
Fire & Paramedic Services Optimization Project Update

RE: Greater Sudbury
Fire Services Current
Service Levels Report
—February, 2017

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Background

As staff continue their analysis for the Fire and Paramedic Services Optimization Project, they have assessed the performance of our current delivery model and firefighter skills against several key fire industry benchmarks which are also used to determine an optimized model. One of the most crucial is a Community Risk Analysis and an assessment of the effectiveness of Greater Sudbury Fire Services (GSFS) in responding to these identified risks, based on several 'industry best practice' parameters and related legislation and regulations. This report focuses on the Fire Service Risk Analysis, for the four major response service types provided by the Greater Sudbury Fire Services: Fire Protection, Technical Rescue, Hazardous Material Response (HAZMat), and Medical Tiered Response (MTR).

It is understood that Fire Services offers protection to the community in the forms of Fire Education, Fire Prevention, and Fire Incident Response. What is less well known is that Fire Services offers additional protection in the community as directed by Council, in the form of Technical Rescue (such as auto extrication, water and ice rescue, rope rescue, confined space rescue, and trench rescue), Hazardous Material Response (HAZMat), and Medical Tiered Response (MTR). For all of the services offered except Medical Tiered Response, the Greater Sudbury Fire Service is the 'service of last resort' in that there is no other agency capable of offering these services, and there is no adjacent community capable to assist in the response. The Optimization Project has, as one of its guiding principles, the need to align the community risk profile with the services required to protect them. The community risk profile, in conjunction with the City of Greater Sudbury's Hazard Identification and Risk Assessment (HIRA) Report (Appendix A) and the Fire Underwriter's Survey (FUS) Report (Appendix B), has identified the residential, commercial and industrial areas of the City with the highest risk of potential emergency incidents. It has also identified that the services currently provided are not in place to mitigate these identified risks; and further, that they are not provided in a consistent manner across the City.

Fire Suppression Response

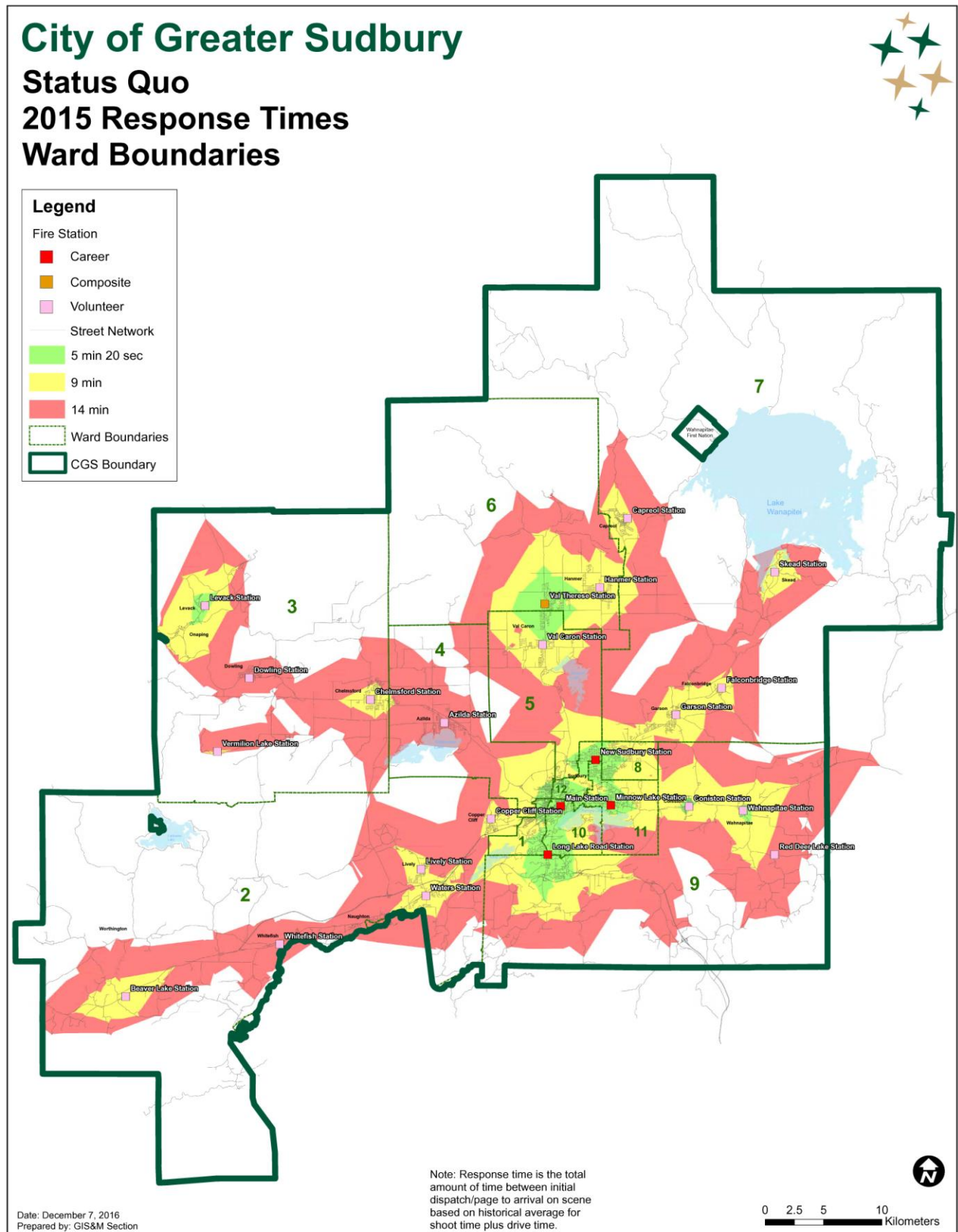
As per the Establishing and Regulating By-law 2014-84, the GSFS currently attempts to deliver fire suppression services across the City in a consistent fashion, in that the entire City is provided both offensive and defensive fire response. Offensive fire response includes interior fire rescue and attack, while defensive fire response is exterior only, with additional consideration for exposure protection (adjacent buildings and vegetation). In 2016, GSFS responded to 4,508 incidents of which 501 were fire calls, and of those 254 were considered structure fires; therefore, these incidents are frequent and the consequences, if not mitigated quickly, are significant.

While GSFS commits to offering this service consistently throughout the City, the actual delivery of the service is heavily dependent upon fire ground staffing levels, and effective response time to establish an initial firefighting complement of four firefighters and an effective firefighting complement of 14 firefighters. Interior fire attack and rescue for incidents with no risk of collapse or entrapment can begin with four firefighters, with a confirmed knowledge of additional resources en route. In the event that a fire

is more advanced, and where there is a risk of collapse or entrapment, interior fire rescue and suppression cannot occur until 14 firefighters are on scene. These requirements are enforced by the Ministry of Labour as governed by the Occupational Health and Safety Act requiring the fire service by way of the Section 21 Guidance Notes, and are based on the National Fire Protection Association (NFPA) 1710 and 1720 Response Standards. While these standards are not adopted by GSFS and are not enforceable in the Province, they are considered 'best practice' and are considered as so by the Ministry of Labour, the Fire Underwriter's Survey (FUS) and thus the insurance industry. The recommended response criteria in the NFPA Standards are; five minutes and twenty seconds (5:20) for urban areas, nine minutes (9:00) for suburban areas, and 14 minutes (14:00) for rural areas. All of these times include a 'chute' or assembly time, which is the time from notification (dispatch for career and pager notification for volunteer) until the fire truck leaves the station. In career response areas, this time is recommended to be one minute and 20 seconds (1:20). There is no defined time in a volunteer area. The average assembly time for GSFS is one minute and 34 seconds (1:34) in the career response area, and five minutes and 48 seconds (5:48) in the volunteer response area. The map below demonstrates the real-time response data for the initial truck arrival, based on the assembly times as noted above using 2015 data plus the required drive time. The green colouration identifies areas where trucks arrive within 5:20 minutes from dispatch time; yellow indicates a response time between 5:21 and 9:00 minutes; and red indicates a response time between 9:01 and 14:00. Areas outside of these colourations indicate response times longer than 14:00 minutes.

The former City of Sudbury is serviced by four career stations which operate five trucks with four responders per truck at all times. This guarantees that all responses have initial staffing of four firefighters, and that when necessary all incidents can have twenty firefighters on scene within the limitations of the response times. The Val Therese Station in the former City of Valley East is a composite station staffed by both career and volunteer firefighters. As a minimum, two firefighters on a single truck are posted at this station at all times ensuring that the first arriving vehicle will respond with that minimum number of firefighters. This response area is dependent upon volunteer firefighter response to augment the guaranteed response for both the initial response (minimum of four firefighters) and the effective response (minimum of 14 firefighters). This volunteer response is not guaranteed and response times of volunteer fire fighters vary and can result in a delay of the assembly time and overall fire ground staffing. As well, it can affect the ability for firefighters on scene from being able to respond as a minimum of four firefighters are required in order to perform rescue and attack activities. The remainder of the City relies entirely on volunteer firefighters for initial truck response. When a call is placed, volunteer firefighters are paged to report to the fire station for assembly and deployment with a fire truck. There is currently no minimum number of volunteers identified to respond to incidents of any type; and therefore, the initial truck may arrive with a single firefighter, or a full complement of four, to any given incident. This can result in a significantly delayed response of the initial four firefighter response and the effective 14 firefighter large incident response.

Map 1



Protecting our Properties, Investments and Employment

The Municipal Property Assessment Corporation (MPAC) annually determines the assessed value of all properties in the City of Greater Sudbury as a base value for the establishment of the municipal taxation. The mission of the GSFS is to protect these properties and the investment they represent. Therefore, an analysis of the MPAC value protected by the GSFS within the time criteria recommended by the NFPA is a direct measure of the efficiency of the service level provided to residents, businesses and industry in the city. An analysis of the data used to create Map 1 above has been used to generate Table 1 below, which identifies the MPAC valuation of properties currently protected by the career, composite and volunteer levels of response by the GSFS. In total, the City of Greater Sudbury has an MPAC valuation of nearly \$18.5 billion. The GSFS is able to respond within 5:20 minutes to about 42% of the MPAC valuation (approximately \$8.4 billion). An additional 27% (approximately \$5 billion) can be responded to within the 5:21 – 9:00 minute and a further 25% (approximately \$4 billion) in the 9:01 – 14:00 minute response time. Combined with the map, this demonstrates that fire protection meets industry best practices within the City core (former City of Sudbury); however, the response in the outlying areas requires improvement.

Table 1 – Service Coverage

Fire Response Times	< 5:20 NFPA 1710		5:21 - 9:00 NFPA 1720		9:01 - 14:00 NFPA 1720		Coverage beyond 14 minutes		Total Coverage	
	% properties covered	\$ Assessed Value	% properties covered	\$ Assessed Value	% properties covered	\$ Assessed Value	% properties covered	\$ Assessed Value	% properties covered	\$ Assessed Value
Status Quo										
Career	35%	\$ 7,487,885,102	48%	\$ 10,428,084,362	61%	\$ 12,711,406,862	61%	\$ 12,711,406,862	61%	\$ 12,711,406,862
Composite	5%	\$ 849,823,700	12%	\$ 1,902,127,367	15%	\$ 2,287,603,567	15%	\$ 2,287,603,567	15%	\$ 2,287,603,567
Volunteer	1%	\$ 85,491,900	9%	\$ 1,165,800,400	18%	\$ 2,487,824,800	18%	\$ 2,487,824,800	18%	\$ 2,487,824,800
Beyond 14 minutes	0%	\$ -	0%	\$ -	0%	\$ -	6%	\$ 936,422,600	6%	\$ 936,422,600
Total	42%	\$ 8,423,200,702	69%	\$ 13,496,012,129	94%	\$ 17,486,835,229	100%	\$ 18,423,257,829	100%	\$ 18,423,257,829

Note: Service level expectations are based on NFPA Standard 1720 – Standard for the Organization and Deployment of Fire Suppression Operations, Emergency Medical Operations, and Special Operations to the Public by Volunteer Fire Departments, which is applied for both composite and volunteer departments.

Fire Prevention and Education

The GSFS currently has six Fire Prevention Officers, who perform request inspections, complaint inspections, and annual inspections on Vulnerable Occupancies such as retirement and long-term care facilities. In 2016, Fire Prevention Officers conducted 1,085 inspections and reviewed 537 building permits along with 27 site plans specific to Ontario Fire Code compliance. The Fire Underwriter's Survey (FUS) in 2016 reviewed the operation of the GSFS and identified Fire Code enforcement as an area that has significant opportunity for improvement. FUS ratings are provided to insurance companies who use these ratings to set insurance premiums for residential and commercial properties. FUS recommends scheduled inspection of high risk occupancies should include regular visits to theatres, clubs, churches, hotels, restaurants, schools, jails, apartment buildings, gas stations,

warehouses, paint booths, and a variety of retail occupancies. Currently, the GSFS does not schedule or perform any annual inspections on these types of commercial, industrial, or high occupancy residential properties. The GSFS has one Public Safety Officer who is tasked with providing targeted fire safety education programs to the most vulnerable members of the population: school-aged children and the elderly. In Greater Sudbury, there are 84 schools and 190 registered Vulnerable Occupancies (i.e. retirement/long-term care facilities, and care and treatment occupancies). The table below shows the current ability to respond to these facilities within five and nine minutes.

Table 2 – Vulnerable Occupants

of vulnerable properties by Medical Tiered Response (MTR)

Category	Area	MTR			Total
		5 min	9 min		
# of Schools	Core	36	10	0	46
	Levack	1	0	0	1
	Val Therese	3	12	0	15
	Capreol	0	1	0	1
	Outside	0	0	21	21
	Total	40	23	21	84
# of Senior Homes	Core	28	2	0	30
	Levack	1	0	0	1
	Val Therese	0	5	0	5
	Capreol	0	2	0	2
	Outside	0	0	13	13
	Total	29	9	13	51
# of Hospitals	Core	1	0	0	1
# of Daycares	Core	41	6	0	47
	Levack	1	0	0	1
	Val Therese	3	8	0	11
	Capreol	0	1	0	1
	Outside	0	0	19	19
	Total	45	15	19	79
# of Correctional Institutions	Core	1	1	0	2
	Total	1	1	1	2
# of Care and Treatment Occupancies and Retirement Homes	Core	37	8	0	45
	Val Therese	2	3	0	5
	Outside	0	0	7	7
	Total	39	11	7	57

NOTE: This is data utilized and maintained by the City's GIS Section. Though every effort is made to keep the data current, accurate and complete, we cannot guarantee its reliability.

Prepared by the GIS&M Section, City of Greater Sudbury, January 17, 2017

The 2011 Census shows that Greater Sudbury has 72,418 dwellings and a population of 160,269. Table 3 shows the current ability GSFS has to respond within five and nine minutes.

Table 3 – Dwellings and Population

Dwellings #	MTR			Total
Area	5 min	9 min		
Core	30,339	11,535	-	41,874
Levack	487	430	-	917
Val Therese	2,888	4,883	-	7,771
Capreol	-	1,418	-	1,418
Outside	-	-	20,438	20,438
Total	33,714	18,266	20,438	72,418

Population #	MTR			Total
Area	5 min	9 min		
Core	58,942	26,419	-	85,361
Levack	1,036	1,006	-	2,042
Val Therese	8,218	12,380	-	20,598
Capreol	-	3,276	-	3,276
Outside	-	-	48,992	48,992
Total	68,196	43,081	48,992	160,269

SOURCE: 2011 Census of Canada, Statistics Canada

Prepared by the Community and Strategic Planning Section, City of Greater Sudbury, January 17, 2017

Technical Rescue

As per the Establishing and Regulating By-law 2014-84, the GSFS currently offers technical rescue services of auto extrication, water and ice rescue, and low-angle rope rescue. The frequency of these type incidents varies from frequent (auto extrication) to somewhat infrequent (ice rescue), but the consequence of these incidents when serious, is high as these incidents are almost always life threatening if not responded to quickly with strategically located staff and equipment.

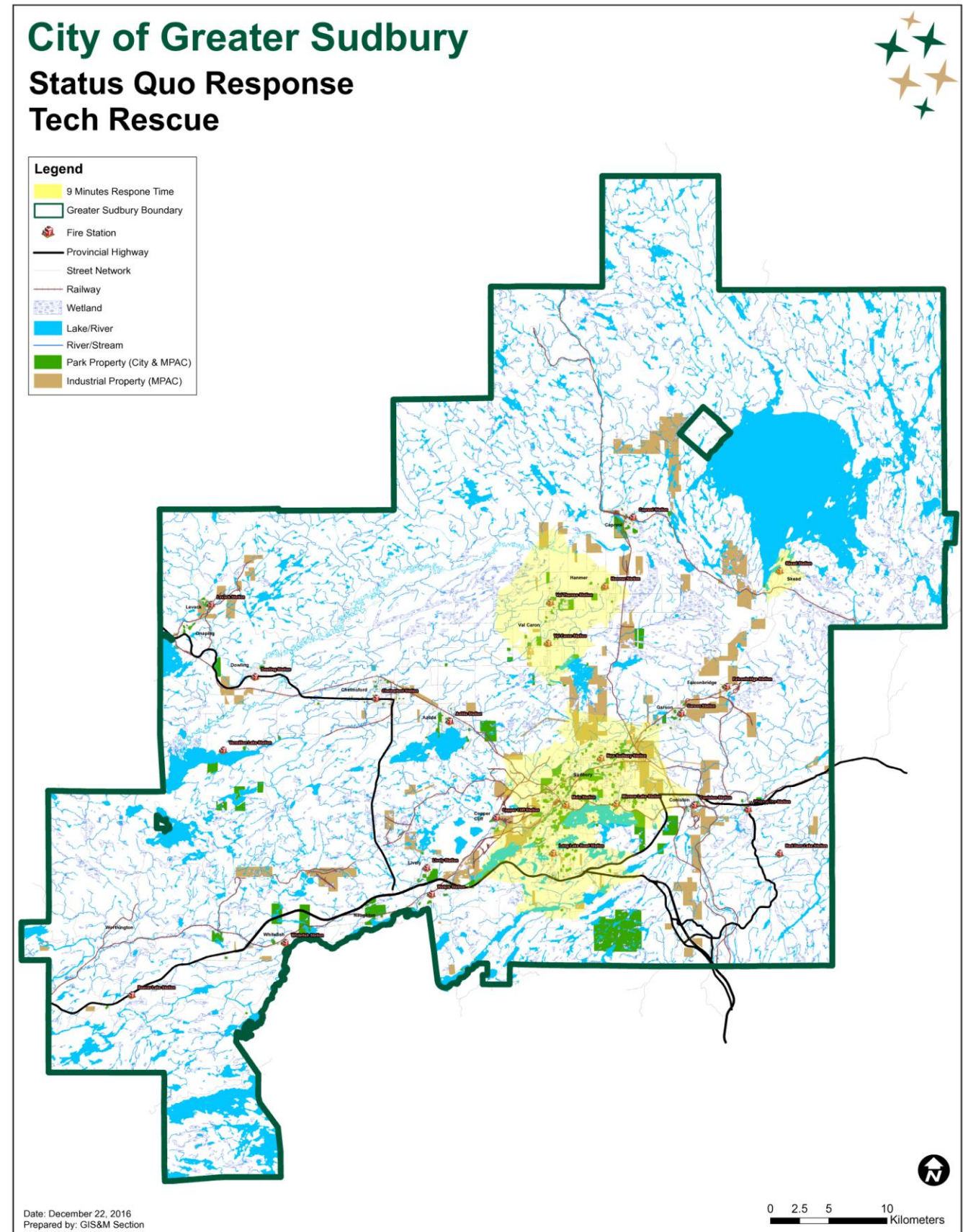
Auto extrication is offered from 13 fire stations (a mix of career, composite, and volunteer stations) which are situated closest to the risk in the community (i.e. main roadways and major provincial highways). The only compromise to consistent service delivery across the City is related to the

response time spectrum from the various stations as noted above. The response time polygon for the City is identified by Map 1 (above) for auto extrication.

Low angle rope rescue consists of assisting patient extrication using rope, where the majority of the load is not supported by the rope (i.e. rescuing an unconscious person being carried on a stretcher on a hillside). Due to the geography and topography of the City, this risk and the service to address it, are offered through the community where the same response time limitations exist.

Water and ice technical rescue is provided by all career stations, the Val Therese composite station, and volunteer stations in Azilda and Skead at an enhanced level. These types of rescue are offered across the City at an awareness level – shore-based rescue, from the remaining stations. Given that Greater Sudbury is known as the City of Lakes, and contains more lakes than any other municipality in Canada; 330 freshwater lakes over 10 hectares in size, these levels of service do not align with the risks associated in our community. Lake Wanapitei is the largest city-contained lake in the world at 13,257 hectares and Ramsey Lake is the second largest. In 2009, approximately 7,000 people or 4% of the City's population lived on a lake and many others have camps and cottages on our City's lakes. The response capability of the GSFS for water and ice technical rescue is identified on Map 2 below. Once again, the response time is based upon 2015 data for average assembly time, plus the required drive time. The yellow polygons on Map 2 indicate a nine minute response time for water and ice technical rescue based on response from those stations which have trained firefighters for this type of rescue. The intense concentration of blue (water) on this map demonstrates the vast network of lakes and rivers which are spread across the entire City of Greater Sudbury. The map also shows industrial properties, railways, major highways and utility rights of way, further reinforcing that the service level offered to the community for all technical rescue does not align with the distribution of risk.

Map 2



The GSFS is currently researching in cooperation with Water/Wastewater Services, the implementation of confined space and trench rescue responses which have been identified as a need under the Occupational Health and Safety Act, Regulation 632/05, Confined Space. The risk profile for trench rescue and confined space rescue focuses on the roadways and right-of-ways used for utility delivery, and other industrial properties spread throughout the City, as identified on Map 2. These services are not currently offered by the GSFS; however, a Budget Enhancement was approved by Council for the 2017 Budget to implement this service. Due to the training commitment associated with these evolutions, delivery of these services will be limited to career firefighters at the present time.

It is important to note that the GSFS is the only agency in the City which offers these technical rescue services to the community. There are some agencies that provide stand-by services but do not offer rescue services.

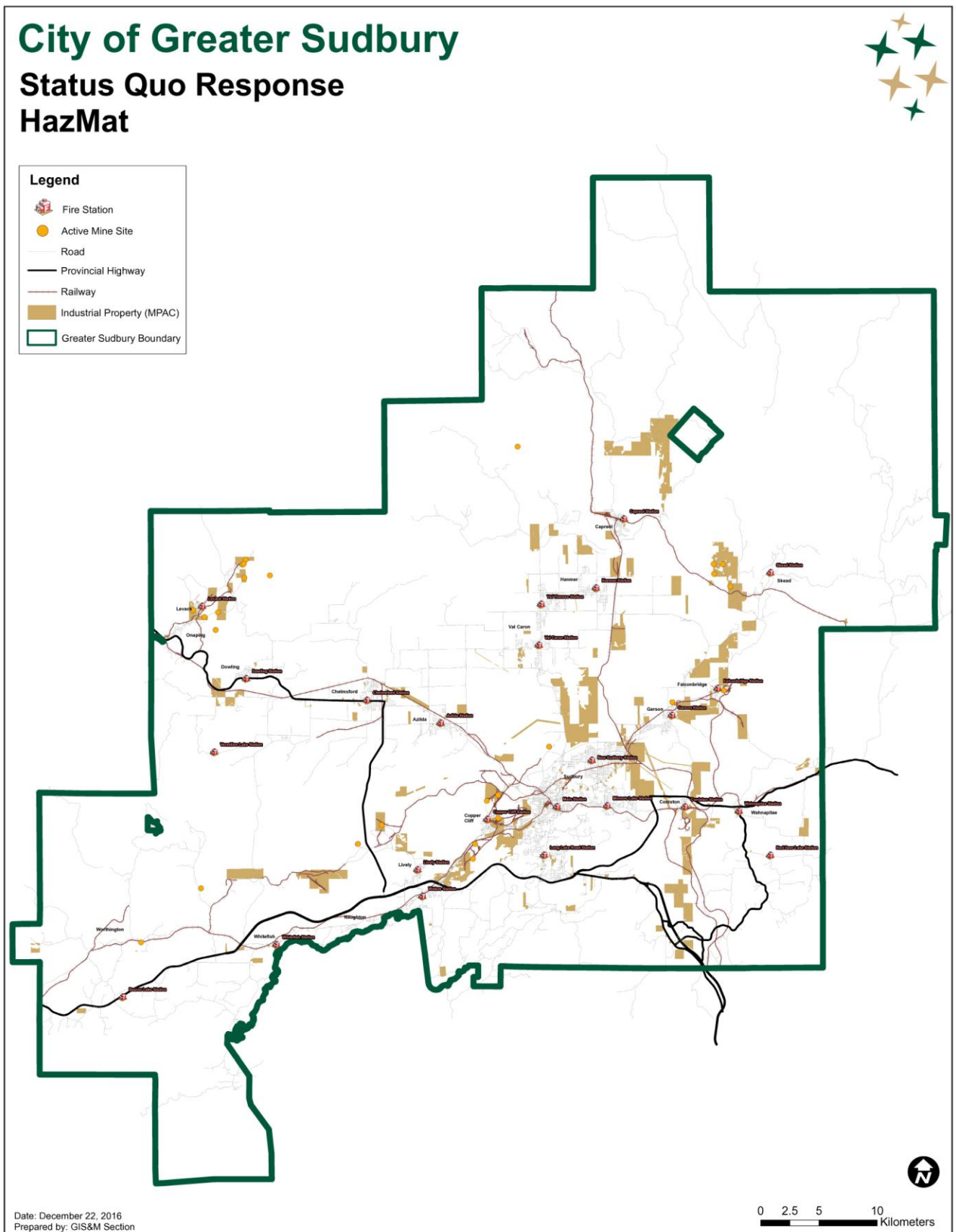
Hazardous Materials (HAZMat) Response

As per the Establishing and Regulating By-law 2014-84, the GSFS currently offers HAZMat response at the lowest level, Awareness, throughout the City. The By-law identifies that the GSFS offers decontamination line services to agencies which may respond in order to mitigate any incidents in the City. HAZMat training has only been provided to career firefighters. The City's Hazard Identification and Risk Assessment (HIRA) has identified these incidents as the highest risk incidents which could cause an emergency to be declared for the community as a whole. The frequency of these types of incidents varies from frequent small spills to somewhat infrequent large spills and transportation emergencies; however, the consequence of these incidents, when serious, is extremely high, and these incidents may be life threatening to entire neighbourhoods. Further, these incidents can have serious community-wide impact to the infrastructure, environment, economy, and reputation of the City of Greater Sudbury.

The City's HIRA has also identified that the level of service provided by the GSFS is low and does not align with the identified risk in the community. Greater Sudbury has significant industrialization related primarily to the mining, milling and smelting of base metals which is the backbone of the local economy. Large quantities of chemicals for industrial manufacturing and processing are delivered into, out of and through the City by way of the three high volume railways and three major highway corridors, including the TransCanada Highway. For example, in the first half of 2016 about 10,000 railcars (or 1.25 million barrels) of crude, oil and gas passed through Greater Sudbury just by rail alone. Road transportation companies are not required to report to municipalities the type or volumes of hazardous materials that are shipped through/around our City. Over the past three years, Greater Sudbury has had two train derailments and at least three major derailments have occurred just outside the City. Further, Transport Canada had identified that the Greater Sudbury area has nine of the top 500 highest risk railway crossings in Canada.

In Greater Sudbury, there are 733 industrial businesses which represent approximately 452 businesses per 100,000 of population. For comparison, the City of Ottawa has 236 industrial businesses per 100,000 and the City of Toronto has 446 per 100,000. Greater Sudbury currently has an awareness level for HAZMat response, whereas Ottawa and Toronto have lower concentration of industrial businesses, but have a higher level of response (Technician Level). Given the high volume of industrial and mining activity in the City, it is no surprise that significant quantities of hazardous materials are stored in warehouses around the City, and are then shipped throughout for use in various the manufacturing and industrial facilities. This further increases the risk of hazardous material spills in our community which we must be prepared to respond. On a positive note, we have some indication of the location and concentration of these facilities in our community (i.e. mine sites, industrial parks, warehouses, etc). These risk areas are identified on Map 3 shown below. It is important to note that GSFS responds to these risks at the awareness level, which would constitute scene security (i.e. barricades) and requesting assistance from Ottawa or Toronto Fire Services. As noted above, Ottawa and Toronto have technician level response, which indicates their active involvement in mitigation. In Greater Sudbury, mitigation, clean up, and remediation would be lead by agencies located outside of the City and the GSFS would be available for support only.

Map 3



Medical Tiered Response (MTR)

As per the Establishing and Regulating By-law 2014-84, the GSFS currently offers Medical Tiered Response (MTR) at the Emergency First Responder level. This means that firefighters would provide basic first aid, cardiopulmonary resuscitation (CPR), rapid application of automated external defibrillator (AED) when paramedics are not immediately available and only until their arrival. MTR is currently provided by City core career stations, the Val Therese composite station, and the Capreol, Dowling and Levack volunteer stations. All of the remaining stations do not offer this type of response. In 2015, GSFS responded to almost 800 calls for medical assistance, or 18% of the total call volume. The frequency of these types of incidents is significant, and the consequence is high as the MTR Agreement outlines that the GSFS response is limited to incidents that are almost always life threatening if not responded to immediately. The GSFS offers this service as a support service to Greater Sudbury Paramedic Services, and they are not the primary agency for medical responses. The GSFS represents a depth of service for medical response to the areas of the City where it is offered and is not a means to replace paramedics.

Map 4 indicates the response polygon for MTR as well as the location of occupancies which generate the highest frequency of incidents. The yellow polygons indicate a 5:20 or less response time and the blue polygons indicate a 5:21 – 9:00 minute response time from those stations which have been trained for MTR. It is noted that there are significant community risks such as schools, daycare centers, and old age/senior care facilities in the former towns of Rayside Balfour, Walden and Nickel Center which are not currently being protected by GSFS medical tiered response. It is important to recognize that the Greater Sudbury Paramedic Service is the primary response agency for these incidents and that they do offer a consistent level of service throughout the City, including an ambulance located in each of the identified communities. GSPS medical tiered response provides primary coverage when an area's ambulance is responding to an incident and an additional ambulance is on route to backfill the coverage.

Map 4

