adding points to the GIS-based model to represent historic emergency call locations that occurred from January 2019 to October 2021 and confirming the calibration of the road network speeds based on the updated call dataset. The historic call incidents mapped in the scenarios analyzed included calls from January 2014 to October 2021. A total of 2,527 calls over this time period were able to be geo-located and presented as dots on the maps. Of these 2,527 mapped historic calls, 2,161 (85.6%) were located within the Town's defined urban boundary.

Although historical emergency call coverage is an important consideration, the percentage of defined urban area coverage and coverage of the Town's geographical area have more merit for consideration of future fire station locations. It is impossible to predict exactly where future emergency calls may occur, however, trends can be associated with the types of land use, such as commercial, industrial or residential. The assumed future community growth over the next 20 years and beyond includes a number of additional residential growth areas. Based on historical patterns it can be assumed that these areas will result in a similar emergency call volume as existing residential areas within the Town.

A three station model will require additional capital and operating costs to build and operate, in comparison to the proposed two station model. This study does not include cost considerations or financial analyses. Staffing practices for a composite fire service are discussed in general in **Section 5.0**, however, this study does not include analysis or

recommendations regarding the staffing of a three station fire service model for the Town of LaSalle.

3.1.1 Fire Suppression Performance Benchmarks

As stated in the FPSMP, the National Fire Protection Association (NFPA) 1710¹ **initial response performance benchmark of four firefighters arriving on scene within a four minute travel time to 90% of the incidents within the defined urban area** of the Town of LaSalle remains the most applicable performance benchmark for assessing the initial response capabilities of the LFS. This is consistent with the 2008 Fire Master Plan analysis as well.

Initial Response Performance Benchmark: Four firefighters arriving on scene within a four minute travel time to 90% of fire suppression related incidents within the defined urban area of the Town.

3.1.2 Scenarios Analyzed

3.1.2.1 Scenario 1 – Site Provided by Town of LaSalle (Existing Station, Old Arena Site and Vollmer Complex Site)

This scenario presents a three station model with stations located at the existing station location (1900 Normandy Street), the old arena property (2170 Front Road), and Vollmer Complex property (approximately 2121 Laurier Pkwy).

3.1.2.2 Scenario 2 – Sites for Stations #2 and #3 Determined by Location Allocation Tool

This scenario included the existing station located at 1900 Normandy Street, and used the GIS-based model and Esri's Network Analyst Location-Allocation tool to determine optimized locations for the other two station sites within the defined urban area of the Town of LaSalle, prior to assessing the four-minute response coverage. This resulted in proposed locations on Front Road near Front Road Park and Laurier Parkway just west of Disputed Road.

¹ The 2019 F P S M P referenced the 2016 edition of N F P A 1710. The 2020 edition is now available and the initial response performance measure has remained the same in the newer edition.

3.1.2.3

Scenario 3 – Site Selected Based on Scenario 2 Results (Existing Station, Old Arena Site and Laurier Parkway West of Disputed Road)

This scenario aimed to assess potentially available sites or properties that most closely aligned with the results of the Station Locations identified in Scenario 2. This scenario included the existing station located at 1900 Normandy Street, the old arena property (2170 Front Road), and proposed site location on Laurier Parkway, slightly west of the location proposed in Scenario 2 (west of Disputed Road).

3.2

Methodology

Three different configurations of three fire station locations (i.e. three scenarios) were analyzed to assess the four minute travel time response coverage, measured against the initial response performance benchmark. Scenarios 1 and 3 used the GIS roads-based model and Esri's Network Analyst tool to assess the response capabilities of the initial arriving apparatus, based on a four minute travel time, from specific potential station location properties provided by Town of LaSalle staff.

Scenario 2 used Esri's GIS application Network Analyst (and specifically the Location-Allocation tool), prior to assessing the four-minute response coverage, to identify optimized (non-site specific) proposed station locations for Fire Stations #2 and #3 and maintained the existing Fire Station #1 in its current location. The analysis of the three station model for fire services was focused within the urban area of the Town of LaSalle. This approach is based on modelled demand points, representing emergency incidents, which are manually added along the GIS-based road network within the urban area, as a proxy for emergency calls. Potential station location points were also added along the road intersections (collector roads, arterial roads and major roads) within the model. This was done to simulate an approximately equal likelihood that an emergency incident could occur throughout the urban area geography and to provide the Location Allocation Tool the information it needs to optimally locate two stations across the urban area. This is distinctly different than the analysis undertaken in Scenarios 1 and 3. The results from Scenario 2 were referenced in order to confirm and select the potential station sites analyzed within Scenario 3.

4.0

Results, Analysis and Discussion

The following presents an overview of the analysis undertaken and discussion of the results.

As noted above, the FPSMP completed in 2019 included analysis and recommendations regarding fire station locations. The FPSMP recommended a two station model that located the proposed Fire Station #2 in the area of Matchette Road and Laurier Drive and in the future relocated Fire Station #1 (Headquarters) to the Disputed Road location in one of the proposed development areas. The modelled results of the FPSMP's recommended scenario indicated that the within a four minute travel time the LFS would be able to respond to 73% of the historical emergency calls for the period from January 31st, 2014 to January 31st 2019. The LFS could also provide initial response coverage within a four minute travel time to 75% of the defined urban area of the Town, and 46% of the Town's geographical area. For comparison purposes, the 2018 existing conditions and the FPSMP Recommended Scenario #4 initial response coverage results are included below in **Table 1**. These results are the baseline to which the initial response results of three station model scenarios are compared.

Table 1: 2019 FPSMP Initial Response Analysis Results Summary

Scenario	% of Historical Calls Covered	% of Urban Area Covered	% of Town's Geography Covered
2018 Existing Conditions	33	28	14
FPSMP Recommended Scenario #4 Two Station Model	73	74	39

4.1 Scenario Results

The scenarios assessed the four minute travel time of the initial responding apparatus from each of the proposed station locations. In order to meet the performance benchmark, the first responding apparatus would need to be staffed with four firefighters. The results included below are focused on the four minute travel time coverage. The scope of this study did not include analysis of initial response staffing levels, depth of response performance or volunteer firefighter response coverage from the proposed fire station locations.

4.1.1 Scenario 1 – Site Provided by Town of LaSalle (Existing Station, Old Arena Site and Vollmer Complex Site)

The results of this scenario are presented in **Table 2** and displayed in **Figure 3** below. This scenario indicates that the initial response (four minute travel time) coverage from the three station locations would cover 80% of the Town's urban area, which is an improvement of 52% from 2018 conditions and 6% more than the recommended two station model. This scenario also achieves coverage of 84% of historic urban area calls, 79% of total historic calls within the Town of LaSalle from January 2014 to October 31st 2021. This scenario also achieves the four minute initial response coverage to 52% of the total municipal geography. This is an improvement of 38% from 2018 conditions and provides 13% more geographical coverage than the proposed two station model. The most significant gaps in initial response coverage are along the eastern end of the urban area, which includes existing development and some planned future development. There is a small band between the four minute initial response coverage from Proposed Fire Station #2 and existing Station #1 where the initial response time would extend to five minutes. This gap includes a small pocket of existing residential development north of Morton Drive between Front Road and Matchette Road, however, this gap exists under the current station configuration as well, so it would not represent a change in service level. Gaps in the initial response four minute travel time coverage should be assessed and considered when planning for fire prevention and public education initiatives, such as the home smoke alarm program.

Table 2: Results Table from Figure 3 (Three Station Model Scenario 1)

Travel Time	% Urban Calls Covered	% Urban Area Covered	% LaSalle Calls Covered	% LaSalle Area Covered
4 Minutes	84%	80%	79%	52%
5 Minutes	94%	92%	90%	65%
6 Minutes	99%	97%	96%	75%
> 6 Minutes	1%	3%	4%	25%

Figure 3: Three Station Model Scenario 1

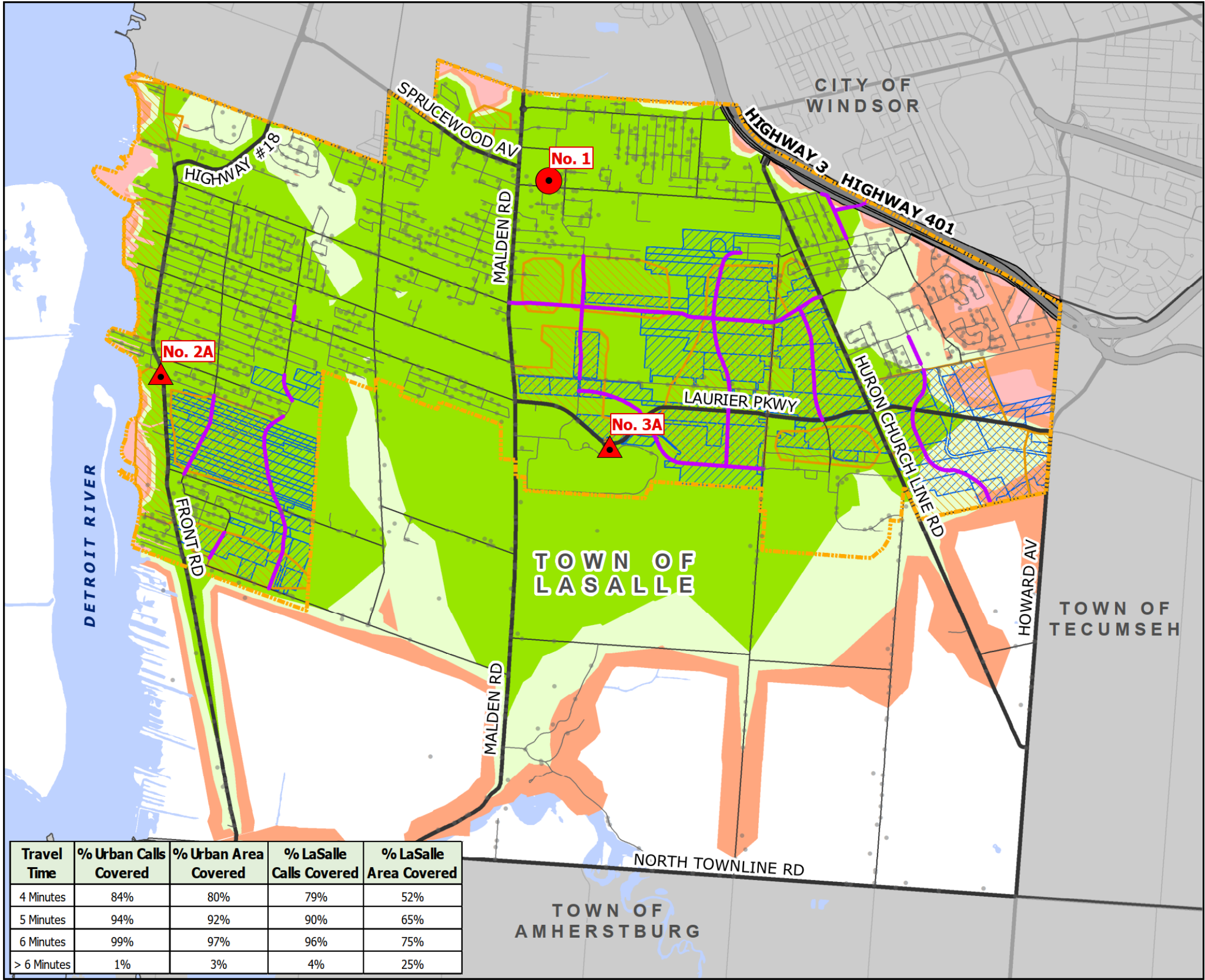


Figure 3: Initial Arriving Company Scenario 1

- Existing Fire Station
 - Proposed Fire Station
 - Historic Incident (2014-2021)
 - Planned Road
 - Future Development
 - Greenfield Property
 - Urban Boundary
- Travel Time**
- 4 Minutes at Network Speed
 - 5 Minutes at Network Speed
 - 6 Minutes at Network Speed
 - > 6 Minutes at Network Speed

DATA PROVIDED BY MNRF, TOWN OF LASALLE
MAP CREATED BY: GM
MAP CHECKED BY: SCD
MAP PROJECTION: NAD 1983 UTM Zone 17N

0 1 km



PROJECT: 21-3052
STATUS: DRAFT
DATE: 2022-01-12



4.1.2

Scenario 2 – Sites for Stations #2 and #3 Determined by Location Allocation Tool

The GIS– based model results of this scenario are presented in **Table 3** and shown in **Figure 4** below. This three station scenario results in four minute travel time coverage of 91% of the Town’s urban area. This is an improvement of 63% from 2018 conditions and 17% more than the recommended two station model. This scenario also provides four minute travel time initial response coverage to 58% of the total Town geography, which is 19% more than the recommended two station model and 44% more than under 2018 conditions. This scenario also achieves coverage of 98% of historic urban area calls, and 89% total calls within LaSalle. This exceeds the performance benchmark of reaching 90% of the incidents within the defined urban area within a four minute travel time. The only gaps in initial response travel time coverage in this scenario are small pockets along the southwest border and the northeastern edge (north of Laurier Parkway) of the defined urban area. These areas are within Greenfield or planned future development areas. The road access to these pockets is the primary cause of the response gap. The planned future road network does not include the detail of local roads, access roads or driveways. It is expected that future access roads will provide improved response times to these areas and further improve the initial response travel time coverage of this scenario.

As previously discussed, Scenario 2 was based on model-selected locations as opposed to staff-selected available sites or properties. Implementing Scenario 2 would require the availability of property at the exact modelled locations, which may not be possible. The results from Scenario 2 were used to inform the selection of site locations for proposed Fire Stations #2 and #3 to test in Scenario 3. Scenario 3 represents the implementable version of Scenario 2 as it is based on the closest available properties to the identified Scenario 2 locations.

Table 3: Results Table from Figure 4 (Three Station Model Scenario 2)

Travel Time	% Urban Calls Covered	% Urban Area Covered	% LaSalle Calls Covered	% LaSalle Area Covered
4 Minutes	98%	91%	89%	58%
5 Minutes	99%	96%	94%	71%
6 Minutes	99%	98%	98%	79%
> 6 Minutes	1%	2%	2%	21%

Figure 4: Three Station Model Scenario 2

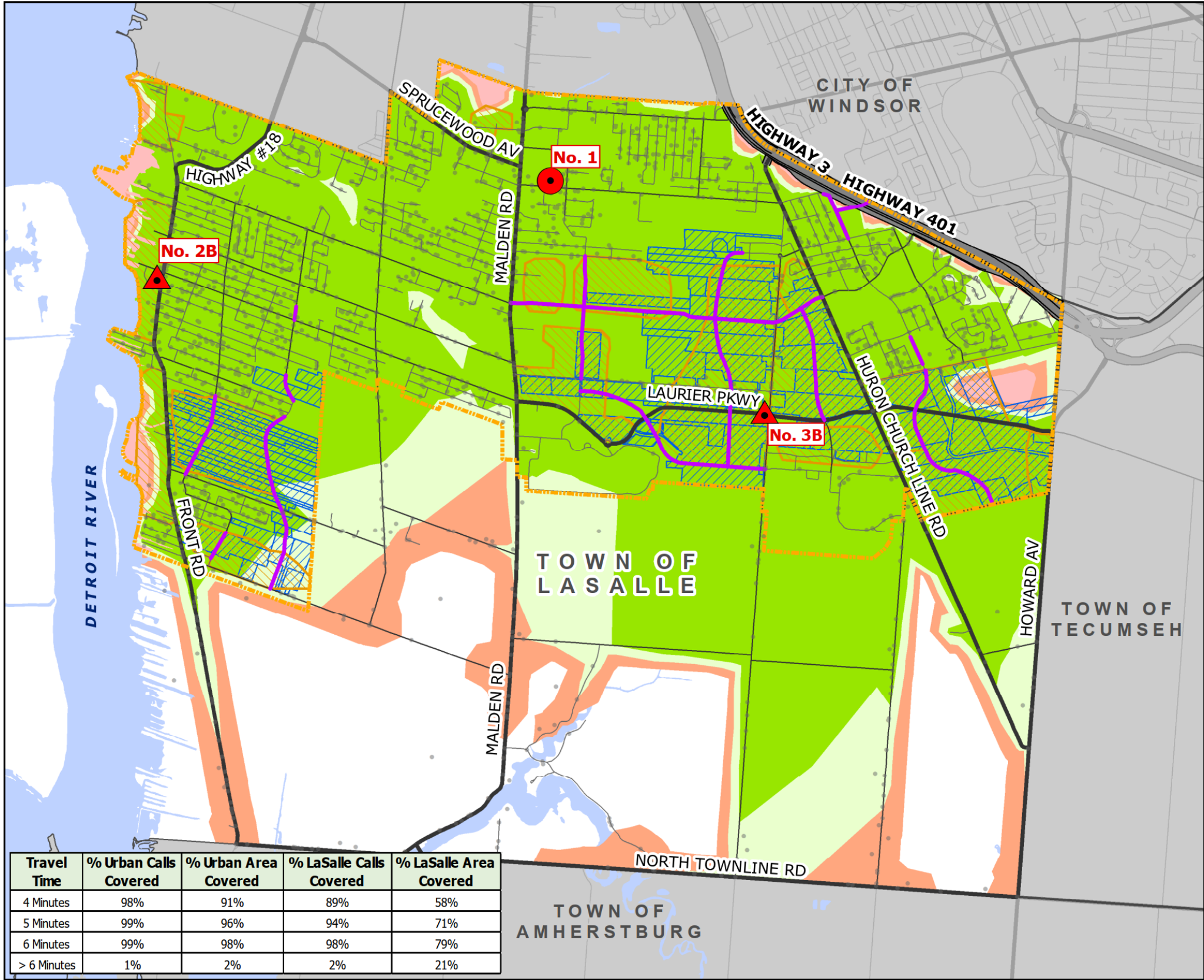
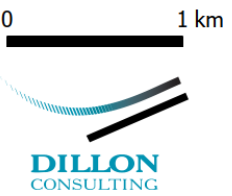


Figure 4: Initial Arriving Company Scenario 2

- Existing Fire Station
 - Proposed Fire Station
 - Historic Incident (2014-2021)
 - Planned Road
 - Future Development
 - Greenfield Property
 - Urban Boundary
- Travel Time**
- 4 Minutes at Network Speed
 - 5 Minutes at Network Speed
 - 6 Minutes at Network Speed
 - > 6 Minutes at Network Speed

DATA PROVIDED BY MNRF, TOWN OF LASALLE
MAP CREATED BY: GM
MAP CHECKED BY: SCD
MAP PROJECTION: NAD 1983 UTM Zone 17N



PROJECT: 21-3052
STATUS: DRAFT
DATE: 2022-01-12



4.1.3

Scenario 3 – Site Selected Based on Scenario 2 Results (Existing Station, Old Arena Site and Laurier Parkway West of Disputed Road)

The results of this scenario are provided **Table 4** and **Figure 5** below. This scenario provides initial response coverage from the three station locations that would cover 87% of the Town's urban area, which is an improvement of 57% from 2018 conditions and 13% more than the recommended two station model. The geographical coverage of the entire Town is 57%, just 1% lower than in Scenario 2 described above. This scenario also achieves coverage of 93% of historic urban area calls and 85% of total historic calls (2014-2021) which exceeds the performance benchmark of reaching 90% of the incidents within the defined urban area within a four minute travel time. This scenario experiences the same small gap at the northeastern edge of the urban area (north of Laurier Parkway) as identified in Scenario 2. As discussed in Scenario 2 results, it is expected that future access roads will provide improved response times to this area and further improve the initial response coverage of this scenario. Similarly to Scenario 1, this scenario also results in a comparable band between the four minute initial response coverage from Proposed Fire Station #2 and existing Station #1 where the initial response time would extend to five minutes. This gap includes a small pocket of existing residential development north of Morton Drive between Front Road and Matchette Road, however, as noted in Scenario 1 results, this gap exists under the current station configuration as well, so it would not represent a change in service level. Gaps in the initial response coverage should be assessed and considered when planning for fire prevention and public education initiatives, such as the home smoke alarm program.

Table 4: Results Table from Figure 5 (Three Station Model Scenario 3)

Travel Time	% Urban Calls Covered	% Urban Area Covered	% LaSalle Calls Covered	% LaSalle Area Covered
4 Minutes	93%	87%	85%	57%
5 Minutes	99%	96%	95%	72%
6 Minutes	99%	98%	98%	80%
> 6 Minutes	1%	2%	2%	20%

Figure 5: Three Station Model Scenario 3



Figure 5: Initial Arriving Company Scenario 3

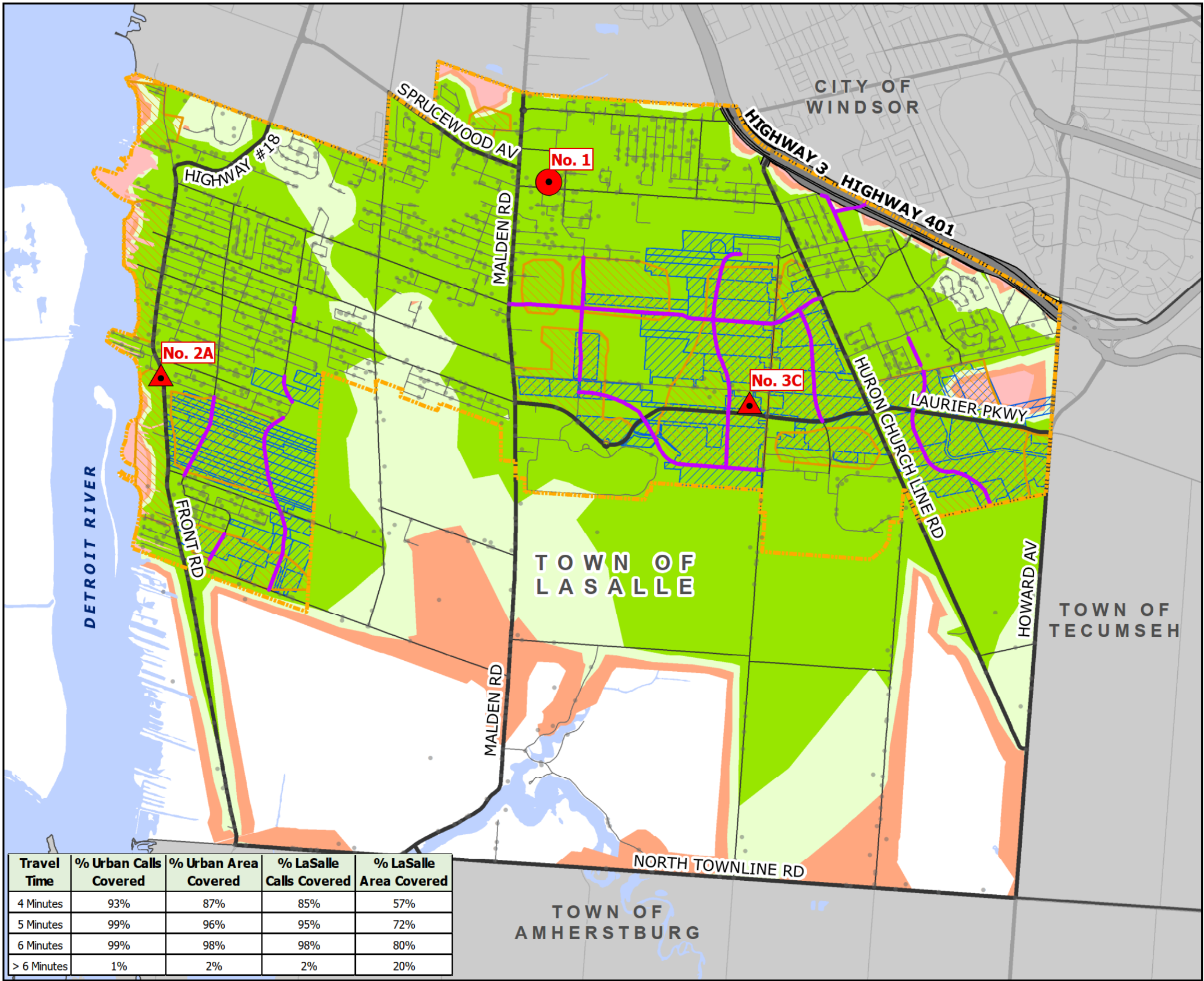
- Existing Fire Station
 - Proposed Fire Station
 - Historic Incident (2014-2021)
 - Planned Road
 - Future Development
 - Greenfield Property
 - Urban Boundary
- Travel Time**
- 4 Minutes at Network Speed
 - 5 Minutes at Network Speed
 - 6 Minutes at Network Speed
 - > 6 Minutes at Network Speed

DATA PROVIDED BY MNRF, TOWN OF LASALLE
MAP CREATED BY: GM
MAP CHECKED BY: SCD
MAP PROJECTION: NAD 1983 UTM Zone 17N

0 1 km



PROJECT: 21-3052
STATUS: DRAFT
DATE: 2022-01-12



4.1.4

Scenario Results Summary

Table 5 summarizes the results from the analyses of Scenarios 1 to 3.

Table 5: Three Station Model Initial Response Summary

Scenario	% of Historical Calls Covered in 4 Minutes Travel Time	% of Historical Calls in Urban Area Covered in 4 Minutes Travel Time	% of Total Town Area Covered in 4 Minutes Travel Time	% of Urban Area Covered in 4 Minutes Travel Time
2018 Existing Conditions	33	Not Available	14	28
FPSMP Recommended Scenario #4 Two Station Model	73	Not Available	39	74
Three Station Model Scenario 1	79	84	52	80
Three Station Model Scenario 2	89	98	58	91
Three Station Model Scenario 3	85	93	57	87

The results from Scenario 1 provide a moderate improvement in initial response coverage in comparison to the two station model proposed within the 2019 FPSMP. Scenario 2 provides a very high percentage of both urban area and historic urban call coverage within the four minute travel time. The challenge with Scenario 2 is that it is based on optimized station locations, and it may not be possible for the Town to secure appropriate building sites for future fire stations at those exact points on the map. Scenario 3 results in initial response coverage that meets the performance benchmark of reaching 90% of the incidents within the defined urban area within a four minute travel time. Scenario 3 provides significantly greater area coverage and historic call coverage than the proposed two station model. Scenario 3 was based on site locations with a higher potential for implementation by the Town in acquiring property for the future fire station locations, in close proximity the model-identified locations from Scenario 2.

5.0

Staffing Practices and Considerations

The information presented within the 2019 FPSMP confirmed the definition of the LFS as a “composite” fire department, including the use of both full-time and paid-on-call volunteer firefighters and presented evidence to support that the composite fire department model has served the Town of LaSalle very well. However, the master plan also identified that the sustainability of using paid-on-call volunteer firefighters to provide initial fire suppression services is an increasing risk for the municipality, and as such it introduced new strategies targeted to support the sustainability of the composite department model.

5.1

Considerations for Full-Time Staffing within the Composite Model

Initial response is consistently defined in the fire service as the number of firefighters initially deployed to respond to an incident. Fire service leaders and professional regulating bodies have agreed that until a sufficient number of firefighters are assembled on-scene, initiating tactics such as entry into the building to conduct search and rescue, or initiating interior fire suppression operations are not safe practices. If fewer than four firefighters arrive on scene, they must wait until a second vehicle, or additional firefighters arrive on scene to have sufficient staff to commence these activities. Based on relevant Office of the Fire Marshal (OFM) Public Fire Safety Guidelines, NFPA 1710 and 1720 standards; and Ontario Health and Safety Act (OHSA) Section 21 Guidance Notes, an appropriate initial response should include a minimum of four firefighters.

Time is a critical component with respect to the growth of a fire and the success of intervention by firefighters. Tests have shown that fire can extend from the room of origin in as little as three minutes, under fast fire growth conditions. In addition to early detection occupant actions, such as working smoke alarms, home escape planning, and prompt notification of the fire department, the success of firefighting intervention requires a timely on-scene response. The assembly of four firefighters on the fire scene provides sufficient resources to safely initiate some limited fire suppression operations. This first crew of four firefighters (initial response) is also able to conduct the strategic operational priority of “size-up” whereby the officer in-charge can evaluate the incident

and where necessary, request an additional depth of resources that may not have been dispatched as part of the initial response.

Ontario Regulation 378/18 requires all municipalities in Ontario to develop a Community Risk Assessment and to use the findings of the risk assessment to inform decisions regarding fire protection services. With the future growth, development and intensification planned within the Town of LaSalle, the community fire risks will continue to increase. The changes to local risks should be continually monitored within the annual reviews of the Town's Community Risk Assessment document, and be incorporated into the department's annual planning.

The 2008 Fire Master Plan, 2018 Fire Master Plan Implementation - Second Station Implementation & Costing Models (Report FIRE 18-06) and the 2019 FPSMP all identify that the future targeted fire suppression deployment model of the LFS should aim to provide initial response by full-time firefighters. The FPSMP recommended a short-term priority to staff the existing Fire Station # 1 (Headquarters) with a minimum of two full-time firefighters at all times. Maintaining a minimum of two firefighters on-duty is aligned with several health and safety practices, including such practices as safe backing of vehicles (e.g. fire apparatus) and reducing the risks associated with "working alone" as a reasonable precaution for the health and safety of on-duty firefighting personnel.

The current master plan also recommends transitioning to the deployment at Fire Station #1 to four full-time firefighters on duty at all times as soon as is fiscally possible to fully staff the initial responding apparatus and thereby enhance its current fire suppression capabilities. The master plan indicated this approach should coincide with prioritizing efforts to sustain the use of paid-on-call volunteer firefighters to staff secondary and additional fire suppression apparatus.

Similar considerations will be required to coincide with the opening of future stations (i.e. Fire Station #2 and potential Fire Station #3). As new fire stations are opened within the Town, consideration should be given to a similar transition to initially staff with a minimum of two full-time firefighters, working towards to the target of four full-time firefighters to staff the initial responding apparatus and meet the initial response performance benchmark, as soon as is fiscally possible. There are various options for transitioning to full-time staffing, which may include options such as day-crews of full-

time staff, supported by paid-on-call volunteers as new stations open and become operational.

Prioritizing the hiring of additional full-time firefighters to reduce the dependency on the paid-on-call volunteer firefighter as the initial providers of fire suppression services in a growing community is one of the strategies to support the sustainability of the use of paid-on-call volunteer firefighters within the composite department model. As the Town of LaSalle continues to experience growth and development, the fire service will be required to grow and evolve to serve the needs and circumstances of the community.

As described within the FPSMP staffing options, the transition to the use of full-time firefighters from the current fire station, and proposed second fire station further acknowledges the importance of transitioning to the use of full-time firefighters to staff the initial responding apparatus, and the utilization of paid-on-call volunteer firefighters to staff secondary and additional fire suppression apparatus. It is assumed that this approach would be carried forward to a potential third station, if a three station model is adopted.

In our experience in working with other municipalities across Ontario there are efficiencies in assessing multiple roles and responsibilities when considering the need for full-time dedicated staff resources. This includes looking at the core competencies of the positions identified as well as the quantity or magnitude of workload anticipated. This often includes additional support in the planning and delivery of fire prevention and public education services for the community. It can also support internal services, such as training, maintenance (e.g. equipment, facility or fleet) or special projects. The assigned roles and responsibilities of the future full-time staffing are expected to include suppression services as well as other supporting roles for the department. This will require further consideration by LFS management and the Town of LaSalle management as the future organizational model is developed.

5.2 Considerations for Paid-on-Call Volunteer Firefighters within the Composite Model

Within the Town of LaSalle the paid-on-call volunteer firefighters represent a core component of the fire services' ability to provide fire suppression. The FPSMP included

several recommendations targeted to specifically to support the sustainability of the paid-on-call volunteer model within the Town of LaSalle. The master plan recognized the need to shift the role played by the paid-on-call volunteer firefighters within the Town of LaSalle from the historical delivery of primary fire suppression services to the more sustainable model of providing the depth of response capabilities for LaSalle Fire Services.

The LaSalle Fire Services continues to experience challenges with recruitment and retention of paid-on-call volunteer firefighters. This has become a major challenge for municipalities across Canada. One approach to addressing these challenges is to increase the overall complement of volunteers to provide a larger pool from which to achieve the recommended depth of response staffing levels, depending on the type of risk being responded to (i.e. single family dwelling, low rise apartment, high rise apartment, etc.). The benefits of a larger complement also provide for the rotation of additional firefighters for rehabilitation during extended emergencies while sustaining the recommended deployment levels for the critical tasks identified for both moderate and high risk occupancies.

As stated in the 2019 FPSMP:

“Historically communities operating volunteer fire departments succeeded with a complement of 20 to 25 volunteer firefighters per station. This complement relied heavily on the availability of these individuals to leave their place of work, live in close proximity to the fire station and be available on a regular basis to train and respond. Today’s volunteer firefighters (paid-on-call) are involved in more social activities, work priorities and life’s priorities, making it increasingly difficult to commit the time necessary to sustain the required training competencies and response capabilities of a volunteer firefighter. As a result, recent trends within the industry are indicating the need to increase the total complement of volunteer firefighters within a fire department. These trends indicate a total complement of 35 to 40 volunteers per station as more reflective of today’s operational needs” (Town of LaSalle Fire Protection Services Master Plan, 2019, page 164).

The FPSMP recommended increasing the total number of paid-on-call volunteer firefighters as the most efficient and cost effective strategy to achieve the proposed

depth of response fire suppression performance benchmark. It recommended that the Town increase the total number of paid-on-call volunteer firefighters to 48, and acknowledged that such an increase may need to occur incrementally within the short-term horizon, to be a manageable process. With the addition of future stations (i.e. proposed Fire Station #2 and potential Fire Station #3), the volunteer complement would need to expand further. This would likely be a minimum complement in the range of 75 to 90 total volunteers, however, this would require further analysis to confirm, with consideration of the performance and sustainability of the department's volunteer complement at the time.

There are resources available to assist with the development of recruitment and retention strategies that have been initiated across the Canada. These include resources from Ontario, Nova Scotia, and Alberta. To sustain the current fire suppression model and provide the best value to the community with the planned future growth of the Town and the LFS, there may be a need to develop and implement a "Comprehensive Paid On-Call Firefighter Recruitment and Retention Strategy". In our experience, such a process will require the direct involvement of Council, senior Town staff and LFS management to be effective. In addition to the operational effectiveness and efficiency, sustaining a composite fire services model including both full-time and paid-on-call volunteer firefighters is the most cost effective operating model for the Town of LaSalle.

6.0

Conclusions

The objective of this study was to assess the response capabilities of the initial arriving apparatus from each existing or potential fire station location within a three station fire service delivery model inside the defined urban area of the Town of LaSalle, considering full buildout of the Town's planned future growth and development.

The study was approached as additional station location analysis, building upon the results and analysis presented within the 2019 FPSMP report. The analysis was focused on the four minute travel time of the initial arriving apparatus from each proposed station location. The scope of this study did not include analysis of initial response staffing levels, depth of response performance or volunteer firefighter response coverage from the proposed fire station locations.

As stated in the FPSMP, the National Fire Protection Association (NFPA) 1710 **initial response performance benchmark of four firefighters arriving on scene within a four minute travel time to 90% of the incidents within the defined urban area** of the Town of LaSalle remains the most applicable performance benchmark for assessing the initial response capabilities of the LFS, and this was the performance benchmark applied for the study analysis.

Three different scenarios of three fire station locations were analyzed to assess the four minute travel time response coverage, measured against the initial response performance benchmark. Scenarios 1 and 3 used the GIS roads-based model and Esri's Network Analyst tool to assess the response capabilities of the initial arriving apparatus, based on a four minute travel time, from specific potential station location properties provided by Town of LaSalle staff. Scenario 2 maintained the existing Fire Station #1 in its current location and used a GIS-based Location-Allocation tool to identify optimized (non-site specific) proposed station locations for Fire Stations #2 and #3, prior to assessing the four-minute response coverage.

The following summarizes the key findings of the three station analysis:

- Scenario 2 provides a very high percentage (exceeding 90%) of both urban area and historic urban call coverage within the four minute travel time, however, the station locations are modelled optimized locations and may not be

- implementable by the Town, if property is not available at the model-identified locations;
- Scenario 3 provides a high percentage of coverage with the potential to meet the initial response performance benchmark, as 91% of historic urban calls are covered within the four minute travel time, and is based on properties which are owned by or anticipated to be available to the Town;
 - All three of the three station model scenarios assessed resulted in improved initial response coverage within the four minute travel time compared to the recommended two station model from the FPSMP, however, there are additional capital and operating costs associated with a three station model versus a two station model, which will require further consideration; and
 - The three station model aligns with a long-term planning horizon that projects full-buildout of the Town's defined urban area.

As the Town works towards implementing a new fire station model, the following should be taken into consideration:

- Annual review and updates (as required), to the Town of LaSalle Community Risk Assessment as the growth, development and intensification occurs;
- Cost-benefit / comparative analysis of the three station model and the two station model fire service delivery options;
- Further analysis of staffing considerations for the composite fire service model, including considerations of costing and implementation planning for both full-time staffing and an increased complement of paid-on-call firefighters to support the depth of response;
- Prioritizing and investing in strategies to support the sustainability of the composite fire service model;
- Preparation of an organizational model for a two or three station fire service delivery model, including the identification of planned roles and responsibilities of additional full-time resources at future fire station locations; and
- Development and implementation of a "Comprehensive Paid On-Call Firefighter Recruitment and Retention Strategy" to support the sustainability of the volunteer complement within the composite fire department model of the LaSalle Fire Service.

