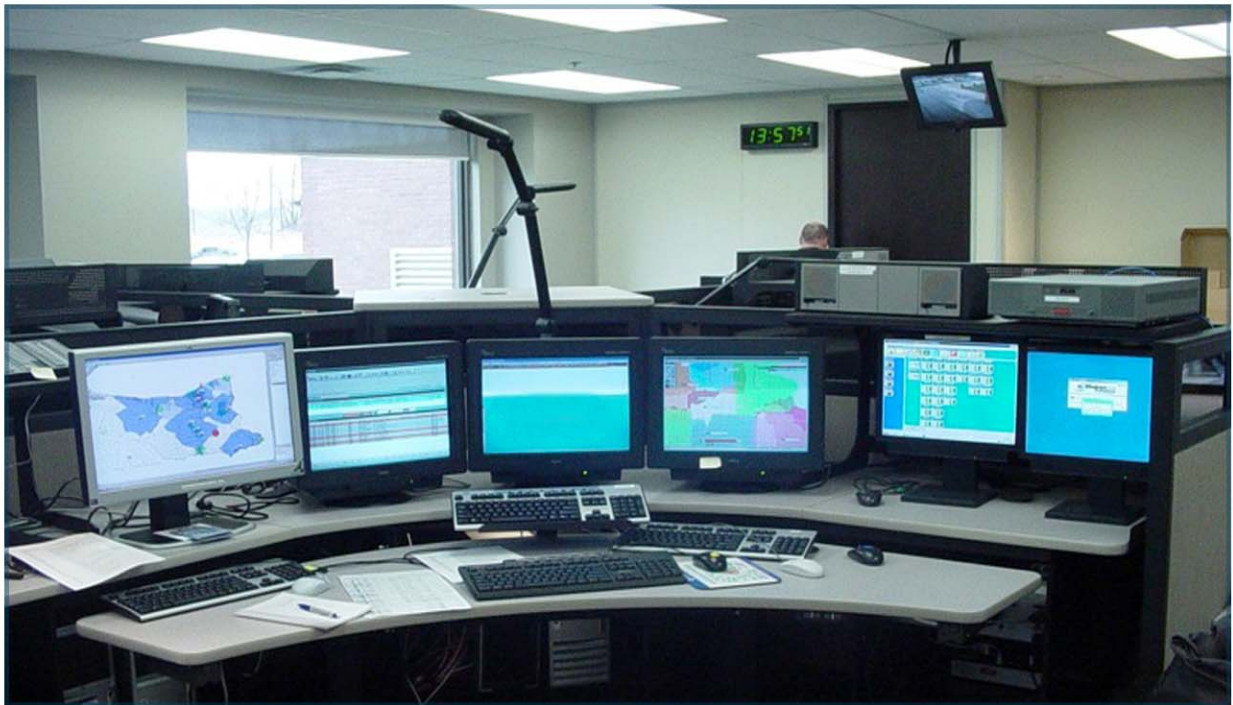




Niagara Region, Ontario Canada

Study of Emergency Dispatch Services



Report

November 30, 2012





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November 30, 2012

Mr. Bob Diakow
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Dear Mr. Diakow:

STUDY OF EMERGENCY DISPATCH SERVICES, NIAGARA REGION, ONTARIO

IBI Group is pleased to submit our report on the above project. Thank you for giving us the opportunity to work on this most interesting assignment.

Sincerely,

IBI GROUP

A handwritten signature in black ink, appearing to read "Lee S. Sims". The signature is fluid and cursive, with the first and last names being more prominent.

Lee S. Sims
Director

A handwritten signature in black ink, appearing to read "Marvin Rubinstein". The signature is stylized and cursive, with a large, sweeping initial "M".

Marvin Rubinstein
Associate

Enc.

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Executive Summary

At the request of Regional Council, the Regional Corporate Services Department established a working group to investigate and report back on ways to merge, amalgamate or streamline emergency dispatch services to better and more cost effectively deliver the services for Niagara citizens and taxpayers.

In addition to the Regional Corporate Services Department the working group consists of the following members, each of whom operates an emergency dispatch center: Niagara Regional Police Service (NRPS), Niagara Emergency Medical Services (NEMS), City of Niagara Falls Fire Department (NFFD) and City of St. Catharines Fire and Emergency Management Services (SCFS).

On November 3, 2011 the working group issued a Request-for-Proposals (RFP) for a professional consultant with experience in emergency dispatch operations to undertake a study with the following as the scope of work. IBI Group was the successful respondent to the RFP. Formal award of the consulting assignment and approval to proceed was issued on February 22, 2012:

- To assess emergency communications services in Niagara against peer agency operations, specifically: 911 call taking, and emergency dispatch services for Police, Fire and EMS.
- To investigate a full range of alternative North American public safety dispatch models from physical co-location, to partial consolidation, to complete integration, including their comparability / compatibility to Niagara.
- To investigate the potential establishment of a joint backup center for emergency communications services in Niagara (to be used during a major disruption of services at one or more of the primary sites).
- To recommend an optimal delivery model and a going-forward implementation strategy.

NRPS serves as primary PSAP for Niagara Region. It operates a fully integrated 9-1-1 / police communications center, where the 9-1-1 function is carried out on an integrated basis with the police dispatch system. The NRPS emergency communications operation is compared to those of 9 other police services, each of which serves as a primary PSAP and also operates a 9-1-1 / police communications center that is fully integrated.

NFFD dispatches the City of Niagara Falls fire resources. SCFS not only dispatches the St. Catharines fire resources; it also is contracted for dispatch services by ten (10) other municipal fire services operating in Niagara and by Haldimand County. NFFD and SCFS dispatch operations are compared to those of 17 other fire services: 4 that dispatch for self only, 8 that dispatch for self and others, 2 that dispatch jointly with others and 3 that are dispatched by a police service.

NEMS operates the Niagara ambulance communications center (NACS), which is one of only two centers in Ontario to be accredited as a Center of Excellence by the National Academies of Emergency Dispatch (NAED). It operates with technology, protocols, call triage and a cost model that differ from those mandated by the Ontario MOHLTC for use in the provincial network of Central Ambulance Communications Centers (CACC). To ensure an apple-to-apple comparison to peers, NACS is compared to accredited Centers of Excellence located in other jurisdictions (or to ambulance dispatch centers that are working toward their accreditation). Nine (9) such centers serve as peer agency comparators to NACS.

The study also investigated 10 alternative North American public safety dispatch models ranging from partial consolidation (integration of technology), to physical co-location, to complete integration of operations. The primary attributes of each of these models are presented below.

Integration of Technology

Some or all agencies (9-1-1, police, fire and EMS) operate with shared (common) CAD and radio systems, and a common IT resource. They may also share telephone and AVL/GPS systems but would have separate RMS.

While their systems are integrated, the agencies continue to deliver their respective dispatch services under governance structures that are autonomous, from their own facilities using their own staff, support resources, programs, procedures and backup solutions.

Physical Co-Location

Some or all agencies are housed in the same building and may even be co-located in the same communications center. However, each agency continues to operate under its own (autonomous) governance structure and mandate, with their respective staff, support resources, programs, procedures and backup solutions. The agencies will typically operate with separate CADs, AVL/GPS and RMS systems. They may share IT supports, as well as common radio and telephone systems.

Integration of Operations

Some or all agencies are consolidated into a single dispatch service (i.e., one employer). The consolidated service operates out of one communications center, under a single governance structure and mandate, with one communicator complement. Some or all of the communicators are cross-trained in multiple dispatch functions. There is one set of support resources including a single IT resource complement, programs, procedures and backup solutions. The consolidated service operates with one radio system, one telephone system, one or more CADs and one AVL/GPS system. Agencies may continue to operate with separate RMS systems.

Recommended Attributes for a Contemporary Emergency Dispatch Operation

Drawing from the information assembled on the above models, IBI Group offers the following as a recommended set of attributes for a contemporary emergency dispatch operation. In our opinion an optimal dispatch delivery model for Niagara should possess these attributes.

1. Quality in the Delivery of the Critical Business Functions
2. Enabled by a Conducive Working Environment, Business Supports and Technological Systems
3. Communications Function is Adequately Resourced and Staffed
4. Interoperability of Communications Within and Across Agencies
5. Backup Solution that will Provide Uninterrupted Services
6. Cost-Efficient in the Delivery of the Services
7. Operations are Performance-Based, Accountable and Transparent
8. Operational Funding is Adequate and Sustainable
9. Governance Structure that Supports Expedient & Cost-Efficient Delivery of the Services
10. Progressive / Forward Looking in its Operations

Alternative Public Safety Dispatch Models

	Functions
Integration of Technology	
Police and Fire Communications, Ottawa, Ontario	9-1-1, P & F
Police and Fire Communications, York Region, Ontario	9-1-1, P & F
Physical Co-Location	
Fire and EMS Communications, Toronto, Ontario	F & EMS
Police and Fire Communications, Peel Region, Ontario	9-1-1, P & F
Denver 911, Denver, Colorado	9-1-1, P, F & EMS
Integration of Operations	
Integrated Emergency Services, Halifax, Nova Scotia	9-1-1, P & F
E-Comm, Vancouver, British Columbia	9-1-1, P & F
Public Safety Communications, Calgary, Alberta	9-1-1, P, F & EMS
Bureau of Emergency Communications, Portland, Oregon	9-1-1, P, F & EMS
Public Safety Communications, Fairfax County, Virginia	9-1-1, P, F & EMS

Findings

Existing Emergency Communications Services Model

NRPS, NEMS, NFFD and SCFS deliver emergency dispatch services under separate (autonomous) governance structures and mandates, from four independently located emergency dispatch facilities, to service areas that vary in size and geographic coverage defined by jurisdictional / contractual authority.

They operate using their own staff resources, training programs and standard operating procedures that are uniquely designed to attain and support their respective (individual) emergency responder activities. Their operations are supported by individual systems and backup solutions (CAD, RMS, radio, telephone) that vary in age, technological capability and inter-agency interoperability.

This emergency communications services model, involving separately operated police, fire and EMS communications centers, is similar to that employed by many jurisdictions. Nonetheless, responsibility for coverage areas that vary according to jurisdiction translates to emergency dispatch services that generally operate independently with relatively little inter-agency activity, and it occasionally impedes a coordinated regional response to emergencies.

To the credit of the Client group, they periodically consult one-another on matters of common interest and their participation on this study demonstrates a willingness to work together. This notwithstanding, for the most part the agencies make independent decisions with little regard to potential opportunities (operational, financial or otherwise) that may be afforded by a singular direction / joint region-wide initiative.

For example, while most of the client agencies are advancing to a P25 radio communications platform (which in itself may enhance inter-agency interoperability) and in the process they periodically consult one-another, little consideration is being given to the opportunities that might be afforded via the establishment of a single area-wide radio network for the entire Region.

To the contrary, efforts to rationalize individual radio infrastructures (including consoles, towers, MDTs et al) within their respective jurisdictions are continuing. In this, SCFS' effort on behalf of 11 locally-based fire services is of particular note – and it begs the following question: why is this initiative not being led regionally, to establish a single area-wide, fully interoperable radio network.

To ascertain the potential benefits that may be realized from a single area-wide radio network one needs only to look at the lessons learned by one or two jurisdictions that have successfully implemented such networks, including E-Comm in Vancouver and Fairfax County Virginia (both of which are discussed in this report).

Peer Agency Comparisons

NRPS, NEMS, NFFD and SCFS are presently delivering the critical business functions associated with their respective emergency communications obligations. With the exception of a few areas where improvement would be desirable (the main ones being those identified below) the agencies operate in a manner consistent and comparable to their peers in terms of organization, staffing, operating protocols, use of technology, workload, response time and operating costs.

Communicator workloads at NRPS, NACS and NFFD are consistent with those of their respective peers; whereas, at SCFS the workload per communicator is almost 50 percent higher than that of its peers. This statistic strongly suggests that SCFS requires additional communications personnel.

At NFFD and NEMS, span of control (defined as the ratio of communicators to supervisors) is consistent with that of their respective peers. In comparison, at NRPS and SCFS the values are 3

to 4 times higher, suggesting that these agencies require additional communications supervisors. The situation at SCFS is particularly problematic as the Divisional Chief of Communications currently serves as Divisional Chief, Manager and Supervisor, and is solely responsible for the administration of the emergency communications operations including oversight, quality assurance, procurement, contracting and funding. While SCFS clientele describe the management at SCFS as being generally responsive, they also make particular mention of the need to address the situation.

On a per capita basis the operating costs at NRPS, NACS and SCFS are generally consistent with those of their respective peers; whereas, at NFFD the per capita operating cost is almost 60% higher than that of its peers. In this, it is noted that at NFFD a relatively large number of fire fighters serve as relief communicators. Fire fighter salaries are administered from a separate cost account. If their salaries were included in the calculations then the per capita cost would be even higher.

For SCFS, another parameter to consider is the 'cost per call', which in the case of SCFS is about 25% below the median value among its peers. This comparatively low figure is attributed to the modest amount that SCFS charges its clientele. In order to sustain the dispatch operation at the current service level or to increase service quality (by way of additional communicators, supervisors and technical support) SCFS should consider developing a new fee structure.

Partial Consolidation (Integration of Technology)

NRPS, NACS and NFFD operate with contemporary windows-based CAD systems that include GIS interface and capability for mobile asset tracking by way of GPS/AVL. These agencies are not planning a major systems upgrade in the near term.

The CAD used by SCFS is designed on a relatively outdated DOS platform, which the manufacturer continues to support and periodically update. SCFS is planning a wholesale upgrade of their CAD to a windows-based system within 16 months. The timing as such presents an opportunity to migrate to a shared CAD arrangement with one of the other agencies, e.g. with NFFD or NRPS.

Ottawa is an example of a jurisdiction where police and fire successfully share a CAD as well as a common radio system. Another successful example is York Region, where radio and CAD are shared by the Regional police service and the Vaughan and Richmond Hill fire departments – with Markham fire department also planning to participate. While their systems are integrated, the police and fire departments of these municipalities continue to deliver their respective dispatch services independently from their own facilities and with their own staffs.

The potential advantages associated with such arrangements include:

- Share the costs of the technology / less cost than if participants purchase stand alone CADs
- Share IT support services
- Less data duplication / access to common data e.g., mapping and street addresses
- Ease of information flow from one agency to another, complimenting responder safety and facilitating the work of communicators through system enhancements (drop downs, etc.)
- Supports automatic / mutual aid and interoperability
- Ease of information exchange via CAD messaging between terminals
- Supports integration of infrastructure, equipment, support and maintenance needs.
- Involvement of like minded agencies strengthens resolve and supports periodic investment in upgrades / supporting technologies (MDTs, GPS/AVL).

In addition, the above advantages may be achieved while avoiding potential labour challenges associated with the physical co-location and operational integration options.

While the timing as such may preclude the agencies other than SCFS from proactively investigating this option in the near term (other than as potential partner with SCFS), they may well wish to

consider this option at a later date when their respective technological systems require upgrading. In this NEMS, which operates under the authority of MOHLTC, would also require Ministry approval for any proposed changes.

Physical Co-Location

NFFD and NEMS operate from relatively new emergency communications facilities that are of a size, design and layout to comfortably serve the needs of their respective operations. These agencies are not planning major facility changes in the near term.

This is not the case at NRPS or SCFD. Their communications center needs have outgrown the space available. NRPS' facility also is noisy and the lighting is not conducive to the operations.

NRPS is planning to construct a new headquarters building with a 2015 move in date. A new 9-1-1 / police communications center is an element of that project. A new SCFS fire station is scheduled for construction in 2013. The present plan is to incorporate a new SCFS dispatch center in this facility.

The planned relocation of two communications facilities (by NRPS and SCFS) within a somewhat similar timeframe begs the following question: why are these two agencies not considering the possibility of physically co-locating their two emergency communications operations in one building i.e., as in the case of Peel Region where police and fire communications operate independently in the same building, or in the case of Toronto where fire and EMS deliver separate dispatch operations from a shared HQ facility.

Depending on the availability of space, the building could also be designed to house a backup dispatch for one or both of the other agencies (NEMS and NFFD) – and potentially one of the other agencies may establish a reciprocal arrangement for NRPS and SCFS. Toronto is one example of a jurisdiction having this type of reciprocal arrangement. In Toronto, the police communications center houses backup dispatch facilities for fire and EMS; and the HQ facility for Fire and EMS houses a backup dispatch for the police service. Other examples of reciprocal arrangements include Vaughan and Richmond Hill Fire Departments which serve as backup for one-another; similarly, in Vancouver, where E-Comm and the BC Ambulance Service house backup facilities for one-another.

In this, another factor to consider is the Ontario Building Code (OBC) requirement that new emergency communications facilities be constructed to 'post disaster' standards (i.e., to standards that are more stringent than those applied to conventional facilities vis-à-vis such items as wind load, snow load, earthquake load, etc). By consolidating the two operations in a single building, the total cost to achieve the more stringent standards may be less than if the agencies build separate facilities.

Another option that has been mentioned is to have NRPS or SCFS (or both) co-locate with NACS in the Foster Wheeler building where space may be made available for this purpose. One of the potential advantages afforded by this option is that this facility is already supported by an emergency communications infrastructure which includes 9-1-1, radio and telephone systems. This notwithstanding, we are advised that the building may not be fully compliant with post disaster standards and as such this option may serve only as an interim alternative (albeit it does not preclude a later decision by some or all of the agencies to move to a more integrated operation).

While the timing as such may preclude the four agencies from co-locating in one facility in the near term, they may well wish to consider this option at a later date.

Listed below are the potential advantages associated with a co-location arrangement:

- Capital savings for the participating agencies – in terms of facility infrastructure

- Lower rent - depending on the choice of location
- Savings derived by sharing supporting emergency communications infrastructure (9-1-1 lines, radio towers, telephone systems et al)
- Opportunity to identify and jointly address dispatch issues that agencies have in common
- Opportunity to consolidate data sources (mapping)
- Opportunity to improve inter-agency coordination of operations
- Opportunity to share support functions and resources
- Additional financial savings that may be derived by taking advantage of the above opportunities

Potential advantages notwithstanding, it is important to note that physical co-location does not immediately translate to improved operations or enhanced service quality. For example, in both Peel and Toronto (where emergency dispatch services are physically co-located) they continue to operate as though they were situated in separately located facilities, with separate governance structures and mandates, using their respective staffs, training programs and operating protocols to attain / support their individual emergency responder activities (i.e., the Peel and Toronto agencies do not take advantage of the co-location arrangement to pursue the above opportunities).

In this respect, the situation in Denver is slightly better since the agencies not only cohabitate in the same building but are co-located in the same communications center, interacting frequently and therefore are more inclined to jointly pursue issues and opportunities of common interest.

As demonstrated by the research contained in the body of this report, the following factors will increase the likelihood that a physical co-location arrangement will contribute to improved operations or enhanced service quality:

- If mandate by a higher authority
- If the leadership promotes / serves as an example to a change in culture
- If it includes the integration of some of the technology (as in Denver where the agencies share a common CAD)
- If it includes the integration of operations (as per the JFCC in Peel where the communicators are cross-trained to perform multiple dispatch services).

This option may potentially be challenged by labour; however, as demonstrated by services that operate on an integrated basis (Peel JFCC, Halifax IES et al), where there is a collective desire to do so such challenges can be managed.

Integration of Operations

In this option the communications functions of the four agencies would be consolidated into a single service having responsibility to provide 'public safety communications' services to Niagara Region. The consolidated service would operate out of one communications center, under a single governance structure and mandate, with one communicator complement, where some (or all) would be cross-trained in multiple dispatch functions. The consolidated service would operate as one program, with one set of procedures, one set of support resources and a single backup solution. The consolidated service would be supported by one radio system, one telephone system and one or more CADs. Agencies may continue to operate with separate RMS systems.

Provincial constraints may preclude NACS from fully consolidating with the other agencies in the near term; however, this would not prohibit the four agencies from commencing the requisite planning and migration process toward complete consolidation over time.

The following are examples of emergency communications services that successfully operate on an integrated basis providing 'public safety communications' to broad service areas defined by their members' collective jurisdictional authorities: Peel JFCC (fire), Halifax IES (9-1-1, police & fire), E-

Comm (9-1-1, police & fire), Calgary PSC (9-1-1, police, fire & EMS), Portland BOEC (9-1-1, police, fire & EMS) and Fairfax Virginia PSC (9-1-1, police, fire & EMS).

Presented below is a relatively lengthy list of the potential benefits / advantages afforded by these and other “operationally integrated” emergency dispatch arrangements, as derived from on-site visits and discussions. The reader will note that “improving service quality and interoperability of public safety communications” is at the top of the list. This message was repeated frequently, as was the following: the primary objective should not be to save money – that will evolve eventually.

- Improves service quality and interoperability of public safety communications
- Broad (area-wide) focus on public safety communications
- Promotes a coordinated area-wide response to emergencies
- Increased interoperability of communications
- Higher quality / performance (beyond that which agencies may attain on their own)
- Resources focussed to provide service as needed, when needed where needed
- Communications system capable of responding to significant events
- Supports integration of infrastructure, equipment, resources, support and maintenance needs
- Financial savings derived by operating from a single communications center, with one CAD-COM system, one supporting emergency communications infrastructure (9-1-1 lines, radio towers, telephone systems et al), one communicator complement (where some or all of the resources are cross-trained to perform multiple dispatch functions), one oversight complement, and one complement of support resources
- Less data duplication / access to common data e.g., mapping and street addresses
- Ease of information flow from one agency to another, complimenting responder safety and facilitating the work of communicators through system enhancements (drop downs, etc.)
- Ease of information exchange via CAD messaging between terminals
- Strengthens resolve and supports periodic investment in upgrades / supporting technologies
- Supports automatic / mutual aid and interoperability in the field
- Supports inter-agency coordination of field operations.

Backup Dispatch Capabilities

To minimize disruption to critical systems each agency is outfitted with system redundancies, continuity protocols, auxiliary power, technical services support arrangements (in-house or under contract) and other back-up supports. The above notwithstanding, unforeseen events could potentially require that a communications center be vacated, potentially for an extended period.

In this area the client agencies’ respective capabilities vary. NRPS’ backup facility is outfitted with telephone and radio; albeit, call taking and dispatch is carried out manually. In the event of a major outage at NEMS, the communicators will relocate to the Hamilton CACC where they will operate in manual mode. The NFFD’s backup facility is outfitted with a communications console, telephone, 9-1-1 lines and a point-to-point data radio link connecting this site back to the primary dispatch center. SCFS does not currently have a backup dispatch capability. In the event of a major outage, SCFS and their clientele would rely on NFFD and neighbouring emergency services for support; albeit, work is underway to establish an interim backup dispatch facility.

A contemporary view among public safety agencies is that the use of separate backup dispatch centers contributes unnecessarily to duplication of technology, infrastructure, facilities, maintenance and financial requirements. Alternatives that are preferred include: (a) reciprocal arrangements where multiple agencies either house backup facilities for one-another (as in Toronto) or they grant one-another access to work stations within their respective centers during emergencies; (b) establishing virtual server environments where one server may be used primarily for CAD and a second server primarily for RMS, however each one is configured to serve as backup for the other (as in York Region); and (c) establishing a joint use backup dispatch facility.

In consideration of the above, as well as the Client group's interest-in-common to enhance interoperability, partnering in the establishment of a single joint use backup dispatch facility merits consideration in Niagara.

An Optimal Delivery Model for Niagara

An operationally integrated 'Public Safety Communications' model is the one that IBI Group favours as the optimal emergency dispatch delivery system for Niagara – this for the following reasons:

- As demonstrated by the research and assessment carried out in the body of this report (and depicted by the Assessment Summary below), among the options considered this arrangement comes closest to meeting all of the previously recommended attributes for a contemporary emergency dispatch operation.
- This option promotes a relatively lengthy list of potential benefits / advantages (as above).
- This option reflects current trends in major North American municipalities, and in the USA it is the direction promoted by federal and state authorities. IBI Group is advised that in some states, emergency dispatch services will not receive 9-1-1 tax dollars unless steps are taken to consolidate dispatch operations.

Assessment Summary

Assessment Criteria	Alternative Options			
	1 Status Quo	2 Integration of Technology	3 Physical Co-location	4 Integration of Operations
1. Quality in the Delivery of the Critical Business Functions				
2. Enabled by a Conducive Working Environment, Business Supports and Technological Systems				
3. Communications Function is Adequately Resourced and Staffed				
4. Interoperability of Communications Within and Across Agencies				
5. Backup Solution that will Provide Uninterrupted Services				
6. Cost-Efficient in the Delivery of the Services				
7. Operations are Performance-Based, Accountable and Transparent				
8. Operational Funding is Adequate and Sustainable				
9. Governance Structure that Supports Expedient & Cost-Efficient Delivery of the Services				
10. Progressive / Forward Looking in its Operations				

Does Not Meet Criterion						Fully Meets Criterion
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As demonstrated by the research contained in the body of this report, it may take a number of years to transition to this model. However, the likelihood of establishing a successful operationally integrated 'Public Safety Communications' model increases substantially when:

- It is mandate by a high level authority

- The participating organizations express commitment and provide clear direction. In Niagara this would include a requirement for support at the local, regional and provincial levels (the latter because of MOHTLC's control and authority over changes that may affect the ambulance dispatch operation)
- There is an executive level sponsor (champion)
- Governance of the newly established organization is aligned to the delivery of public safety communications (i.e., as part of a Police, Fire, EMS and emergency communications public safety continuum)
- Governance is aligned to the delivery of service quality objectives, including consideration of such items as resourcing, access to technology, training et al
- Capital and operating budgets are similarly aligned
- The leadership (among agencies) promotes / serves as an example to a change in culture
- The Director has extensive previous experience as a uniformed officer of an emergency services organization (i.e., establishes trust / confidence)
- Employees and stakeholders are engaged in the change process.

Some may suggest that an operationally integrated 'Public Safety Communications' model will not work in Niagara due to items such as:

- Cultural differences among the agencies
- Concerns over loss of control over dispatch
- Collective agreements that prohibit outsourcing.

To this, IBI Group and others would reply that such concerns are not unique to Niagara. Further, as demonstrated by the above examples of emergency communications services that successfully operate on an integrated basis, where there is a collective desire to do so such challenges can be managed.

Clearly, at the outset there will be many challenges in advancing an operationally integrated 'Public Safety Communications' model, including reaching agreement on technological platforms, cost allocation, training, labour relations et al. Those who successfully deliver such services have stated that "it gets easier as one proceeds" and that they "would never consider reverting back".

Recommendations

An Optimal Delivery Model for Niagara

1. It is recommended that as a preferred long term direction, the Client group should adopt an operationally integrated “Public Safety Communications” model as the optimal emergency dispatch delivery system for Niagara. The system will include an area-wide radio network and a backup dispatch center.
2. Resolutions signifying local and regional Councils (and Authorities) commitments to the preferred long term direction should be secured. The resolutions should also authorize agency staff to work with one-another in the development of a going forward plan.

Governance

3. As an interim governance arrangement, an Advisory Management Board should be established with responsibility to develop a going forward plan. The Board, to be chaired by Niagara Region, will consist of senior representatives of each of the Client group agencies.
4. The Advisory Management Board will also serve as a forum for dealing with matters arising from the implementation and management of the system, including plans that may conflict with the preferred long term direction (i.e., near term plans for new communications facilities, proposed CAD upgrades, etc).
5. It is recommended that a review of the governance arrangement be undertaken in 2 to 3 years.

Moving Forward

6. The provincial government should be informed and invited to participate in the establishment of the Public Safety Communications system. Similarly, key stakeholders and potential partners should be informed and invited to participate (e.g., Niagara Parks Commission).
7. The Advisory Management Board should retain an Executive having previous experience as a uniformed officer of an emergency services organization and applicable personal attributes to lead this initiative on behalf of the Board.
8. On behalf of the Board, the Executive should develop a going forward plan that will identify and address the elements that are integral to the establishment of the proposed Public Safety Communications system, including:
 - Change and risk management
 - Human resources and labour
 - Infrastructure and assets
 - Technology systems
 - Operating model and relevant business processes
 - Inter-agency coordination
 - Communications strategies for dealing with stakeholders, the province and others
 - Identification of potential partners and additional funding sources
 - Identification of early opportunities, time frames and targeted milestones
 - Financial resources (including multi-year budget estimates that align to plan components).

1. Introduction

1.1 Context

The Regional Municipality of Niagara consists of 12 unique and distinct local municipalities covering an area of approximately 1,850 square kilometres and housing a resident population of almost 450,000 persons. Niagara Region hosts over 14 million visitors annually.

Niagara is currently served by the following four (4) providers of emergency dispatch services.

- Niagara Regional Police Service (NRPS) operates a fully integrated 9-1-1 / police communications center, which in addition to the 9-1-1 function, dispatches and coordinates the deployment of NRPS resources. Emergency (9-1-1) calls requiring either fire or paramedic services are routed to the respective agencies.
- Niagara Emergency Medical Services (NEMS) operates Niagara ambulance communications service (NACS), which controls the deployment of Regional paramedic resources.
- The City of Niagara Falls Fire Department (NFFD) operates a fire communications center, which dispatches the City's fire services resources.
- The City of St. Catharines Fire and Emergency Management Services (SCFS) operates a fire communications center, which in addition to dispatching the City's fire services resources, is contracted for dispatch services by the ten (10) other municipal fire services operating in Niagara and by Haldimand County.



On February 10, 2011 Niagara Regional Council passed the following resolution.

"That Council direct the Emergency Medical Services, Regional Municipality of Niagara Police Services Board and the remaining dispatch centers in Niagara to establish a working group to report back on ways to merge, amalgamate or streamline their activities to better and more cost effectively deliver emergency dispatch services for Niagara citizens and taxpayers."

1.2 Study Objectives

In conformance to Regional Council's resolution a working group was established under the leadership of the Regional Corporate Services Department with the following as members: NRPS, NEMS, NFFD and SCFS. The members developed a study terms-of-reference with the following as the principal objective and scope of work.

Study Objective

To investigate ways in which the existing emergency dispatch services may be merged, amalgamated or streamlined to better and more cost effectively deliver the services for Niagara citizens and taxpayers.

Scope of Work

- To assess emergency communications services in Niagara against peer agency operations, specifically: 911 call taking, and emergency dispatch services for Police, Fire and EMS.
- To investigate a full range of alternative North American public safety dispatch models from physical co-location, to partial consolidation, to complete integration, including:
 - Potential advantages as may relate to such items as improved service quality, operational streamlining, cost-effectiveness, and interoperability, and
 - Comparability / compatibility to Niagara.
- To investigate the potential establishment of a joint backup center for emergency communications services in Niagara (to be used during a major disruption of services at one or more of the primary sites).
- To recommend an optimal delivery model and a going-forward implementation strategy.

1.3 IBI Group's Participation

IBI Group's participation in this study is the direct result of a competitive procurement process conducted by the Regional Municipality of Niagara that required a response to a Request-for-Proposals (RFP) issued on November 3, 2011. Formal award of the consulting assignment and approval to proceed was issued on February 22, 2012. Our team included the following consultants:

- Marvin Rubinstein, Senior Associate IBI Group (Project Manager)
- Wayne Gould, D. Wayne Gould Consulting Services
- Ron Welbourn, Proven Ways Emergency Services Communications
- Brian Holmes, Associate IBI Group
- Lee Sims, Director IBI Group

1.4 Study Oversight

Study oversight was provided by the following Steering Committee. IBI Group acknowledges the Steering Committee members and their staff for their leadership, assistance and cooperation:

- Brian Hutchings, Commissioner of Corporate Services, Niagara Region (Chair)
- Bob Diakow, Director IT Solutions, Niagara Region (Project Manager)
- Joe Matthews, Deputy Chief, NRPS
- Akram Askoul, Director Information & Communications Technology, NRPS
- Lee Smith, Fire Chief, NFFD
- Mark Mehlenbacher, Fire Chief, SCFS
- John Cunnane, Chief, NEMS

1.5 Stakeholder Consultations

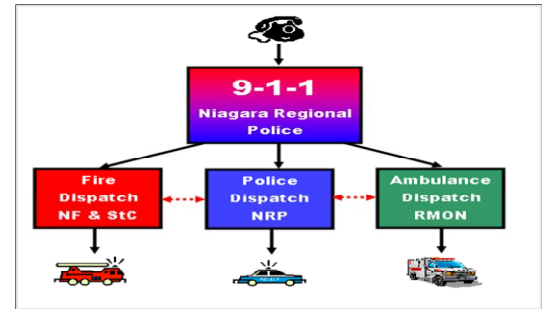
IBI Group also acknowledges the following stakeholders who were consulted during the study:

- Communications services personnel employed by NRPS, NEMS, NFFD and SCFS
- Niagara Regional Police Association
- Niagara Falls Professional Fire Fighters Association
- St. Catharines Professional Fire Fighters Association
- CUPE 1019 representing NACS personnel
- Grimsby, Port Colborne, Thorold and Welland Fire Services (clientele dispatched by SCFS)

2. Existing Emergency Communications Services

NRPS, NEMS, NFFD and SCFS deliver emergency dispatch services under separate (autonomous) governance structures and mandates, from four independently located emergency dispatch facilities, to service areas that vary in size and geographic coverage defined by jurisdictional / contractual authority.

They operate using their own staff resources, training programs and operating procedures that are uniquely designed to attain and support their individual emergency responder activities. Their operations are supported by individual systems and backup solutions (CAD, RMS, radio, telephone) that vary in age, technological capability and inter-agency interoperability.



Graphic by Niagara Region EMS

This emergency communications services model, involving separately operated communications centers, is similar to that employed by many jurisdictions. In this model, 9-1-1 calls are answered by call takers who ask whether the emergency is for police, ambulance or fire. Once the need is determined the call is routed to that organization's dispatch center. Ten (10) seconds to completion is the standard most commonly applied to this process.

The existing providers of emergency dispatch services are discussed individually in Sections 2.1 to 2.4. For the reader's convenience, a summary of key attributes is presented in Exhibit 2.1.

Exhibit 2.1
Existing Dispatch Services

	NRPS	NEMS	NFFD	SCFS
Communications Services	Fully Integrated 9-1-1 and Police Dispatch	Dispatch for EMS and Fire Tiered Response	Dispatch for City of Niagara Falls Fire Services	Dispatch for St. Catharines and Other Fire Services
Primary Center Location	HQ (SC)	HQ (NOTL)	HQ (NF)	HQ (SC)
Annual Call Volume	135,000 (911) / 80,000 (police)	42,000	5,000	16,500
Full-Time Communicators	56	25	4	10
Work Stations	16	8	2	4
CAD	Versadex	TriTech VisiCAD	Symposium	enRoute
Radio	VHF / P25	FleetNet Trunked VHF	VHF / P25	VHF
GIS Interface	Yes	Yes	Yes	Not Supported
Mobile Tracking	Not Implemented	GPS/AVL	GPS/AVL	Not Supported
Gross Annual Operating Cost	\$6,049,000	\$4,456,900	\$555,000	\$1,547,000
3rd Party Revenue	\$1,208,000 Niagara Region	\$4,456,900 MOHLTC	\$12,000 GO Transit	\$751,000 Municipal Clients

2.1 Niagara Regional Police Service (NRPS)

NRPS operates a fully integrated 9-1-1 / police communications (dispatch) center, which is located at NRPS headquarters at 68 Church Street in St. Catharines.

In this model the 9-1-1 function is carried out on an integrated basis with the police dispatch system i.e., when it is determined that a call is for police services then the 9-1-1 call taker will continue with the call serving as police call taker. The system does not include communicators dedicated to the 9-1-1 function on a continual basis.

The center handles approximately 135,000 incoming 9-1-1 emergency calls a year: 59% are requests for NRPS, 7% are routed to NFFD and SCFS, 29% to NEMS and 5% to other agencies including the OPP and Niagara Parks Police.

In addition to the 9-1-1 function, the center dispatches and coordinates the deployment of the 700 full-time police officers and 350 police vehicles that operate out of the Region's 8 police stations.

Staffing consists of 56 full-time communicators (call takers and dispatchers), a manager, 4 supervisors, a training supervisor and 6 temporary employees to cover vacancies. The basic shift pattern on weekdays consists of 14 communicators and a supervisor.

The communications center is equipped with 16 work stations; 9 for call taking, 4 for dispatch, 1 for a supervisor and 2 for switchboard operators. The systems used include:

- Versadex computer aided dispatch (CAD) system for both 9-1-1 call taking and police dispatch operations. The CAD, which is manufactured by Versaterm, is a fully supported windows-based system. The system has a GIS interface and is capable of supporting GPS based tracking of vehicles and assets; albeit, NRPS does not presently use this feature.
- Versaterm records management system (RMS). It is fully integrated with the CAD system.
- VHF, Motorola P25 radio system, which is capable of operating in digital and analog formats. It is a multi-site, conventional VHF voice communications system with 3 dispatch and 7 tactical channels. Plans are underway to advance the current VHF radio system to 700 MHz.

The annual cost to deliver the communications function is approximately \$6.05 million. Annually, NRPS budgets about \$1.2 million for 9-1-1 call taking operations and about \$4.85 million for police dispatch services. The cost of 9-1-1 call taking services is based on an equivalency of 12 full-time call takers, and is subsidized by the Regional Municipality.

NRPS proposes to relocate the communications center from 68 Church Street in St. Catharines to a new NRPS headquarters building in Niagara Falls in 2015. The present building is slated for demolition and a new police station is proposed to be constructed on the site.

2.2 Niagara Emergency Medical Services (NEMS)

NACS, which is located at NEMS administrative headquarters at 509 Glendale Avenue East (Foster Wheeler Building) in Niagara-on-the-Lake, controls the deployment of 163 full-time paramedics, 78 part-time paramedics and 37 vehicles that operate out of the Region's 17 ambulance stations.

NACS handles approximately 42,000 calls for ambulance services a year. About 30% involve fire tiered response.

Staffing consists of 25 full-time and 7 part-time communicators (referred to as Systems Status Controllers), 2 managers, 5 supervisors and various support positions that are shared with field

operations including QA, regulatory compliance, training, and systems and administrative support. The basic shift pattern on weekdays consists of 7 communicators and a supervisor.

The communications center is equipped with eight work stations; 4 for call taking, 3 for dispatch and 1 for a supervisor. The systems used include:

- Custom-designed CAD constructed on a TriTech VisiCAD platform with the following subsystems, several of which are unique to Niagara EMS:
 - FleetMonitor, a tool that provides real time status of vehicles
 - Mobile Area Routing Vehicle Location Information System (MARVLIS)
 - FirstWatch real-time biosurveillance and syndromic surveillance
 - Advanced Medical Priority Dispatch System (AMPDS) / ProQA AQUA for call triage
 - Headstart e911 and Live Routing to assist with pre-alert, paging and routing to scene
 - GIS interface that supports tracking of vehicles and assets by way of GPS/AVL
 - Digital Alpha-Numeric Paging
 - CADPortal, a digital CAD-to-CAD interface between NACS and NFFD for fire tiered response. A similar interface has been partially implemented with SCFS.
 - Alertline, a tool that notifies dispatchers of critical changes in incidents and call information
- MOHLTC data records warehouse which is networked to the CAD, and EMS Edge (Business Objects IX) for in-house data management.
- Provincial government FleetNet VHF trunked radio system for voice communications. It has six talk groups, 3 for dispatch and 3 tactical. The province through Infrastructure Ontario presently has a program underway to modernize the FleetNet system.

The annual cost to deliver the land ambulance communications function is approximately \$4.46 million. The cost is fully funded by the Ontario MOHLTC. NACS operates under the auspices of MOHLTC in accordance with terms and conditions that are set out in a performance agreement. Changes to NACS operations, technology or infrastructure are subject to Ministry approval.

2.3 Niagara Falls Fire Department (NFFD)

The NFFD communications center, which is located at fire headquarters (5815 Morrison Street in Niagara Falls), dispatches and coordinates the deployment of the City's 125 full-time fire fighters, 100 part-time volunteers and 15 vehicles that operate out of the City's 6 fire stations.

Staffing consists of 4 full-time communicators, manager (part of Deputy Chief's duties), supervisor and 16 fire fighters who periodically serve as relief communicators (call taker/dispatcher). The basic shift pattern on weekdays consists of 1 communicator (2 during peaks) and a supervisor.

The NFFD fire communications center responds to approximately 5,000 emergency calls a year. About 60% are routed from the NRPS 9-1-1 call center and 40% from NACS. In 2011, while serving as relief communicators, NFFD fire fighters handled about 24% of the annual 5,000 fire calls.

The NFFD communications operation was upgraded about two years. The work involved a relocation of the center above grade, improvements to the backup dispatch facility and purchase of a new fire CAD and radio system. It presently consists of:

- 3 fully interoperable work stations; 2 for communicators and 1 for the supervisor.
- Symposium CAD, which is a fully supported windows-based system. It has a GIS interface and supports GPS tracking of assets. Mobile data terminals (MDTs) are being phased in.

- FirePro records management system, which is integrated into the CAD.
- CAD-to-CAD interface with Niagara EMS for fire tiered response to medical emergencies.
- VHF, Motorola P25 radio system, which is capable of operating in digital and analog formats.
- Analog paging of volunteers.
- Two leased tower sites (at Font Hill and Embassy Suites).

For IT support NFFD relies in part on the City and in part on a 3rd party contracted resource.

The annual cost to deliver the communications function is approximately \$555,000. NFFD receives about \$12,000 a year in revenue from GO Transit (rent in return for warehousing of GO Transit computer systems).

2.4 St. Catharines Fire and Emergency Management Services (SCFS)

SCFS communications center, which is located at the headquarters facility at 64 Geneva Street in St. Catharines, controls and coordinates the fire resources of about 54 fire stations situated in:

- City of St. Catharines
- Ten (10) municipalities in Niagara (all but Niagara Falls), and
- Haldimand County.

The SCFS fire communications center responds to approximately 16,500 emergency calls a year. About 7,200 calls originate in the City of St. Catharines whereas 9,300 originate in client jurisdictions requiring a response by their respective fire services.

Calls are routed to the SCFS communications center by the following means: NRPS serving as primary PSAP for Niagara Region, North Bay OPP serving as primary PSAP for Haldimand County, or NACS requesting fire tiered response.

Staffing consists of 10 full-time communicators, Divisional Chief of Communications who serves as Manager and Supervisor, and IT support. The basic shift pattern on weekdays consists of 2 communicators and the Divisional Chief of Communications.

The communications center is equipped with 4 fully interoperable work stations; 3 for communicators and 1 for the Divisional Chief. The systems used include Motorola Gold Elite VHF radio system and DOS-based CAD provided by enRoute Emergency Systems.

The enRoute CAD is fully supported by the provider and is capable of delivering the critical business functions relevant to fire dispatch. It includes a records management system and a communicator interface with NACS. It does not presently support GIS or GPS integration.

The cost to deliver the communications function is approximately \$1.55 million a year. The revenue from clientele is about \$750,000 a year.

SCFS plans to upgrade to a windows-based CAD system within 16 months. Other proposed changes include:

- Communications center is to be relocated to a planned new Fire Station #4 in 2013. The new station will also house the City's IT data center and an Emergency Operations Center (EOC).
- Provision within the proposed relocation to accommodate 5 fully inter-operable work stations (up from the current four).
- An upgrade to a VHF Motorola P25 radio system, similar to that which NFFD currently uses.

- Current communications center at 64 Geneva Street to serve as backup.
- Planned introduction of 2 communications coordinator positions.

IBI Group interviewed a sample of SCFS clientele (specifically the Fire Chiefs of Grimsby, Welland, Port Colborne and Thorold). The clientele describe the current management at SCFS as being generally responsive. Particular mention was made of quarterly meetings where they may jointly discuss issues in common. This notwithstanding, the following issues were identified:

- Occasional difficulty answering radio communications in a timely manner (when dealing with multiple concurrent emergencies)
- Inability to expediently address such issues as: procurement, contracting and funding of communications infrastructure and equipment.

In this, it is important to note that in the absence of supervisors, the Divisional Chief has to deal with these types of issues; also, that the clientele consist of 12 fire departments having multiple views reflecting – each one reflecting the makeup and financial capacity of their respective communities.

3. Peer Agency Comparisons

3.1 Delivery of Critical Business Functions

In the broadest of terms, the primary objective of an emergency services communication center is to receive notification of an incident and to expediently dispatch the appropriate resources to effectively resolve the occurrence. Each emergency communications service operates with its own uniquely designed set of operating procedures (SOP's) involving multiple critical and inter-related business functions that are designed to attain / sustain this primary objective. Listed below are the respective emergency responder activities:

- *9-1-1 Call Answering.* NRPS receives a 9-1-1 call. Once the service requirement is determined (Police, Fire or EMS) the call is routed to the emergency communications center relevant to that emergency services organization. Ten (10) seconds to completion is the standard most commonly applied to this process and most 9-1-1 agents will measure and report on their performance relative to this standard.
- *Call Taking.* On receipt of a call from the 9-1-1 agent, a communicator in the emergency services organization (Police, Fire or EMS) performs caller screening to determine an appropriate response and the potential need for support by one of the other emergency services organizations. The communicator's performance of this function is aided by one of several tools that generally are embedded in the CAD system.
- *Dispatching.* Once an appropriate response is determined, the process advances to the dispatching of an appropriate resource to the location of the emergency. As above the communicator's performance of this function is aided by tools and information that generally are integrated with the CAD. They include radio, telephone, paging and RMS systems. For call taking and dispatching, the standard generally employed is a combined time interval ranging from 1 to 2 minutes.
- *Call Monitoring.* Once a response unit(s) is committed to an incident, the communicator will monitor the activity by way of the radio system or in-vehicle mobile data terminals (MDTs), responding to the assigned field crew's requests for additional information or resource support.
- *Data Processing & Management.* Every incident produces a myriad of data pertinent to the occurrence, i.e.: location of the incident, nature of the emergency, personal information, information concerning the resources that were dispatched and the actions that were taken, time stamps (including time dispatched, time to go mobile, time arrival scene), etc. The communicator will track and record incident activities and other salient information in a CAD/RMS system. In addition, all telephone and radio communication is recorded.

As will be discussed on the following pages, the client agencies are delivering the critical business functions necessary to ensure their respective operational continuity on a daily basis. Each one is vigilant in the activities necessary to ensure operational continuity on a daily basis. In this regard, each agency has in place, a documented set of protocols (SOPs) setting out the procedures and parameters to be followed to ensure reliable emergency communications services.

Each agency also has in place, a technological system (CAD, RMS, telephone, radio, recording, etc) that enables the agency to carry out their respective critical business functions and each is capable of up-staffing during peak periods or to accommodate special events. This notwithstanding, two of the agencies (NRPS and SCFS) require additional communications staffing.

3.1.19-1-1 / Police Dispatch

Nine (9) Ontario-based police services serve as peer agency comparators to NRPS. They are identified in Exhibit 3.1. For this purpose, each agency completed a survey setting out salient information relevant to their dispatch operations. Relevant peer comparisons are presented below.

Operating Model

NRPS serves as primary PSAP for Niagara Region. Similarly, the peers serve as primary PSAP for their municipalities.

NRPS operates a fully integrated 9-1-1 / police communications center, where the 9-1-1 function is carried out on an integrated basis with the police dispatch system. The peers also operate 9-1-1 / police communications centers that are fully integrated.

NRPS staffs its dispatch center with civilian communicators. The majority are full-time employees. Temporary / part time personnel serve as relief communicators, covering for vacation, lieu days, sick leave, etc. Staff are trained to perform 9-1-1 call taking, police call taking and radio dispatchers. The same is true of the staff employed by the peer agencies.

All agencies, including NRPS, assign responsibility for management and administration of the communications center to a uniformed officer (Staff Sergeant or Inspector). This approach is common to many emergency services.

Technology

- CAD: NRPS uses a Versadex CAD. Versadex and Intergraph are the most popular commercial CAD systems among police services.
- RMS: NRPS uses a Versaterm RMS. Versaterm and Niche are the most popular among police services.
- Radio: NRPS operates with a VHF Motorola P25 radio system as do many of the other peers.
- Paging: Relatively few Police services use paging systems. An example of one that does is the Greater Sudbury Police Service. They use this application to dispatch the City's rural-based volunteer fire fighters.
- GPS/AVL: The Versadex CAD used by NRPS supports tracking of vehicles and assets by way of GPS/AVL but NRPS does not presently use this feature. Most peers operate with CAD systems that have incorporated and utilize this feature.

Exhibit 3.1
Peer Agencies: 9-1-1 / Police Dispatch

Police Services	Service Area		
	Population	Sq Km	Pers/Sq Km
Peterborough, City	78,698	58	1,357
Thunder Bay, City	108,359	328	330
Greater Sudbury	160,274	3,201	50
Niagara Region	431,346	1,854	233
Halton Region	501,669	964	520
Durham Region	608,124	2,524	241
Ottawa	883,391	2,790	317
York Region	1,032,524	1,762	586
Peel Region	1,296,814	1,247	1,040
Toronto	2,615,060	630	4,151

Call Activity

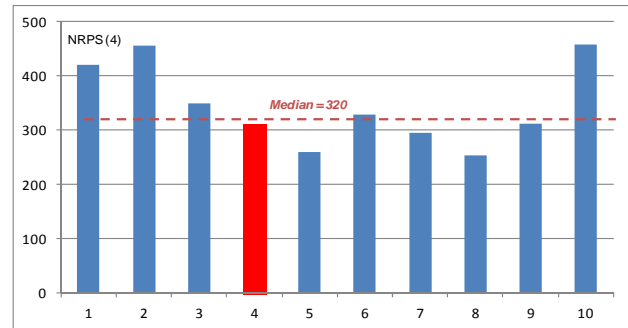
Given that the peers vary in service area coverage from 78,600 to over 2 million residents, to enable an apple-to-apple comparison, call activity statistics are reduced to a common parameter expressed as average volume of calls per 1,000 residents.

Annually the peer agencies handle an average of 250 to 460 incoming 9-1-1 emergency calls per 1,000 residents. The median value is approximately 320. NRPS handles a volume that is approximately equal to the median value.

Of the incoming 9-1-1 emergency calls handled by NRPS:

- 59% are requests for police services. For the peers the value ranges from 58% to 79%
- 7% are routed to NFFD and SCFS. For the peers the value ranges from 3% to 10%
- 29% are routed to NEMS. For the peers the value ranges from 15% to 32%.

Exhibit 3.2
Annual 9-1-1 Calls per 1,000 Residents



Note: The results are sequenced in accordance to the listing in Exhibit 3.1

Communicator Workload

Communicator workload is derived by dividing the annual number of 9-1-1 calls by the communicator complement. For this calculation full-time staffing is combined with part-time staffing, adjusting the latter value by 50% to reflect the part time role.

Peer Agencies Workloads per communicator vary from 1,600 to over 5,000 incoming 9-1-1 emergency calls a year.	NRPS Each NRPS communicator handles an average of 2,400 incoming 9-1-1 emergency calls a year. This is approximately equal to the median value among peers.
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Operating Cost

Among the peers the annual cost to operate a fully integrated 9-1-1 / police communications center ranges from \$80,000 to over \$125,000 per communicator. The median value is over \$110,000. For NRPS, the annual operating cost is slightly below the median value.

Among taxpayers, cost per household or per capita costs are parameters commonly used to measure the cost effectiveness of municipal service delivery. A comparison of the per capita costs to deliver 9-1-1 / police dispatch services is presented below.

Peer Agencies Among the peers, the annual cost per resident varies from \$8 to \$15.	NRPS For NRPS the annual cost per resident works out to approximately \$14. This is approximately equal to the median value among peers.
--	--

3.1.2 Fire Dispatch

Seventeen (17) Ontario-based fire services serve as peer agency comparators to NFFD and SCFS. They are identified in Exhibit 3.3. Each peer completed a survey setting out salient information relevant to their fire dispatch operation. Relevant peer comparisons are presented below.

Operating Model

- 4 dispatch self only
- 8 dispatch self and others
- 2 dispatch with others. One is Ajax, which dispatches jointly with Pickering. The other is Brampton, which along with the fire departments of Mississauga and Caledon, operates a Joint Fire Communications Center in Peel Region.
- 3 are dispatched by a police service. All 3 are located in single tier municipalities.

Peers offered the following comments on their respective dispatch service arrangements.

- *Dispatch for self only:* Advantages include control of dispatch policies and procedures, ability to swiftly adjust procedures and operational response plans when required, control over processing times and flow of information and ease of communications between field operations and dispatch.
- *Dispatch for self and others:* For self the advantages are as above plus the revenue from others helps to contain costs. Disadvantages include added complexities associated with multiple response plans and clientele.
- *Dispatch jointly with others:* Advantages include the potential to contain costs (particularly overtime / backfill costs), fire fighters not needed for relief dispatch and opportunity to separate call taking and dispatch for greater efficiency. Disadvantages include added complexities associated with multiple partners and stakeholders.
- *Receive fire dispatch from others:* Advantages include low cost and not having to deal with staffing, labour or equipment related issues. Disadvantages include lack of direct control (which resides with provider) and limited opportunity to influence decisions.

Exhibit 3.3
Peer Agencies: Fire

Fire Service	No. of Fire Services Dispatched	Service Area		
		Population	Sq Km	Pers/Sq Km
<i>Dispatch Self Only</i>				
Niagara Falls	1	82,997	210	395
Milton	1	84,362	363	232
Brantford	1	93,650	72	1,301
Markham	1	301,709	213	1,416
Toronto	1	2,615,060	630	4,151
<i>Dispatch Jointly With Others</i>				
Ajax	3	209,662	722	290
Brampton	3	1,296,814	1,243	1,043
<i>Dispatch Self and Others</i>				
Orillia	6	84,826	2,115	40
St. Catharines	12	371,534	1,942	191
Barrie	14	296,431	2,795	106
Oshawa	4	313,821	1,189	264
Burlington	2	358,299	325	1,102
Kitchener	5	371,014	1,069	347
Vaughan	2	308,200	607	508
London	17	402,651	1,870	215
Ottawa	3	917,801	3,591	256
<i>Receive Fire Dispatch Services from Police</i>				
Kawartha Lakes	1	73,214	3,059	24
Thunder Bay, City	1	108,359	328	330
Greater Sudbury	1	160,274	3,201	50

The SCFS communications center is staffed with 10 full-time employees who are dedicated to the communications function. In contrast, at the NFFD center communications staffing consists of 4 full-time employees who are assisted by a relatively large auxiliary of 16 fire fighters serving as relief communicators.

Among the peers, 12 staff their dispatch centers entirely with full-time communicators, 3 (Barrie, Burlington and Kitchener) augment the full-time communicator complement with part-time personnel, and 4 (Ajax, Brampton, Brantford and London) use fire fighters trained in the communications function as relief communicators (as does NFFD).

Technology

- CAD: NFFD uses a Symposium CAD. SCFS uses enRoute. Crisys and enRoute are the most popular commercial CAD systems among fire services.
- RMS: NFFD uses FirePro. SCFS uses Amanda. Crisys, enRoute and Firehouse are the most popular among fire services.
- Radio and paging: Motorola appears to be most popular manufacturer of Fire radio and paging. Both NFFD and SCFS use radio and paging systems manufactured by Motorola.
- GPS/AVL: The Symposium CAD used by NFFD supports this feature. NFFD has equipped several of its fleet with Motorola MDTs. The enRoute CAD used by SCFS does not support this feature; albeit the proposed CAD upgrade will include this feature. Many of the peer agencies do not currently track mobile assets using GPS/AVL. Among those who do, there does not appear to be a preference for any one commercial system.

Call Activity

Exhibit 3.4 compares the demand for Fire dispatch services among the peer agencies. The demand, which is expressed in terms of annual incidents per 1,000 residents, is derived by dividing the annual number of incidents that the dispatch center handles by the population of the 'service area'.

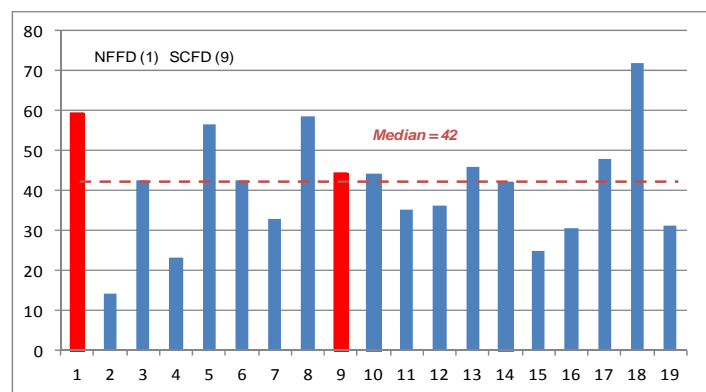
For NFFD the population of the service area and that of the municipality are one and the same. For SCFS the service area population includes the residents living in all of the municipalities for which SCFS provides fire dispatch services, including those living in the County of Haldimand.

Annually, peer agencies respond to volumes ranging from 15 to over 70 incidents per 1,000 residents. The median value is 42.

NFFD responds to an annual 60 incidents per 1,000 residents. This comparatively high figure is attributed to the fact that Niagara Falls is a major tourist destination.

SCFS responds to an annual 45 incidents per 1,000 residents, which is only slightly above the median value among the peers.

Exhibit 3.4
Annual Incidents per 1,000 Residents



Note: The results are sequenced in accordance to the listing in Exhibit 3.3

Communicator Workload

Fire communicator workload is derived by dividing the annual number of incidents by the communicator complement. For this calculation full-time staffing is combined with part-time staffing, adjusting the latter value by 50% to reflect the part time role. For NFFD an adjustment was included to reflect the call volume handled by fire fighters serving as relief communicators.

Peer Agencies
Workloads per communicator vary from 300 to over 2,300 incidents a year. The median value is about 1,100.
NFFD
The workload per communicator is slightly below the median value.
SCFS
The workload per communicator is almost 50% above the median value. This statistic affirms an impression derived from an on-site visit – specifically that for the current workload SCFS may require additional communications personnel.

Operating Cost

Among the peers the annual cost to operate a fire communications center ranges from \$75,000 to \$160,000 per communicator. The median value is about \$125,000.

For NFFD, the annual cost per communicator is about \$105,000. This comparatively low cost is attributed to two factors: the relatively few full-time communicators employed at that center and the relatively large number of fire fighters serving as relief communicators – particularly since fire fighter salaries are administered from a separate cost account.

For SCFS, the annual cost per communicator is about \$155,000. This comparatively high cost affirms the earlier assertion that SCFS requires additional communications personnel.

A comparison of the per capita costs to deliver fire dispatch services is presented below. As above, the figures are derived on the basis of the service area populations which, for SCFS, includes the combined population of its client group.

Peer Agencies
Among the peers, the annual cost varies from \$2 to \$8 per resident. The median value is \$4.
NFFD
For NFFD the annual cost per resident is estimated to be almost \$7 (i.e., the cost is almost 60% higher than the median value among the peers). In this, it should be noted that if one were to include the salaries for fire fighters serving as relief communicators then the figure would be even higher.
SCFS
For SCFS the annual cost per resident is \$4, which is equal to the median value among the peers. This statistic notwithstanding, another parameter to consider is the 'cost per fire call'. For this parameter the median value among the peers is about \$115 per call, whereas for SCFS it is about \$90. This comparatively low figure is attributed to the modest amount that SCFS charges its clientele. In order to sustain the dispatch operation at the current service level or to increase service quality (by way of additional communicators, supervisors and technical support) SCFS will need to reassess (increase) the amount that it charges.

3.1.3 EMS Dispatch

The Niagara ambulance communications center (NACS) is one of only two centers in all of Ontario to use an internationally recognized call triage system (Advanced Medical Priority Dispatch System) and to be accredited as a Center of Excellence by the National Academies of Emergency Dispatch (NAED). The other is the ambulance communications center operated by Toronto EMS. Both of these centers operate with technology, protocols and cost models that differ significantly from those mandated by the Ontario MOHLTC for use in the provincial network of Central Ambulance Communications Centers (CACC).

To ensure an apple-to-apple comparison to peers, a decision was made to compare NACS to similarly accredited Centers of Excellence located in other jurisdictions (or to centers that are working toward their accreditation). Nine (9) ambulance communications centers serve as peer agency comparators to NACS. They are identified in Exhibit 3.5.

Exhibit 3.5
Peer Agencies: EMS

EMS Service	Service Area		
	Population	Sq Km	Pers/Sq Km
Richmond Ambulance Authority, Richmond Virginia	205,533	156	1,318
MD Ambulance, Saskatoon	222,189	210	1,058
Eastern Health Authority - Newfoundland	313,203	21,000	15
Niagara EMS	431,346	1,854	233
Ottawa Paramedic Service	883,391	2,790	317
Sunstar EMS, Pinellas County Florida	916,542	725	1,264
Emergency Medical Care Inc., Nova Scotia	921,727	52,939	17
MEDIC, Mecklenburg County North Carolina	944,373	1,362	693
Toronto EMS	2,615,060	630	4,151
British Columbia Ambulance Service	4,400,000	922,500	5

Each peer completed a survey setting out salient information relevant to their ambulance communication operation. Relevant peer comparisons are presented below.

Operating Model

NACS dispatches and coordinates the deployment of Niagara Region's land-based paramedic resources. The peers provide a similar function for paramedic services operating in their respective jurisdictions. In addition:

- Ottawa Paramedic Service dispatches for the neighbouring paramedic services of Cornwall, Stormont Dundas and Glengarry, and the United counties of Prescott and Russell.
- Richmond Ambulance Authority dispatches several locally-based volunteer rescue squads.
- MEDIC dispatches County Fire Departments.
- MD Ambulance (Saskatoon) dispatches land and air ambulances for multiple health regions, and fire services for multiple fire departments.
- Eastern Health Authority dispatches multiple land ambulance services operating in Newfoundland and Labrador, as well as the province's air ambulance system. BC Ambulance Service also dispatches an air ambulance system.

At NACS the majority of the communications staff are full-time employees. Part time personnel serve as relief communicators, covering for vacation, lieu days, sick leave, etc. The same is generally true of the staff employed by the peer agencies; albeit, several centers are staffed entirely with full-time employees.

NACS communicators are trained to serve as emergency medical call takers and radio dispatchers. The same is true of the staff employed by the peer agencies. Communicators at MEDIC also are trained to perform 9-1-1 call taking and fire dispatch. Communicators at Sunstar also are trained to perform 9-1-1 call taking and those at MD Ambulance also are trained in Fire dispatch. Further, Sunstar and Eastern Health require that their communicators be paramedic-certified.

Technology

- CAD: NACS operates with a custom designed CAD constructed on a TriTech VisiCAD platform. TriTech is the most popular commercial CAD system among paramedic services.
- RMS: Ontario ambulance communications services, including NEMS, rely on the MOHLTC data records warehouse system which is networked to their CAD. For others, there does not appear to be a preferred commercial system for RMS.
- Radio: NACS operates with the provincial government FleetNet VHF trunked radio system. Among the peers Motorola appears to be the manufacturer of choice for radio systems.
- GPS/AVL: The TriTech CAD used by NACS supports vehicle tracking by way of GPS/AVL. NACS has equipped its entire fleet with MDTs. This is generally true among the peer agencies.

For call triage NACS and all peers but one (Ottawa) use Advanced Medical Priority Dispatch System (AMDPS). Ottawa uses a MOHLTC supplied system known as Dispatch Priority Card Index (DPCI-2). This is the same system used by the other MOHLTC CACCs.

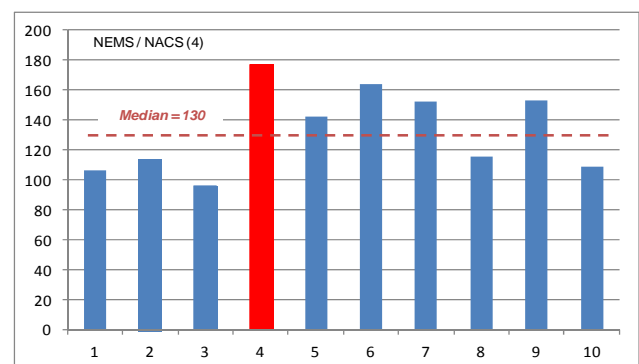
NACS operates with a 9-1-1 ANI / ALI enhanced system available to support the dispatcher. All of the peers but one operate with this feature. For fire tiered response, all ambulance communications centers are capable of communicating by voice with fire agencies (i.e., by radio and telephone). The majority of the peers also have text messaging capability by way of a CAD-to-CAD interface. NACS has a direct CAD-to-CAD interface with NFFD and ultimately there will be a similar capability with SCFD (when the latter completes its planned CAD upgrade).

Call Activity

Exhibit 3.6 compares the demand for ambulance dispatch services among the peer agencies. The demand, which is expressed in terms of annual incidents per 1,000 residents, is derived by dividing the annual number of incidents that the dispatch center handles by the 'service area' population. Postings and standbys are included in the calculation.

NACS at an annual 175 calls per 1,000 residents, is the highest volume ambulance call center among the peers. This comparatively high figure is attributed to Niagara's role as a major tourist destination.

Exhibit 3.6
Annual Calls per 1,000 Residents



Note: The results are sequenced in accordance to the listing in Exhibit 3.5

Communicator Workload

Communicator workload is derived by dividing the annual volume of EMS calls by the communicator complement. For this calculation full-time staffing is combined with part-time staffing, adjusting the latter value by 50% to reflect the part time role.

Peer Agencies Workloads per communicator vary from 2,300 to over 5,000 calls a year.	NEMS Each NACS communicator handles an average of 2,700 calls a year. This is approximately equal to the median value among the peers.
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Operating Cost

In consideration that wage rates for Canadian and US communicators vary significantly this portion of the investigation compares the operating costs of only the Canadian dispatch operations.

Among the Canadian peers the annual cost to operate an ambulance communications center ranges from \$85,000 to \$185,000 per communicator. For NACS the value is \$140,000, which is slightly higher than the median value.

A comparison of the per capita costs to deliver ambulance dispatch services is presented below.

Peer Agencies Among the peers, the annual cost per resident varies from \$3 to \$12.	NEMS For NACS the annual cost per resident is approximately \$9, which is equal to the median value among the peers.
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3.2 Communicator and Supervisory Staffing

Statistics presented in Section 3.1 demonstrate that the workload among communicators employed by three of the agencies - NRPS, NACS and NFFD - is generally consistent with the median values among their respective peers. This is not the case at SCFS where the workload is almost 50 percent above the peer agency median.

The data also illustrates significant variance in the supervisory span of control:

- At NFFD the ratio of communicators to supervisors is 4:1 (based on 4 full-time communicators and 1 Supervisor).
- At NEMS the ratio is 6:1 (based on 25 full-time communicators, 7 part-time communicators and 5 Supervisors).
- At NRPS the ratio is 15:1 (based on 56 full-time communicators, 6 relief communicators and 4 Supervisors).
- At SCFS the ratio is about 20:1. At SCFS communications staffing consists of 10 full-time communicators and 0 Supervisors. The Divisional Chief of Communications serves as Divisional Chief, Manager and Supervisor. If the Divisional Chief were to spend all of their time in the role of supervisor then the ratio of communicators to supervisors would be 10:1. More realistically, the Divisional Chief spends about half their time in this capacity and the ratio of communicators to supervisors is the equivalent of 20:1.

Additional information derived from on-site visits:

- Occasional difficulty at SCFS to answer radio communications in a timely manner, particularly when dealing with multiple concurrent emergencies.
- Occasional difficulty at SCFS to respond expediently to issues raised by clientele.
- Challenge at NRPS to provide in-service communicator training updates and to deliver a structured, proactive QA program geared to the communications function.

Observations

In consideration of the above, it is suggested that SCFS requires additional communications personnel. SCFS also requires additional supervisory staff dedicated to the communications function. A similar conclusion has been reached in regard to supervisor staffing at the NRPS communications center.

It is understood that SCFS plans to introduce 2 new Communications Coordinator positions. From a functional perspective these will be somewhat similar to a supervisor position.

In consideration of the unit costs presented in Section 3.1 which, for SCFS is substantially below the median value, it is suggested that SCFS should reassess (increase) the amount that they charge their clientele to reflect the true costs to operate at appropriate levels of staffing, including the requisite technical support and auxiliary programs for training, risk and performance management.

3.3 Backup Dispatch Capability

To minimize disruption to critical systems each agency has implemented built-in system redundancies, continuity protocols, auxiliary power, technical services support arrangements (in-house or under contract) and other back-up supports.

The above notwithstanding, unforeseen events could potentially require that a communications center be vacated, potentially for an extended period. In this area the client agencies' respective capabilities vary, as discussed below.

- **NRPS:** An NRPS station at 2 Cushman Road serves as backup center for emergency communications. The backup facility is outfitted to handle telephone and radio communications; albeit, call taking and dispatch must be carried out manually.
- **NEMS:** The Hamilton Central Ambulance Communications Center (CACC) operated by MOHLTC serves as backup dispatch center for NACS. In the event of a major outage at NACS, NEMS communicators will relocate to the Hamilton CACC, where they will operate in manual mode using radio and telephone.
- **NFFD:** In the event of a major outage NFFD communicators will relocate to a backup center located at the Crowland volunteer fire station on Schisler Road, where they will operate remotely from off of the primary CAD server. The center is outfitted with a communications console, telephone, 9-1-1 lines and a point-to-point data radio link connecting this site back to the primary dispatch center.
- **SCFS:** SCFS does not currently have a backup dispatch capability. In the event of a major outage, SCFS and their clientele would have to rely on NFFD and neighbouring emergency services for support. Discussions with City Public Works are underway for the provision of space at the Lake Street Public Works facility to accommodate the establishment of an interim backup communications center.

Observations

The situation among the comparators (i.e., among 9-1-1 / Police, Fire and EMS peer agencies) is similar to that of Niagara. Their backup solutions also vary from those having to operate manually (as per NRPS and NACS) to those with CAD functionality similar to that of their primary dispatch center (as per NFFD). This is discussed further in Section 5.

The ongoing practice of separate backup dispatch centers promotes inefficient duplication of technology, infrastructure, facilities, maintenance and financial requirements. In consideration of this, as well as the Client group's interest-in-common to enhance interoperability, partnering in the establishment of a single joint use backup dispatch facility merits consideration.

3.4 Communications Center Facilities

NFFD recently upgraded their emergency communications capabilities. The upgrade included a relocation of the primary dispatch center above grade, improvements to the backup dispatch facility and purchase of a new fire CAD and radio system. Recent testing has confirmed the achievement of the intended quality improvement objectives.

NACS has operated at the present location (Foster Wheeler Building) for 7 years. It is a relatively new emergency communications facility that was designed to stringent standards reflecting industry best practices for land ambulance communications.

SCFS is committed to relocating their Fire communications center to a planned new Fire Station #4 in 2013. SCFS recently called for tenders. Construction is scheduled to start shortly.

The present NRPS facility at 68 Church Street in St. Catharines is slated for demolition and NRPS has proposed that the communications center be relocated to a planned new NRPS headquarters building in Niagara Falls. The new headquarters building is to be constructed in 2015.

Observations

The planned relocation of two communications facilities (by NRPS and SCFS) within a somewhat similar timeframe begs the following question: why are these two agencies not considering the possibility of physically co-locating their two emergency communications operations. Listed below are several of the advantages associated with such an option:

- Potential capital savings for both agencies – in terms of facility infrastructure
- Potentially, lower rent for both agencies - depending on the choice of location
- Potential savings associated with the extensive supporting emergency communications infrastructure which both would require (i.e., 9-1-1 lines, radio towers and telephone systems)
- Potential that this building could also house a backup dispatch for both NEMS and NFFD.

To be clear, the above is not a suggestion to integrate operationally to a single communications service, but rather to physically co-locate in one building as is the case in the following communities: Peel Region and Toronto.

In Peel Region, police and fire communications operate independently in the same building. The building also serves as a backup to the MOHLTC CACC based in Mississauga. In Toronto, fire and EMS communications operate independently in the same building. The building also houses a backup center for Toronto police.

Another option that has been mentioned is to have NRPS or SCFS (or both) co-locate with NACS in the Foster Wheeler building where space may be made available for this purpose. One of the potential advantages afforded by this option is that this facility is already supported by an emergency communications infrastructure which includes 9-1-1, radio and telephone systems.

Another consideration is the Ontario Building Code (OBC), which requires that new emergency communications facilities be constructed to 'post disaster' standards. IBI Group is advised that both the planned NRPS headquarter building and the planned SCFS Station #4 will be constructed to these standards. The recently upgraded NFFD communications center is either partially or fully post-disaster compliant. NACS, which was constructed about 7 years ago and is located in a multi-story commercial building, may not be fully compliant with the standards.

3.5 Supporting Systems and Technology

Client agencies operate with individual systems and backup solutions that vary in age, technological capability, inter-agency interoperability, and business and performance management supports, as discussed below.

- CAD systems used by NRPS (Versadex), NACS (TriTech) and NFFD (Symposium) are fully supported windows-based systems with GIS interface capable of supporting mobile asset tracking by way of GPS/AVL. CAD used by SCFS (enRoute) is a DOS-based system. While it is fully supported by the provider and is capable of delivering the critical business functions relevant to fire dispatch, it does not support GIS or GPS integration. SCFS plans to upgrade to a windows-based CAD system within 16 months.

- NACS and NFFD use GPS/AVL in concert with in-vehicle MDTs to complement the dispatch and coordination of field resources. SCFS' planned system upgrade will include a mobile asset tracking capability. While the NRPS CAD will support GPS based tracking of vehicles, at present the fleet is not equipped with GPS/AVL and this feature is not in use (albeit being considered for 2013).
- The agencies rely on accurate mapping as an integral part of the dispatch process. NFFD, NRPS and NEMS operate with CAD systems that support windows based mapping and incident location. SCFS, which operates with a DOS-based system, must rely on alternative mapping solutions including map books and the internet. This will be addressed by way of the planned CAD upgrade.
- NRPS and NFFD operate with VHF Motorola P25 radio systems that are capable of operating in digital and analog formats. SCFS presently operates with a conventional Motorola VHF system; however, its plan is to advance to a P25 platform. NEMS is obligated to use the provincial government FleetNet VHF trunked radio system. Respectively, all of the radio systems are configured with multiple dispatch and tactical talk group channels.

Observations

Since SCFS is planning a wholesale upgrade of their CAD systems, the following is another question to consider: why does SCFS not consider the possibility of sharing a common CAD system with one of the other agencies, e.g. with NFFD or NRPS. The advantages associated with such an option would include:

- Potential capital savings for both agencies – in terms of technological infrastructure and future upgrades
- Potential savings in operating costs as relate to CAD operations, IT support, shared services arrangements, mutual backup solutions, etc
- Increased interoperability and information sharing.

Ottawa is an example of a jurisdiction where police and fire successfully share a common CAD as well as a common radio system. While the systems are integrated, police and fire continue to deliver their respective dispatch services independently from their own facilities and with their own staffs.

Another successful example is York Region, where radio and CAD are shared by the Regional police service and the Vaughan and Richmond Hill fire departments – with Markham fire department also planning to participate (Note – these 3 departments dispatch all of the fire services operating in York Region). As above, each agency continues to deliver their respective dispatch services independently from their own facilities and with their own staffs.

Yet another successful example is Denver 911, where police, fire and EMS share a common CAD system. In this case the agencies are physically co-located in one center; however, they operate independently with their own staffs – they are not operationally integrated.

To the credit of the Client group, they periodically consult one-another on matters of common interest and their participation on this study demonstrates a willingness to work together. This notwithstanding, in the area of systems and technology, the agencies continue to make independent decisions with little regard to potential opportunities (operational, financial or otherwise) that may be afforded by a singular direction / joint region-wide initiative.

For example, while most of the client agencies are advancing to a P25 radio communications platform (which in itself may enhance inter-agency interoperability) and in the process they

periodically consult one-another, little consideration is being given to the opportunities that might be afforded via the establishment of a single area-wide radio network for the entire Region.

To the contrary, efforts to rationalize individual radio infrastructures within their respective jurisdictions are continuing. In this, SCFS' effort on behalf of 11 locally-based fire services is of particular note – and it begs the following question: why is this initiative not being led regionally.

To ascertain the benefits (operationally, financially or otherwise) that may be realized from a single area-wide radio network one needs only to look at the lessons learned from one or two successful examples, including E-Comm in Vancouver and Fairfax County Virginia.

The following are additional areas that would benefit from a singular communications services direction / joint area-wide radio network initiative: use of common commercial products and associated equipment (i.e., telephone consoles, MDTs); use of a common product procurement process; establishment of shared technical support services, storage space arrangements; etc.

3.6 Joint Problem Solving / Inter-Agency Coordination

The establishment of a 9-1-1 call taking service at NRPS was set out in a 1989 agreement referred to as the "Joint Powers Agreement". That agreement, which was signed by Niagara Region, the Regional Board of Commissioners of Police, the Ministry of Health, Niagara Parks Commission and each of the area municipalities, specified that the services were to be administered under the oversight of a 5-member 'Management Board' that would report annually to Niagara Regional Council. The Board was comprised of a Regional Elected Official, a Police representative, a Fire representative, Ministry of Health (which at that time was responsible for the delivery of land ambulance services) and a Regional staff member who would serve as Coordinator.

In 2001 Niagara Region entered into a new agreement authorizing NRPS to continue to deliver the 9-1-1 services on the Region's behalf. It was a bilateral agreement signed by Niagara Region and the NRPS Board. This agreement introduced the following changes: It assigned the NRPS Board sole responsibility for management of the 9-1-1 operations and it acknowledged that 9-1-1 would be operated on an integrated basis with the police dispatch system, and that the system would not include communicators dedicated to the 9-1-1 function on a continual basis.

The 2001 agreement also requires that the Board make semi-annual written reports to the Region as to the status of the 9-1-1 system. The reports are to include summaries of complaints, concerns and suggestions received from police, fire, ambulance and/or any member of the public. IBI Group is advised that such reporting does not presently take place.

The term of the 2001 agreement was 5 years and it includes a provision that the agreement automatically renews for an additional 5 years unless the parties decide otherwise. It would appear that the agreement expired in 2011 and it has not been renewed; albeit the 9-1-1 service continues to function (as though an agreement were in force).

IBI Group also had an opportunity to review a draft terms-of-reference for a '9-1-1 Advisory Committee', Version 0.2 dated April 2009. Paraphrasing from that document, the Committee was set up to serve as a forum, in which to discuss and propose solutions to 9-1-1 and emergency service issues for all emergency services in Niagara.

IBI Group is advised, that while the 9-1-1 Advisory Committee continues to meet periodically the Committee terms of reference have not been endorsed and the participants have little if any authority to make decisions or to influence the 9-1-1 operations.

Additionally, there is an agreement between Niagara Region and Bell Canada that sets out their respective obligations pertaining to the delivery of 9-1-1 services. Bell's obligations under this

agreement include the provision of 9-1-1 telephone lines to the primary and backup centers, provision of ANI/ALI data and selective routing and transfer of emergency calls.

On a related note, there was a recent 9-1-1 outage in Niagara. The impacts were significant, affecting a large portion of the residents for a period of several hours. The outage resulted from a failure of a system which is owned and operated by Bell. Client group members continue to pursue a response / remedy from Bell. The above agreement, which expires in 2014, serves as a basis for such discussions.

Observations

Niagara Region and the NRPS Board, in consultation with other emergency dispatch services providers, should review the 9-1-1 services agreement to ensure that it accurately represents the needs of their respective organizations and those of Niagara residents.

In conjunction with the above, the 9-1-1 Advisory Committee terms-of-reference should be reviewed, revised and distributed for each agency's formal endorsement.

In addition to the formal establishment of a 9-1-1 Advisory Committee, the Client group should consider implementing an Operational Working Group that would serve as a working forum for operational level personnel (Communications Managers and Supervisors), i.e., a forum where they may jointly identify, discuss, investigate and recommend solutions to communications issues in common.

3.7 Interoperability

The Federal Emergency Management Agency (FEMA) of the U.S. Department of Homeland Security has suggested the following definition for the term 'interoperability'.

"Interoperability allows emergency management / response personnel and their affiliated organizations to communicate within and across agencies and jurisdictions via voice, data, or video-on-demand, in real-time, when needed, and when authorized - this includes equipment and the ability to communicate. If entities have physical communications systems that are able to directly communicate, those systems are considered to be interoperable. This can be a function of the actual system or the frequency on which the system operates."

The Client group is in general agreement with this definition and for greater clarity has offered the following add-ons:

- Interoperability is intended to ensure connectivity of communications regardless of differences in systems so that agencies are capable of communicating with one-another at times of need (i.e., during major incidents involving multiple agencies).
- In respect of multi-agency incidents, interoperability is intended to ensure that all agencies have access to sufficient, accurate and timely information (and information updates) that will enable appropriate real-time decision making in regard to the deployment of staff and equipment, and to ensure the safety of the personnel.
- Interoperability is not intended to mean giving front line first responders the ability to talk with one-another (i.e., ambulances communicating with fire trucks). The focus should be on the command level i.e., giving incident commanders the ability to communicate with their respective agencies. They would then share that information during face-to-face discussions. The use of mobile command units would complement such a process.

From an operational perspective, the Client group is of the view that improving interoperability can be relatively simple, particularly given the many off-the-shelf technology solutions that are currently available for such purposes. The CAD-to-CAD interface between NEMS and NFFD is cited as an example of improved interoperability between fire and EMS.

Observations

In consideration of each agency's willingness to establish / enhance interoperability at the command level, IBI Group offers the following suggestions for each agency's consideration:

- Include interoperability on an ongoing basis in the agenda for incident commander briefings and as a component of incident commander training sessions.
- Consider developing supportive directives or protocols that one might share between agencies, including corresponding agencies in the U.S.
- Consider addressing / assessing interoperability capabilities by way of command tactical worksheets. This would include mobile command units, to ensure that on-board technological systems will support interoperability of communications.

From a broader perspective one might consider establishing an overall Regional strategy that would link each individual agency's interoperability initiatives. Further, given the following considerations, one might consider having municipal Emergency Operations Centers (EOC) and their respective Emergency Control Groups take the leadership for its development: the responsibilities vested with these groups by the Emergency Management and Civil Protection Act, which include supporting the response capability of the community, and the inter-agency communications capabilities that these groups have already implemented.

Finally, it is safe to assume that any future change in emergency dispatch arrangement (co-location, systems integration, operational integration, etc) is very likely to support and complement interoperability between the participants. Whether it's because they may share the same facility, establish on site working groups or share technology, enhanced interoperability will likely evolve naturally.

3.8 Risk and Quality Management

The Client group agencies all have requisite systems, processes and documentation in place to support and provide necessary direction for their respective communications operations. These include standard operating procedures (SOPs), guidelines, response protocols and directives. In addition, the agencies all have training programs in place to ensure their respective staffs attain acceptable levels of competence and that they are capable of performing duties as assigned.

Maintaining the currency of these documents is an ongoing task. In this regard, each agency is at a different state in their review cycle. The documents and procedures used by NEMS and NFFD appear to be up to date. NRPS has recently completed a major update of their procedures and they are presently being introduced to the staff. SCFS is currently in the review and development process of their documents.

Each agency rigorously maintains a record of all calls. This includes information stored in the RMS and by way of voice recordings. Each agency periodically summarizes some of the information for general reporting on their activities. While the agencies may use the data to assess the performance of their communications operations or as a tool for future planning or predictive modeling, only NEMS does so in a structured manner.

Although each agency has their own specific performance benchmarks for call answering and processing and can cite the applicable standards (when asked to do so), with the exception of NEMS, there is little evidence that the agencies are doing much in the way of benchmarking relative to peers, to assess or improve their own performance.

Similarly, in the area of Quality Assurance (QA), all agencies have documentation in place to support QA; however, with the exception of the approach taken by NEMS, QA is predominately a reactive process involving a response to an issue that has already taken place. That response includes a review of the call record and voice recordings, the supervisor having a face-to-face discussion with the communicator, and following a review providing the communicator with remedial direction. At NEMS the process is ongoing and proactive, not only involving periodic scrutiny by supervisors but it also is tied to each communicator's in-service update training.

Research by IBI Group and others demonstrates that "Risk and Quality Management" are gaining increasing importance in the management of both public and private sector organizations - particularly public sector organizations because they are entrusted with budgets largely composed of public funds.

In general terms "Risk Management" is a process for identifying, managing and mitigating potential risks and liabilities, and for protecting the physical, human and financial assets. "Quality Management" is a practice involving the use of pre-defined outcome-based performance objectives, standards and procedures to monitor, assess and manage performance quality. Quality Management differs from quality control (compliance or audit) which is intended to ascertain whether an organization is adhering to established procedures and standards.

Best practices demonstrate that a consistent, proactive and structured Risk and Quality Management program can have a significant positive impact on operational performance, going-forward organizational and staffing model changes and employee job satisfaction.

Over the years similar views have been expressed by others on behalf of Client group members, e.g. the 2008 report for NRPS by Priority Dispatch Corp., "Public Safety Communications Center Performance Review", which stated: *"In addition, the Communications Unit is in dire need of an aggressive Quality Assurance program. An aggressive Quality Assurance process, accompanied by a structured protocol system, will ensure the highest quality of service both for the public as well as Emergency Response personnel throughout the Region."*

Further, that report recommended that *"a Quality Assurance unit be created and appropriately staffed, and that an aggressive Quality Assurance program be initiated as soon as possible"*.

NEMS has already implemented a consistent, proactive and structured Risk and Quality Management program, which they apply to their entire organization – communications and field operations. That program has demonstrated significant positive impacts on NEMS' operational performance.

Observations

Given the above, the Client group members should consider jointly developing a proactive and structured 'Risk and Quality Management' program using the NEMS approach as a guide.

In IBI Group's opinion, such a program will help the Client group members to evolve organizationally to meet emerging emergency services demands, as well as the emerging fiscal, operational, organizational and technological realities of the next generation of service delivery models.

3.9 Talent Management / Succession Planning

The importance of establishing and maintaining a competent capable Emergency Communications Services management team becomes readily evident when one considers the relevant services provided by the communications function, public and community expectations, health and safety and liability issues coupled with mandatory regulatory requirements. This notwithstanding, IBI Group has not seen anything substantive that would affirm the existence of a program tailored to Talent Management / Succession Planning.

Observations

Listed below are several suggestions derived from previous research:

- The process to promote succession planning / career advancement should begin during the orientation process immediately following recruitment.
- Position descriptions for supervisory positions and above, should clearly define management talent expectations i.e., knowledge and skill requirements pertaining to supervisory and management duties.
- Promotional process for a position having supervisory duties should contain an element that promotes management skills, leadership and team building abilities.
- Once a candidate attains a specific position, their immediate report should assume some responsibility for helping to develop the candidate's technical, supervisory and management capabilities (e.g., through such means as mentoring and promoting professional development training courses, etc).
- There should be an annual training calendar that provides an overview of what's available, when, who should attend and how to enrol.

Some would suggest that succession planning initiatives cannot be successful unless individuals take ownership of their own career. While this may be true, the availability of a well documented and promoted Succession Planning / Management Talent strategy would enhance and support individual decision making.

4. Alternative Public Safety Dispatch Models

The principal study objective, as defined by the enabling Regional Council resolution February 2011, is to investigate ways in which Niagara's existing emergency dispatch services may be merged, amalgamated or streamlined to better and more cost effectively deliver the services.

To this end, the study investigated ten (10) alternative North American public safety dispatch models ranging from partial consolidation (integration of technology), to physical co-location, to complete integration of operations. The models are listed in Exhibit 4.1.

Exhibit 4.1
Alternative Public Safety Dispatch Models

	Functions	Service Area		
		Population	Sq Km	Pers/Sq Km
<i>Integration of Technology</i>				
Police and Fire Communications, Ottawa, Ontario	9-1-1, P & F	917,801	3,591	256
Police and Fire Communications, York Region, Ontario	9-1-1, P & F	1,032,524	1,762	586
<i>Physical Co-Location</i>				
Fire and EMS Communications, Toronto, Ontario	F & EMS	2,615,060	630	4,151
Police and Fire Communications, Peel Region, Ontario	9-1-1, P & F	1,296,814	1,247	1,040
Denver 911, Denver, Colorado	9-1-1, P, F & EMS	619,968	401	1,546
<i>Integration of Operations</i>				
Integrated Emergency Services, Halifax, Nova Scotia	9-1-1, P & F	390,096	5,490	71
E-Comm, Vancouver, British Columbia	9-1-1, P & F	2,313,328	2,883	802
Public Safety Communications, Calgary, Alberta	9-1-1, P, F & EMS	1,214,839	5,107	238
Bureau of Emergency Communications, Portland, Oregon	9-1-1, P, F & EMS	593,820	377	1,575
Public Safety Communications, Fairfax County, Virginia	9-1-1, P, F & EMS	1,100,692	1,053	1,045

The models were selected on the basis of the following considerations derived from public literature and interviews with industry leaders: length of time in operation, commitment to service excellence, and potential advantages that include enhanced interoperability and cost-effective operations.

In almost all cases the investigation included a tour of the facility, an interview with management and assembly of information on such items as listed below, particularly "lessons learned / critical success factors". In this, a primary objective is to investigate comparability to Niagara:

- Governance arrangement
- Operating model
- Systems integration
- Shared services arrangements
- Quality and performance management
- Cost and funding
- Backup dispatch capabilities.

The models are discussed individually in Sections 4.1 to 4.10. For the reader's convenience, a summary of key attributes is presented in Exhibit 4.2 (next page).

Exhibit 4.2
Key Attributes: Alternative Public Safety Dispatch Models

	Integration of Technology	Physical Co-Location	Integration of Operations
Key Attributes	<p>Some or all agencies (9-1-1, police, fire and EMS) operate with shared (common) CAD and radio systems, and a common IT resource. They may also share telephone and AVL/GPS systems but would have separate RMS.</p> <p>While their systems are integrated, the agencies continue to deliver their respective dispatch services under governance structures that are autonomous, from their own facilities, using their own staff, support resources, programs, procedures and backup solutions.</p> <p>Each agency is responsible for its own service area. Service areas vary in size and geographic coverage defined by jurisdictional / contractual authority.</p>	<p>Some or all agencies are housed in the same building and may even be co-located in the same communications center <i>[as in the case of Denver 911]</i>.</p> <p>The agencies may share IT support as well as common radio and telephone systems <i>[as in the case of Denver 911]</i>. They will typically operate with separate CADs, AVL/GPS and RMS systems <i>[or may choose to share common CAD and other systems as per Denver 911]</i>.</p> <p>Notwithstanding their physical co-location, the agencies continue to deliver their respective dispatch services under governance structures that are autonomous, using their own staff, support resources, programs, procedures and backup solutions.</p> <p>Each agency is responsible for its own service area. Service areas vary in size and geographic coverage defined by jurisdictional / contractual authority.</p>	<p>Some or all agencies are consolidated into a single dispatch service (i.e., one employer).</p> <p>The consolidated service operates out of one communications center, under a single governance structure and mandate, with one communicator complement. Some or all of the communicators are cross-trained in multiple dispatch functions.</p> <p>There is one set of support resources including a single IT resource; also, one program, one set of procedures and a single backup solution for the consolidated service.</p> <p>The consolidated service operates with one radio system, one telephone system, one CAD <i>[or multiple CADs as per Calgary and E-Comm]</i> and one AVL/GPS system. Agencies may continue to operate with separate RMS systems.</p> <p>The consolidated service is responsible for the provision of 'public safety communications' to a broad service area defined geographically by the participants' collective jurisdictional authorities.</p>
Alternative Models	<p>Police and Fire Communications, Ottawa, Ontario <i>[9-1-1, police and fire]</i></p> <p>Police and Fire Communications, York Region, Ontario <i>[9-1-1, police and fire]</i></p>	<p>Fire and EMS Communications, Toronto, Ontario <i>[Fire and EMS]</i></p> <p>Police and Fire Communications, Peel Region, Ontario <i>[9-1-1, police and fire - the fire communications component is a fully consolidated dispatch model functioning on behalf of 3 fire departments]</i></p> <p>Denver 911, Denver, Colorado <i>[9-1-1, police, fire and EMS]</i></p>	<p>Integrated Emergency Services, Halifax, Nova Scotia <i>[9-1-1, police and fire]</i></p> <p>E-Comm, Vancouver, British Columbia <i>[9-1-1, police and fire]</i></p> <p>Public Safety Communications, Calgary Alberta <i>[9-1-1, police, fire and EMS]</i></p> <p>Bureau of Emergency Communications, Portland, Oregon <i>[9-1-1, police, fire and EMS]</i></p> <p>Department of Public Safety Communications, Fairfax County, Virginia <i>[9-1-1, police, fire and EMS]</i></p>

4.1 Police and Fire Communications, Ottawa, Ontario

The Police and Fire departments of the City of Ottawa have adopted a partially consolidated emergency dispatch services arrangement (i.e., one involving an integration of technology). Specifically, the two departments share a common computer aided dispatch (CAD) system.

To be clear, Ottawa Police own, operate and maintain a CAD system on behalf of both agencies. While Police and Fire share a common CAD, they operate from their respective communications centers, under separate (autonomous) governance structures and mandates, using their respective (individual) staffs, support resources, programs, procedures and backup solutions.

The Ottawa Paramedic Service operates a stand alone dispatch center / system using technology mandated by the Ontario MOHLTC.

History

The City Ottawa was created in 2001 by way of an amalgamation of multiple former municipalities with the Regional Municipality of Ottawa Carleton. The amalgamation led to the establishment of a single police department and a single police dispatch center. Versaterm was the CAD of choice.

The amalgamation also resulted in the establishment of a single fire department. Fire investigated a range of alternative dispatch options, from stand alone operations to partnerships. As a result of the investigation a decision was made to partner with Police in the use of a common CAD system. The decision was driven primarily by cost – cheaper than a stand alone operation.

It took about a year to complete the integration. Technology and software issues were relatively easy to address.

Governance

- Police Communications is considered the 'business owner'.
- Police IT is responsible for managing and maintaining the entire system including CAD servers, monitors, UPS, fire walls, etc.
- Fire Communications is considered a client. In matters pertaining to the communications function Fire generally interacts with Police IT.
- Agencies communicate as required

Operating Model

- Police serves as primary PSAP answering about 260,000 9-1-1 calls a year (65% police, 27% EMS, 4% fire and 4% other)
- Calls requiring fire or EMS are downstreamed to the respective agencies. Downstreaming is performed by way of a handset.
- All City departments, including Police and Fire, are on the same radio system. The Paramedic service uses the provincial FleetNet radio system.
- Police and fire operate with separate telephone systems. The two organizations also do not share GPS/AVL.
- They operate with separate RMS systems. Police use Versadex (manufactured by Versaterm) and Fire uses FDM
- Versaterm CAD can be configured by user category (as police call taker, fire call taker, police dispatcher, etc)
- Similarly, clients can set RMS access parameters (as police access only, fire access only, common access, etc)

Advantages / Benefits

- Share the same CAD infrastructure and system
- Less total cost than if the parties had purchased two stand alone CADs
- Working together ensures critical mass to sustain state-of-art CAD technology
- Police IT maintain the system on behalf of both agencies
- The system is set up to automatically create police and fire calls
- Common data bases for street network addressing, mapping, specifics on institutions, etc (albeit each may show their own operating districts)
- Ease of information exchange (i.e., hazards critical to the personnel safety)
- Added benefit of having to only update a single file – not two files that may mirror one-another
- Each agency can perform own independent operational adjustments (e.g., change station resources and recommends)
- Having a common radio system and a single CAD enables push to talk feature, common emergency activation, etc.

4.2 Police and Fire Communications, York Region, Ontario

The emergency dispatch services arrangement in York Region is similar to that of Ottawa. In this arrangement, York Regional Police shares a CAD system with both the Vaughan and Richmond Hill Fire Departments. They also share a common radio system.

These technological arrangements notwithstanding, the agencies operate from their respective communications centers, under separate (autonomous) governance structures and mandates, using their respective (individual) staffs, support resources, programs, procedures and backup solutions.

Of the 8 fire departments operating in York Region only 3 provide fire dispatch services. Vaughan Fire dispatches self plus one other. Markham Fire self dispatches and Richmond Hill Fire dispatches for self and 4 others. Markham Fire is in need of a CAD upgrade and has expressed interest in joining the partnership. For this purpose the parties are working out a new funding arrangement.

York Regional Paramedic Service is dispatched by the provincially operated Georgian CACC based in Barrie.

History

- Police and fire services in York Region implemented a common radio system in 2000-01
- Police implemented a Versaterm CAD in 2004. Vaughan and Richmond Hill Fire Departments came on board in 2007-08.
- In 2010 the partnership served as a basis for outfitting the respective fleets with MDTs.

Governance

- The terms of the police / fire partnership are set out in a service agreement
- York Regional Police own and manage the CAD and radio systems
- Police IT department is responsible for maintaining the systems
- Inter-agency coordination is at both a high level (e.g., annual meeting of Chiefs) and a working level (e.g., monthly meeting of partners to discuss issues of common interest i.e., mapping).

Operating Model

- York Regional Police (YRP) serves as primary PSAP handling about 262,000 9-1-1 calls a year. Calls requiring fire or EMS are downstreamed to the respective agencies.

- Fire and police share a common CAD server. They also share common data bases i.e., street network addressing and mapping
- The partnership is described as a “hands off” approach. Fire self dispatches using own staff (from their remote locations).
- Fire cannot make wholesale changes to the system (prevented by firewalls). However, they can access and adjust their portion of the CAD system (e.g., to update recommends in response to changes in field operations)
- YRP’s role is to maintain the system and to provide project management (i.e., for major system upgrades), interface, ensuring the firewalls, facilitation when requested. For example, Police use a Versaterm RMS whereas Fire uses Firehouse. Police IT arranged the development of an interface between the Versaterm CAD and the Firehouse RMS
- Fire is responsible for determining and obtaining own ‘local’ approvals for communications / dispatch needs. Following the receipt of local approvals, requests are submitted to Police where they are incorporated into their annual operating budget ‘as a pass through’
- Annually fire’s contribution to the partnership is about \$400,000. This is a combined figure for Vaughan and Richmond Hill. Covers CAD, MDTs, licensing, technical support, etc.
- The annual operating budget maintained by YRP includes a technology refresh component. This also is included in Fire’s annual contribution.

Advantages / Benefits

- Share the same CAD and radio systems
- Less total cost than if the parties had purchased stand alone systems
- Maintains “hands off” approach to dispatching, in which agencies continue to operate from their respective communications centers, under separate (autonomous) governance structures and mandates, using their respective (individual) staffs, support resources, programs, procedures and backup solutions
- Avoids challenges associated with the integration of dispatch operations (e.g., labour)
- Agencies can perform own independent operational adjustments
- Working together ensures critical mass to sustain state-of-art technology
- One IT resource to maintain the systems on behalf of the partners
- Use of common data bases / fewer files that need to periodic updating
- Access by all to incoming call information where relevant (e.g., hazards)
- Ease of information exchange / improved downstreaming and associated response times

Experience / Lessons Learned

- Versaterm is good to work with. Versaterm’s police clientele meet 3 to 4 times a year where they discuss items of common interest. Versaterm attends. Outputs of these discussions may find their way into subsequent Versaterm upgrades
- Agencies are migrating to virtual server environments (for financial reasons). In this environment one server is used for CAD and a second server for RMS – yet each one serves as backup for the other
- Primary sites are generally more expensive than backup sites (as they require built-in redundancies, built-in interfaces with other systems, etc)
- Cost of a secondary (backup) is determined by what features and core services one wishes to have there. In this, one needs to clearly understand the objectives established in the business continuity model
- CAD is housed in a YRP facility which does not meet OBC post-disaster standard
- Fire stations have two means of connectivity – fibre and wireless
- Future aspirations: Bring Markham Fire Department on board. Assume EMS dispatch from MOHLTC. Operationally integrate the dispatch function (physical co-location, cross-train, etc).

4.3 Fire and EMS Communications, Toronto, Ontario

This is an example of a “physical co-location” model. The headquarters of Toronto Fire and Toronto EMS are housed in the same building. The facility is owned by the City and costs are apportioned between Fire and EMS.

The Toronto Fire Services Communications Center is located on the 3rd floor. The Toronto EMS Communications Center is located on the 1st floor. The building also houses a backup communications center for Toronto Police. Conversely, the Toronto Police facility (located elsewhere) houses backup communications centers for Fire and EMS.

Operating Model - Fire

- Incidents per year: 148,000
- No. of communicators: 64 (all are full time)
- No. of Managers: 1 (District Chief)
- No. of Supervisors: 8
- Other staff: QA Manager, Administrative Assistant, 1 Radio Support
- No. of work stations: 16
- Shift Staffing: 4 call takers, 6 dispatchers, and 2 supervisors (uniformed officers)
- CAD: Intergraph (as does Toronto Police / EMS uses TriTech)
- RMS: Zoll
- Radio: Motorola
- QA: Program is still evolving. Key Performance Indicators are primarily response time performance driven. Working on a process that will enable individual performance reviews.

Operating Model - EMS

- Incidents per year: alpha to echo - 265,000; all in – 400,000
- Fire is tiered to about 34% of the calls (priorities alpha to echo)
- No. of communicators: 108 (all are full time)
- No. of Managers: 4
- No. of Supervisors: 21
- Other staff: 21
- No. of work stations: 31 (includes hospital destination and clearing, special events and tactical)
- Weekday shift Staffing: 25 work stations, 6 call takers and 18 dispatchers
- CAD: TriTech
- RMS: Locution
- Radio: AVTEC
- Accredited in 2008 as a center of excellence (by Salt Lake City)

Advantages of Co-locating Fire and EMS

- Potential to develop relationships / rapport / mutual support programs (e.g., at leadership level, technical support, training, etc)
- Opportunity to provide a co-ordinated emergency response
- Opportunity to enhance interoperability of communications
- Secure facility shared by both
- Disadvantage: if one agency has to evacuate the building then so might the other

Key Observations

- Co-location does not immediately translate to streamlining or more cost-effective operations

- Despite the potential advantages noted above, there is relatively little interaction between fire and EMS communications services (continue to operate in separate silos). May be partly attributed to cultural differences.
- Change must be driven from the top down
- Current study by Pomax may drive future communications decisions
- Inter-agency communications is usually issue specific (i.e., radio system upgrade)
- Some sharing of common areas (i.e., boardrooms)
- Fire, EMS (and Police) all share a common radio system
- Utilize different CAD and telephone systems
- Maintain separate support resources
- The two organizations share in the payroll process (performed by Fire with chargeback to EMS)
- Space in the building may be maxed out. Fire beginning to examine options including decentralizing into 2 centers (each one potentially serving as backup to the other).

4.4 Police and Fire Communications, Peel Region, Ontario

This is another example of a “physical co-location” model; albeit, as described below, the fire component is a fully consolidated dispatch operation that functions on behalf of 3 fire departments.

Police and fire dispatch have been co-located in the same building since 1997 when, with their Council approvals, the parties agreed to establish and operate a centralized communications center that would provide a co-ordinated emergency response across Peel Region. Peel Regional Police serves as the primary PSAP for 9-1-1. The three fire services share a common CAD system and together with police, they utilize the same radio and telephone systems.

While physically co-located on the same floor, police and fire emergency communications operate from two separate and secure areas. The fire communications center component - officially known as the Joint Fire Communications Center (JFCC) - dispatches fire services for Mississauga, Brampton and Caledon.

The Police space includes a boardroom which is equipped to serve as backup for the Mississauga CACC (i.e., equipment is stored in cupboards).

History

Faced with the need to replace its radio and telephone system and space issues, the communications function for Mississauga Fire co-located to the Peel Police building in 1997 (and tapped into their radio and telephone system). Brampton Fire, which also dispatched for Caledon, joined in 1999 to form the JFCC. In the period 1999 to 2004 the two fire communications services co-existed but operated separately. In 2004 they began joint call-taking. In 2007 they introduced cross-training and commenced joint operations (in the current form).

Operating Model - Police

- Incidents per year: 405,576
- No. of full time communicators: 112
- No. of part time communicators: 11
- No. of Supervisors: 7
- Work stations: 32
- Typical number of communicators on days: 15 to 20
- CAD: Transitioning to Intergraph
- RMS: Niche
- Radio: Motorola (moving to P25 radio system)

Operating Model - Fire

JFCC is a fully integrated multi-agency fire dispatch operation responsible for dispatching fire services for Mississauga, Brampton and Caledon. Oversight is provided by way of a Joint Management Team consisting of the 3 Fire Chiefs, 3 Deputy Fire Chiefs and the JFCC Manager (who holds the rank of Divisional Chief and serves as Chair) - meets quarterly.

Interoperability is a major advantage: sharing of radio systems and common radio channels. Operating costs are shared on a per capita basis between the 3 municipalities.

The integrated model allows for Mississauga and Brampton fire fighters to cover one-another's work stations when required. In support of the fire dispatch consolidation, the respective fire associations signed a letter of understanding, waiving the no-contracting out clause (for the dispatch function), thus permitting the fire dispatch model to evolve.

- Incidents per year: 42,451
- No. of communicators: 29 (all are full time). All are trained to perform call-taking and dispatch. Rotate through various positions throughout a shift
- No. of managers: 1
- No. of Supervisors: 8
- Coordinators: 2 - one from each fire service
- Technicians: 2 - one from each fire service
- Work stations: 8
- Staffing: Minimum - 3 for Mississauga and 2 for Brampton. Maximum - 4 and 3 respectively
- CAD and RMS: Enroute
- Radio: Motorola (moving to P25 radio system with Police)

JFCC Challenges

- Serving the needs / interests of multiple fire departments
- Having to deal with multiple collective agreements, each with own terms and entitlements
- Letter of understanding is silent on reporting / supervision relationships
- Having to rationalize communications function around multiple SOPs
- Use of firefighters as relief communicators - more specifically 16 from each organization
- Duplication / redundancy in IT support – by each organization
- QA Process is mainly reactive

Advantages of Co-locating Police and Fire

- Potential to develop relationships / rapport / mutual support programs (e.g., at leadership level, technical support, training, etc)
- Opportunity to provide a co-ordinated emergency response
- Opportunity to enhance interoperability of communications i.e., jointly moving to P25 radio system
- Secure facility shared by both
- Opportunity to share common areas i.e., meeting rooms, kitchen, etc
- One agency (in this case police) own and maintain the radio/telephone systems
- Disadvantage: if one agency has to evacuate the building then so might the other

Key Observation

Despite the potential advantages noted above, there is relatively little interaction between police and fire communications services. This may be attributed partly to Police being at the upper tier (regional) level while fire is at a lower tier level.

4.5 Denver 911, Denver, Colorado

This is another example of a “physical co-location” model; however, unlike those described previously for Toronto and Peel, this one involves all 3 emergency service agencies – Police, Fire and EMS.

Moreover, the agencies are not only housed in the same building, they also are co-located in the same communications center, and they operate with the same technology i.e., they share a common CAD, radio, telephone and AVL/GPS systems, as well as an IT resource (which is responsible to maintain the systems).

- Named Denver 911 in 2007
- Serves a combined population of 620,000 (which on weekdays increases to over 1 million). This includes the City-County (combined government entity) and several outlying communities that contract with the City-County for Fire suppression
- City-County operates with 1 police service and 1 fire department. There are 6 police districts plus HQ and 28 fire stations
- EMS is delivered by Denver Health. Inter-facility transfers are contracted to AMR
- Denver 911 handles about 1.1 million calls a year. About 50% are 9-1-1 emergencies and 50% are non-emergency calls. About 90% are for police, 5% for fire and 5% for EMS.

Governance

- Director heads up the Public Safety Communications function
- Director reports to the Manager of the Department of Public Safety – as do the Police and Fire Chiefs (puts all 3 positions at the same level)
- Leaders meet bi-weekly. Participants include the Police and Fire Chiefs, their deputies, the Director PSC and the PSC senior leadership team

Operating Model

- Co-located model where the communicators for police, fire and EMS work from the same communications center using common (shared) technological systems. Otherwise the operations are separate
- 9-1-1 call taking and police dispatching are performed by one group of civilians. They also perform medical triage (not unionized)
- EMS communications is performed by a second group of civilians (hired by Denver Health – also not unionized)
- Fire dispatch is performed by uniformed fire fighters (and they are unionized)
- City-County owns the facility. Denver 911 owns the technology and mobile equipment

Staffing

- Operates with a total staff complement of 168
 - 9-1-1 call takers (Emergency communications operators): 69
 - Police dispatch: 45
 - Fire dispatch: 20
 - EMS dispatch: 20
 - Operations supervisors: 10
 - Dedicated trainers: 4
- Each agency provides own training / no cross-training
- Uniformed oversight for Fire and EMS - captains serve as supervisors
- Civilian oversight of 911 call taking and police dispatch

Technology

- CAD: TriTech - used by police, fire and EMS
- RMS: Police use Versaterm, Fire uses Fire House and EMS uses High Plains
- Radio: Harris 800 MHz
- AVL/GPS: Fire 100%; EMS going to 100%; Police use MDTs
- Medical triage: ProQA backed up by cards
- Operate with automated call distribution
- In-house technical support for system upkeep and major changes; albeit agencies may each arrange additional technical support

Facility

- Current facility was built in 1948. Does not fully meet NFPA 1710.
- Emergency communications function moved into the facility in December 1992
- Recently commenced a facility needs assessment
- Planning for 25 year growth
- Seeking potential partners (e.g., 311)
- Outfitted with 44 consoles
 - 9-1-1 call taking: 21
 - Police dispatch: 9
 - Fire dispatch: 6
 - EMS dispatch: 6
 - Supervisors: 2
- Weekday afternoons: staffs 30 to 34 consoles

Operating Cost

- Annual operating totals \$12.43 million
- Includes \$9.8 million from City-County, \$2.4 million from 911 surcharge and \$240,000 from Denver Health (equivalent to the cost of 4 communicators)
- Fire pays for own operations – estimated to be \$1.8 million

4.6 Integrated Emergency Services, Halifax, Nova Scotia

This is example of an “operationally integrated” emergency dispatch arrangement. Halifax Integrated Emergency Services (HIES) is responsible for 9-1-1 call-taking and dispatching of police, fire and RCMP services. In this, only the provincially delivered paramedic service is unique (dispatched separately).

HIES is based in Dartmouth serving the Halifax Regional Municipality (a population center of about 400,000 persons).

HIES was formed in 1996/97 following an amalgamation of the area's 3 police services (into the Halifax Regional Police Service), 3 fire services (Halifax Regional Fire Department) and the inclusion of 9-1-1. Consolidation was mandated - driven by financial issues.

By way of background, 9-1-1 services are administered by the Province of Nova Scotia. In total there are four Public Safety Answering Points (PSAP) – HIES plus one each in Cape Breton, Truro and the Valley. They all operate under an MOU with the province with standardized training, equipment and protocols. Remuneration for services is based on the volume of calls transferred.

Facility: Excellent, aesthetically pleasing, lots of noise reduction, great lighting with good control, modern workstations.

Governance

- Operates as a division of the Halifax Regional Police Service with its own separate cost center
- Reports to a Deputy Police Chief
- Overseen by a committee consisting of Police/Fire/RCMP. Committee is chaired by a Police Supt.

Operating Model

- Responsible for 9-1-1 call-taking and dispatching of police (HRPS), fire (HRFD) and RCMP.
 - HRPS: 6 police stations and 560 officers
 - HRFD: 65 fire Stations
 - RCMP: 185 officers
- Annual 9-1-1 calls of about 110,900 (49% Police, 30% EMS, 3% Fire and 18% other)
- Total of 80 staff, all of whom are civilians (members of the Halifax Regional Police Association)
 - 60 full time communicators (Civilian Communication Radio Technicians – CCRT)
 - 12 part time CCRT
 - 8 Supervisors
- All of the staff are trained in 9-1-1 call taking
 - 88% are also trained in police dispatch
 - 55% also trained in fire dispatch
 - In total 47 % are cross-trained to perform all functions
- The current number of work stations = 16. Six are for call taking (4 dedicated to 9-1-1), 4 for Fire dispatch (2 are always staffed) and 6 are for Police dispatch (one work station for each of 6 zones).
- In comparison, prior to the '96/'97 amalgamation there were a total of 14 work stations: The 3 police services staffed 7 work stations, the 3 fire services staffed 3 work stations and the RCMP staffed 4 work stations.
- Operates with two 12-hour shifts (6 am to 6 pm) each one is staffed with about 17 to 18 personnel (6 call takers, 4 fire dispatchers, 6 police dispatchers, and 1 to 2 supervisors).
- Adheres to fire service standards approved by Council. Daily audits by an Administrative Assistant to ensure that standards are being met

Technology

The center originally operated with two separate CADs. It evolved to a single Versaterm CAD in 2005. Police and fire continue to operate with individual RMS.

- CAD – Versaterm
- RMS – Police use Versaterm and Fire uses RFD
- Radio – Motorola (province-wide interoperability).
- Paging – VHF (fire)
- GPS/AVL – all marked police units are equipped with GPS/AVL and MDT's; Fire is in the process of introducing MDT's
- Built in redundancies: UPS, generator, secondary generator and a backup UHF radio for voice and paging.

IT support is provided by the Region's Corporate Services. HIES employs an individual who serves as liaison between Police, Fire and Corporate IT. Prior to the creation of this position, there was a vacuum in that Corporate IT does not comprehend the business (and systems needs) of Police and Fire, and within Police and Fire there was no one who understood the systems side who could properly articulate the needs to the techies in Corporate IT

Both police and fire have access to their own data for report production

Operating Cost

- Operates with a budget of about \$7 million a year
- Outside revenue sources: about \$500,000 from EMS and about \$525,000 from province for 9-1-1 services

Experience / Lessons Learned

- Consolidation was mandated - driven by financial issues
- Most labour issues were resolved fairly quickly
- Still dealing with some collective agreement restrictions (e.g., inability to use full time staff to address peak service periods)
- Security: requisite clearances for staff / maintain separate RMS for police and fire (albeit the preference is to have one system)
- Integration of fire saved one person per shift
- Some staff "grand-fathered" to maintain their respective agency role
- Efficiency is gained by cross-training communicators i.e., provides flexibility to manage staff resources
- Important that everyone operate off the same CAD - for efficiency/managing/supporting/training, etc.)
- Fire was initially concerned that police may be too busy. While the volume of fire calls is relatively low, these calls take more time to carry out
- Communications Center needs to be under the control of an emergency services agency. Tried a different managing/reporting model but was not successful
- HIES based in Dartmouth while Police HQ is in Halifax is not an issue. Need good solid operational training, emergency services oversight and good personnel.
- Staff retention: Not an issue, \$65k per year plus benefits
- Future: There may be opportunities to co-locate other dispatch units in the same building; i.e. transit, public works, etc
- "No one had an epiphany, this was mandated, making the task easier to achieve. The result was a single organization and they would never go back. Only through the complete integration, do you get professional, competent staff and the potential for additional opportunities i.e., to establish a profile organization and to obtain City investment in state of the art technology."
- "This won't come by consensus, has to come by decision, direction."

4.7 E-Comm, Vancouver, British Columbia

E-Comm is another example of an "operationally integrated" emergency dispatch arrangement responsible for 9-1-1 call-taking and dispatching of police and fire services.

E-Comm serves as regional emergency communications center for southwest B.C., providing: wide-area radio network; 9-1-1 call taking (serves as primary PSAP for Metro Vancouver and area); and police and fire dispatch services.

Paramedic services are dispatched separately by the British Columbia Ambulance Service (BCAS).

E-Comm operates from a purpose-built post-disaster facility with resilient operational technologies, security, back-up power and built-in system redundancies. It is a must see facility.

History

- E-Comm has been in operation for 13 years (since 1999)
- The decision to establish E-Comm evolved from the June 1994 Stanley Cup Riot in Vancouver, where poor radio communications impeded a coordinated public safety response by police, fire and EMS

- The objective was to establish a robust / rigorous / interoperable radio system for southwest B.C. that is capable of supporting responding agencies with accurate and timely information
- Created jointly by Metro Vancouver municipalities and the provincial government. Championed by the Vancouver City Manager
- Proof of E-Comm's success was demonstrated during the June 2011 Stanley Cup Riot, where the radio system successfully coped with a massive increase in radio traffic and 9-1-1 call volumes
- The initial investment was about \$50 Million.

Governance

- Not-for-profit organization where funds are used to strengthen and support emergency services
- Governing authorities include the Emergency Communications Corporations Act (1997) and the BC Business Corporations Act
- Governance is based on a membership model of Metro Vancouver municipalities served
- There are 26 Class "A" Shareholders (on the radio system) and 23 Class "B" Shareholders (not on the radio system but hold expression of interest for future need or opportunity). RCMP is a Special User
- Oversight is by an 18-member Board of Directors - 10 are municipal representatives, 2 are from Police Service Boards, 2 are provincial representatives, and 4 are independent members without municipal affiliation who are chosen for their expertise (e.g., legal, finance, etc).
- Board Chair is selected from the independent members.
- Obligations of the Corporation are set out in various members' agreements
- Service / user committees (Police/Fire/EMS) meet periodically to provide input

Operating Model

- Serves a population base of over 2 million
- Its wide-area radio network is used by police, fire and ambulance (total of 30 agencies)
- Dispatches for 12 police departments and 18 fire departments
- Responds to an annual 940,000 9-1-1 calls. 95% are answered in 5 seconds or less
- 71% require police, 23% EMS and 6% are fire
- Also handles about 370,000 non-emergency police calls a year
- Operates with a total of 280 staff (full time and auxiliary)
- 24-hour on site management and oversight
- Professional in-house training program
- All communicators are trained in 9-1-1 call taking
- Operates with experienced police and fire call-taking and dispatch staff (not cross-trained)
- 65 workstations of which 45 to 50 are regularly staffed
- Separate CADs for police and fire
- Large consolidated team enables staffing and support efficiencies to participating agencies (i.e., fire dispatcher will assist with 9-1-1 call taking when required)
- Ability to forecast and implement staffing levels for anticipated and unplanned events
- In-house quality assurance department
- 24/7 information and technology helpdesk on site
- Community outreach and 9-1-1 education programs aimed at supporting operational excellence

Technology

- 800 MHz radio system / 7,500 radios (owned by E-Comm)
- Police dispatch function uses a Versaterm CAD and Versadex RMS
- Fire dispatch function uses an Intergraph CAD and FDM for RMS
- Most units operate with GPS/AVL and MDTs
- Agencies arrange own maintenance / supported by E-Comm

Advantages

- Multiple municipalities and agencies sharing the same radio and CAD systems ensures interoperability between their respective services (police, fire and EMS)
- Less total cost than if the parties had purchased stand alone systems
- Opportunity for smaller communities to contain cost yet receive high quality services
- Municipalities are secure in the knowledge that the CAD and radio systems are secure, reliable, resilient and interoperable across an extended coverage area
- Municipalities are secure in the knowledge that backup / business continuity solutions are in place to ensure high quality, seamless services
- Working together ensures critical mass to sustain state-of-art technology
- One IT resource to maintain the systems on behalf of the partners
- Use of common data bases / fewer files that need periodic updating
- Access by all to incoming call information where relevant (e.g., hazards)
- Ease of information exchange / improved downstreaming and associated response times
- Flexibility to seamlessly adjust call taking and dispatch staffing in response to unplanned events
- Transparency of not-for-profit operation ensures cost-effectiveness of services and use of funds to strengthen and support emergency services

Operating Cost

- Annual operating budget of \$50 million
- Receive about \$3 million from province (for 9-1-1). Rest comes from member fees
- Member fees are made up of two components: radio component and a dispatch component
- The annual operating cost of the two components are roughly equal
- Costs include a technology refresher component
- Radio costs are allocated on the basis of coverage and traffic
- Dispatch service costs are allocated on the basis of call volume
- Staff are represented by CUPE
- Top rate for call-takers is \$72,000 and for dispatchers it is \$88,000

Lessons Learned

- Important at the outset to understand what factors drive the costs
- Also important at the outset to develop an appropriate cost allocation model including:
 - Credits for existing infrastructure, equipment, licenses, etc
 - Capital replacement
 - Flexibility to adjust to change over time
- Resist doing "one off" deals at less than total cost to operate

4.8 Public Safety Communications, Calgary, Alberta

Calgary Public Safety Communications (Calgary PSC) is an example of a fully integrated emergency dispatch operation. Responsibilities include: 9-1-1 call taking and dispatch services for police, fire and EMS.

Clientele include: Calgary Police, Calgary Fire, 8 outlying Fire Departments (mostly volunteer) and Alberta Health Services (AHS), for whom they are contracted to dispatch emergency paramedical services and to arrange inter-facility patient transfer services.

Calgary PSC was implemented in 2006, as a result of City Council's direction to establish a more cost efficient operation. Prior to 2006 there were 3 separate emergency dispatch operations, delivered respectively by Police, Fire (which also served as PSAP) and EMS.

Governance

- Separate business unit situated in the City's Community Services and Protective Services division.
- The original governance structure included a Board which was made up of the 3 Chiefs plus the City's Chief Technology Officer.
- In 2010 the governance arrangement was changed to reflect the findings of a 2009 operational review as well as the provincial government's realignment of EMS responsibility to Alberta Health Services.
- The current Board consists of the following members: 2 Police, 2 Fire and 2 representatives from Community Services.
- Originally the leadership was assigned to a civilian Commander. Challenges included: lack of trust, lacked understanding of emergency services culture and too much emphasis on attaining cost-efficiency.
- Leadership model was changed in 2010. Currently it consists of a Commander and Deputy Commander – both of whom are drawn from Police and Fire organizations.
- Police and Fire take turns (annually) to appoint the Deputy Commander.
- Deputy serves for 1 year and then moves up to Commander (also for a term of 1 year). On completion of the term as Commander the individual returns to their respective organization.
- Leadership model reflects a major commitment by Police and Fire – as they each are required to loan out a senior officer for a period of 2 years.

Operating Model

- Organizationally PSC is structured into 3 areas: Operations, Specialized Support Services and Client Services
- Handles about 1 million calls a year. About 500,000 are 9-1-1 emergency calls. About 55% are for police services, 35% for AHS and 10% for fire.
- Operates with 312 staff (including 16 supervisors). Call takers are designated separately from dispatchers.
 - About 2/3 are trained to dispatch police only
 - About 1/3 are cross-trained to dispatch Fire and EMS (emergency and non-emergency)
 - About 10 communicators are cross-trained to dispatch all 3 functions (police, fire and EMS)
- All communicators are members of IBW electrical workers.
- 67 work stations: about 52 are staffed weekdays: 32 for police and 20 for fire and EMS
- Includes 4 supervisors per shift (2 for police and 2 for Fire and EMS).
- Includes the following additional positions for advice and support: 2 Police Supervisors, 1 Deputy Fire Chief (position currently vacant due to retirement), and 4 EMS Deployment Managers.
- Maintains a service agreement with each client. The agreements set out clear expectations vis-à-vis services and performance
- Provides clients with monthly reports on performance
- Client Services section is responsible for Client interaction. Meets regularly by way of scheduled and ad-hoc meetings.
- Call takers start at \$26/hr and go up to \$44/hr
- Dispatchers are paid about 3% more than call takers.

Technology

- Operates with 2 CAD systems
- Intergraph CAD (V9.01) is used for 9-1-1 PSAP, Fire and EMS. This one is owned by the City. City also owns all MDTs used for these functions (including those installed in AHS ambulances).

- Intergraph CAD (V6/7) is used to dispatch Police Services. This one is owned by the Police Service. Are awaiting release of V API-3 (came out of a provincial investigation). Police also own their own MDTs.
- PSC has in-house IT support, as does the Police Service. Additional support may be had from the City's corporate IT.
- RMS: Police currently use Niche (going to API-3). Fire uses FDM. Each agency tracks own information.
- Each agency has access to their respective call records - this, either by way of a terminal or by way of a request for a disk containing an electronic copy.

Operating Cost

- Annual operating budget is about \$34 million
- \$21 million comes from the property tax base
- The rest comes from the province for 9-1-1 services, AHS for ambulance dispatch and outlying fire departments for fire dispatch services.

Other

- As a result of a provincial mandate police services throughout Alberta are to migrate to an Intergraph CAD (V API-3) – this in order to ensure interoperability of communications among the police services.
- Intergraph API-3 is not conducive to multi-agency use, which means that Calgary PSC will likely continue to operate with a separate CAD system for police
- Had it not been for the provincial mandate, Calgary PSC would be migrating to a single CAD and concurrently increasing their cross training efforts.
- AHS is investigating 'buy' or 'build' strategies for ambulance dispatch. Under a 'buy' strategy PSC may assume an expanded ambulance dispatch function (for southern Alberta). Under a 'build' strategy the responsibility for ambulance dispatch may be relinquished to AHS.

Experience / Lessons Learned

- Capital efficiencies / savings attributed to a single primary center, a single backup center and a single tele-communications system
- Better / coordinated use of front line responders
- Performs call taking and dispatch more rapidly
- Difficult to precisely assess savings in operating costs for the following reasons
- Prior to amalgamation the centers were not meeting the standards that they set for themselves
- Following consolidation, new standards were set for the organization as a whole
- For this purpose they generally adopted the most stringent of the previous standards and applied these to the operations of all of the clientele
- Staffing was increased over time to attain the new standards
- Consolidation must be mandated from above
- Having an executive level sponsor (champion) is essential.
- Preferable that the Commander be from uniform. If civilian, then must have extensive previous experience working for an emergency services organization.

4.9 Bureau of Emergency Communications, Portland, Oregon

The Portland Bureau of Emergency Communications (BOEC) is another example of a fully integrated emergency dispatch operation. Responsibilities include: 9-1-1 call taking and dispatch services for police, fire and EMS.

History

BOEC was created in 1974/75 as a partnership with Multnomah County. This was accomplished by way of a City ordinance that transferred the 9-1-1 call taking and police dispatch responsibilities from the Portland Police department.

A few years later BOEC's responsibilities were expanded to include EMS dispatch on behalf of Multnomah County, which continues to deliver the EMS function. American Medical Response (AMR) is the EMS operator working on behalf of the County.

BOEC assumed additional responsibility for fire dispatch in 1994.

Today, the BOEC operation involves 7 municipal partners. In addition to the City of Portland they are: Multnomah County, the Cities of Gresham, Troutdale, Fairview, Maywood Park and Wood Village.

Governance

- BOEC is a department of the City of Portland.
- An inter-agency agreement defines the terms of the partnership
- Partners participate and are consulted by way of Advisory and Finance Committees
- Since BOEC is a City department, decisions ultimately rest with City Council
- The facility is built to post-disaster construction standards. It is owned by the City and managed by the City's facilities group
- BOEC is staffed by City employees. The staff are members of the American Federation of State, County and Municipal Employees (AFSCME)
- BOEC provides dispatch for 12 emergency service agencies (referred to as the users). They include 7 police departments, 4 fire departments (Portland, Gresham and 2 volunteer services) and the County's EMS service.
- BOEC also dispatches for the airport, which has its own police and fire departments.
- Three (3) dispatch committees assist with the operations: one is for police dispatch, one for Fire dispatch and one for EMS.
- The Police and Fire dispatch committees are chaired by agency supervisors. The EMS committee is chaired by Multnomah County EMS.
- A "user" Committee meets every 2 months.

Operations

- Handles about 700,000 calls a year – about 450,000 are 9-1-1 emergencies. 70% are for police, 20% are medical and 10% for fire
- Currently operate with about 80 communicators. Target is to attain a staff complement of 104
- Typical weekday staffing of about 26
 - 15 call takers
 - 5 for police dispatch, 2 for fire and EMS and 2 tactical
 - 2 supervisors
- 90% of the staff are cross-trained to deliver police dispatch and also to dispatch for fire and EMS (up from 25% in 1994)
- New hires are expected to undergo cross-training. The general view is that if one can achieve certification in police dispatch (which is considered to be the more difficult task to perform) then they also should be able to achieve certification as a Fire/EMS dispatcher.
- Intake training lasts about 18 months. Includes:
 - 2 months academy
 - 4 to 6 months on the job as call taker
 - 8 to 10 months police dispatch
 - An additional 4 months for Fire and EMS dispatch

- 8 of 10 candidates are generally successful in call taking
- 4 of 10 are generally successful in police dispatch. These will go on to fire and EMS dispatch training
- For its operations BOEC has adopted the most stringent of the communications standards previously promoted by the partners. The standards are applied to all of the users
- Fire SOPs have been consolidated and apply to all of the fire departments that BOEC dispatches
- Includes the following additional positions for advice and support: Fire Liaison and an AMR System Status Controller
- QA: Every dispatcher gets an annual performance review plus a monthly call evaluation (1 call per month per dispatcher)
- CQI: Currently focuses on EMS and Fire. Police maybe in future.
- Publish a Service Efficiency Achievement report annually

Technology

- Operate with a Versaterm CAD and PPDS as the records management system
- One data base for mapping and addressing
- Medical triage is carried out using a card index system developed by the Medical Director (not AMPDS). Not certified as a Center of Excellence.
- Use an 800 MHz radio system owned by the Bureau of Technical Services (BTS). It is completely interoperable across the service area.
- Migrating to a P25 radio platform.
- Fleets are equipped with AVL/GPS and MDTs. Mobile devices are owned by the users. BTS helps to maintain the equipment
- Users can monitor field operations in real time. They can view the entire service area and one-another's vehicles.
- Partners can download only their own data. Firewalls protect one-another's information
- BOEC employs own technical support to maintain the systems. Also receive considerable support from the City's BTS.

Operating Cost

- Annual operating cost is about \$24 million
- Includes 4 million to pay off the cost of the recent CAD refresh
- Revenue is about \$200,000 / year (for CAD and tape printouts)
- Have tried various funding models.
 - City's general fund pays 80%
 - Rest comes from the state for 9-1-1 and the municipal partners (prorated based on population)
 - Volunteer Fire services don't contribute financially.
- Communicators start at \$18/hr and go up to \$30+/hr

Experience / Lessons Learned

- Integration must be mandated from above
- Having an executive level sponsor (champion) is essential.
- In the case of Niagara, the mayors of the local municipalities will have to be committed to getting this done through Regional Council
- Cooperation among agencies is usually driven by financial issues
- Operational effectiveness / streamlining can be achieved by consolidating the multiple field operations to one consistent set of SOPs
- Resistance to "a loss of control over dispatch" is not unique to the Niagara situation
- Staff resisted the transition of CAD to Versaterm. Lost about 8 staff during the transition (mostly retirements). Required lots of training. Very please with the outcome.

4.10 Public Safety Communications, Fairfax County, Virginia

The Fairfax Department of Public Safety Communications (F-DPSC) is another example of a fully integrated emergency dispatch operation. Responsibilities include: 9-1-1 call taking and dispatch services for police, fire and EMS.

F-DPSC is a “must see” integrated emergency dispatch facility. It has hosted thousands of visitors from 28 countries and is described as a “great spot for the nay-sayers to visit”. Its features include:

- Relatively new (3 years old)
- Constructed to post disaster standards
- On a 100 acre site that incorporates: F-DPSC, Office of Emergency Management, County Police, Fire and Rescue Department, tire training center, fleet management center, Department of Transportation, Police Forensics and State Police
- Facility entry is staffed by security. Visitors require photo ID. X-ray and metal detection are present
- Communications Center is 12,000 sq. feet and about 3.5 stories high (for noise suppression, ventilation, air quality)
- Accommodates 97 workstations. About 60 are for public safety communications. The rest are for partners including Virginia DOT, Police, Fire, EMS, State Police and Office of Emergency Management
- Founded on partnerships where all may benefit financially and through improved service quality
- Handles about 1 million 9-1-1 calls / year
- Staffing totals 215 with 170 in the communications center
- Communications staff are cross-trained in at least 3 different functions, selected from the following: 911, police dispatch, fire-EMS dispatch, service desk, vehicle tow and teletype

Background

- Fairfax County is a commonwealth. It covers 435 sq. mi. and houses 1.3 million residents - plus 250,000 commuters each day along with 25,000 to 30,000 visitors.
- The County includes the City of Fairfax and Towns of Herndon and Vienna (which operate with own police). The towns are served by volunteer fire departments which are staffed by the County.
- EMS delivery is fire-based
- F-DPSC dispatches all police except the police departments of the City of Fairfax, Herndon and Vienna. They self dispatch.
- F-DPSC has been in operation for 40 years. The onset of 9-1-1 technology drove the process to physically co-locate and consolidate call answering. It is described as a common sense decision.
- Was part of the police department up until 2005. Challenges included: training, budget, staff recognition (civilian employees), location (basement) and upward mobility
- Consultant report recommended the establishment of an independent organization with a focus on public safety communications as part of the public safety continuum (Police, Fire-EMS and Communications). The organization should be set up in its own facility and led by a Director

Governance

- F-DPSC is a department (separate business unit) of the County of Fairfax
- Director is a civilian with an emergency services background (establishes trust / comfort)
- The primary operating philosophy is to have a “consolidated, civilianized and cross-trained” communications center.
- Staff pride themselves on the quality of service (self-motivated group in a great facility)
- Police and fire-EMS representatives are assigned to the communications center to serve as liaison officers and advisors

- Medical oversight group ensures the effectiveness of medical triage protocols.

Operating Model

- Handles about 1 million 9-1-1 calls / year
- Interoperability is a principal objective underlying the integrated dispatch operation
 - Horrific highway crash in 1963 led to the establishment of a multi-agency agreement requiring that the closest fire resource be sent regardless of jurisdiction
 - Has worked for numerous years, saved countless lives, money and reduced the need for additional stations, equipment and personnel
 - Aided by the introduction of 800Mhz trunk radio system with common tactical channels, and subsequently by the establishment of CAD to CAD interfaces
 - "With these tools we really have a fire department without borders".

Staffing

- Staffing totals 215 with 170 in the communications center. 40 persons per shift (97 workstations)
- Communications staff are cross-trained in at least 3 different functions, selected from the following: 911, police dispatch, fire-EMS dispatch, service desk, vehicle tow and teletype
 - About one-half are comfortable in doing 9-1-1 call taking and police/fire dispatch
 - About 50% are in IAFF
 - Use 12 hour shifts. Some 12 hour shifts commence at alternate times to accommodate personnel needs
 - Staff rotate through work stations every 4 hours to maintain skills and reduce boredom
- Hiring process takes place 3 times a year
- Training consists of 10 weeks academy classroom - CAD only, followed by 10 weeks on the job with radio training
- Extremely proud of their QA program. It is employee driven (by co-workers). Philosophy is to catching people doing something "right".

Technology

- Intergraph CAD for both Police and Fire-EMS
- All vehicles are equipped with GPS/AVL
- Radio – 800 Mhz
- The system infrastructure (radio, CAD, GPS/AVL, etc) is owned by the Department of Information Technology (DIT).
- Maintenance and refresh is done in-house
- A user group works collectively to address common issues and interests

Facility

- Overall facility is 87,000 sq. feet. Communications Center is 12,000 sq. feet
- Built on a 100 acre site: most of the facility/grounds are low maintenance
- Accommodates 97 workstations. About 60 are for public safety communications. The rest are for partners including Virginia DOT, Police, Fire, EMS, State Police and Office of Emergency Management
- Constructed to post disaster standards
- \$157 million to build. 40% was provided by the State, and 60% by the federal government, Homeland Security and FEMA.
- Sign at main entrance of the communications center states that "the safety of 1.4 million people begins in this room – they're in good hands."

- Accommodates 97 workstations (including Virginia DOT, Police, Fire, EMS, State Police and OEM (Office of Emergency Management) – about 60 for public safety communications when others are netted out
- Designed for 25 years of growth
- Communications center layout
 - Separate areas for 9-1-1 call taking and dispatching of: County Police, County Fire-EMS, State police, State Transportation Department, etc
 - Middle area for supervisors and tactical
 - Numerous monitors around the room for display and/or staff messaging/training
- Fitness facility, kitchens, lockers, etc are shared by all (builds cross cultural relationships)

Operating Cost

- Annual operating budget is \$44 million
- State 9-1-1 tax revenues pay 70%
- County tax revenues pay 30%.

Experience / Lessons Learned

- Integration is more successful if mandated by a higher level of authority
- Having an executive level sponsor (champion) is essential.
- Ensure clear direction and support - need commitments from municipal partners
- Engage employees and stakeholders in the process
- Be solid in convictions – don't waiver
- Should be done to improve service quality and interoperability of "public safety communications"
- Should not be done to save money – that will evolve eventually
- Staff need to be properly trained. Exposure to other environments / conferences is helpful
- In the US, the F-DPSC model is the wave of the future. Agencies will receive no 9-1-1 tax dollars unless they consolidate their dispatch operations

5. Survey of Backup Dispatch Center Capabilities

Another of the study objectives is to investigate the potential to establish a joint backup center for emergency communications services in Niagara (to be used during a major disruption of services at one or more of the primary sites).

To this end, the study includes a survey of off-site backup center capabilities established by multiple emergency dispatch operations. This includes both peer agency operations and alternative North American public safety dispatch models.

The survey results are presented in Exhibit 5.1 (next page) organized as follows:

- Peel Region: Police and Fire
- York Region: Police and Fire
- Ottawa: Police, Fire and EMS
- Toronto: Police, Fire and EMS
- Fire Services: Orillia, Barrie and Oshawa
- EMS Services: Eastern Health Authority Newfoundland and Nova Scotia EHS
- Partial and fully consolidated emergency dispatch operations: Denver 911, Halifax Integrated Emergency Services, Calgary Public Safety Communications, Portland Bureau of Emergency Communications and Fairfax Public Safety Communications.

Exhibit 5.1
Comparison of Backup Dispatch Center Capabilities

Backup Center Features	Testing and Emergency Activation
<p>Peel Region: Police and Fire (JFCC)</p> <p>Unlike the primary dispatch arrangement, in which police and fire co-locate in one building, the parties maintain individual backup solutions at separate locations.</p> <p>Police</p> <p>Backup facility is at an off-site location about 15 minute drive from the primary center. Fully redundant with duplicate systems including telephone, radio and CAD. Requires Bell to redirect 9-1-1 lines</p> <p>Outfitted with 15 work stations (compares to 32 at primary and weekday staffing at primary of about 15). Floor space is about 1/3 that of the primary center and is considered to be too small to work in for an extended period. Under lock and key / not used for other purposes</p> <p>Fire (JFCC)</p> <p>The 3 fire departments participating in the JFCC (Mississauga, Brampton and Caledon) also share a joint fire backup facility. It is located at Mississauga Fire HQ – a drive of about 20 minutes from the primary center</p> <p>Works remotely from off the primary CAD. Outfitted with 7 work stations (3 have only telephone and are used for call taking; 4 have radio and telephone and are used for dispatch). Compares to 8 work stations at primary and minimum weekday staffing at primary of about 5. Floor space is about 1/4 that of the primary center and is considered to be too small to work in for an extended period. Under lock and key. Occasionally may be used for training</p>	<p>Police</p> <p>Backup procedures are tested weekly. They simulate a CAD shut down and resort to manual operations. Occasionally perform a planned evacuation where staff are sent to test the systems at the backup center. Staff do not recall activating the backup center due to an unplanned event</p> <p>Fire (JFCC)</p> <p>Backup procedures are tested periodically (every few months). This involves having staff operate remotely for several hours. Backup center has been activated once (in past 3 years) due to an environmental situation (fumes in the building)</p>
<p>York Region: Police and Fire</p> <p>The backup solution mirrors the features of the primary dispatch arrangement, in which police HQ houses a CAD-Com system which the fire departments share by tapping in from their respective communications centers (currently Vaughan and Richmond Hill – with Markham possibly joining at a later date).</p> <p>The backup CAD-COM system is located at an off-site location about 30 minute drive from the primary. The site is fully redundant with duplicate supports including telephone and radio to serve as a backup dispatch for police. Outfitted with 16 work stations (compares to 20 at police's primary). Floor space is about 1/2 that of the police HQ center. Under lock and key / not used for other purposes.</p> <p>Vaughan Fire communications center serves as backup for Richmond Hill. Reciprocal arrangement at Richmond Hill Fire. Each party provides the other with the use of 2 work stations (compares to 4 at their respective primary locations). From these centers the parties would continue to link remotely to the shared police/fire CAD.</p> <p>The telephone systems used by Vaughan and Richmond Hill Fire differ; albeit Richmond Hill is transitioning to the one used by Vaughan. Vaughan also has an in-house CAD which they used to use before migrating to the current shared police/fire system. Potentially, that older CAD may serve as a secondary backup.</p>	<p>Police</p> <p>Police test their evacuation procedures every 4 to 6 weeks. Involves the entire team (2 shifts). Staff do not recall activating the backup center due to an unplanned event.</p> <p>Fire</p> <p>Vaughan Fire tests their procedures every few months. They and Richmond Hill Fire have each experienced an unplanned event in the past 12 months, which involved their transition to one-another's centers for relatively short periods.</p>

Backup Center Features	Testing and Emergency Activation
<p>Ottawa: Police, Fire and EMS</p> <p>Unlike the primary dispatch arrangement, in which police HQ houses a CAD-Com system which is shared with fire, the two parties maintain individual backup solutions, as does the Ottawa Paramedic Service.</p> <p>Police</p> <p>Two (2) off-site backup facilities – one serves as PSAP; other handles police call taking and dispatch. Each backup facility is about 200 sq ft. Compares to primary center in excess of 2,000 sq ft (outfitted with 32 work stations - staffed weekdays at about 20 to 25).</p> <p>Backup PSAP: An office in the Fire department's communications center, which would be made available to police. Building is outfitted with 9-1-1 lines. Office will accommodate up to 6 call takers who will perform 9-1-1 call taking via telephone in manual mode.</p> <p>Backup for Police call taking and dispatch: Located in a City owned building which also houses an EOC. Outfitted with telephones and radio to function as a cold backup. Will accommodate up to 10 communicators operating in manual mode. Under lock and key / not used for other purposes.</p> <p>Are looking at developing a reciprocal backup arrangement with a non-emergency police call center located in the City's west end. Both operate with the same phone and CAD systems. Would replace the above 2 locations with one combined backup facility – designed as a hot backup with about 15 to 20 work stations</p> <p>Fire</p> <p>Fire backup center is located in a fire station about 20 minute drive from the primary center. Floor space is about 3/4 that of the primary center. Could potentially accommodate up to 10 persons, although at present it is outfitted with only 3 fully functional work stations (compares to 8 at primary and weekday staffing at primary of 6). Equipped with telephones, radio, computer and standalone CAD. Would require Bell to switch 9-1-1 lines.</p> <p>EMS</p> <p>EMS backup center is located in a fire station about 15 minute drive from the primary center. Consists of 3 rooms with a combined floor space of about 1,000 sq feet (1/4 that of the primary center). Outfitted with 15 work stations (compares to 25 at primary and weekday staffing at primary of about 15). Communicators would operate in manual (paper) mode with telephone and radio – no CAD. Under lock and key / not used for other purposes</p>	<p>Police</p> <p>Equipment at the backup centers is tested every 2 weeks. Backup procedures are tested annually. This involves having staff operate concurrently from both the primary and backup centers. One unplanned event in the past 10 years that involved a transition to the backup centers (i.e., suspicious substance in the building)</p> <p>Fire</p> <p>Equipment at the backup center is tested monthly. Backup procedures have not been tested for some time. Staff do not recall activating the backup center due to an unplanned event; albeit, may have happened during the ice storm (in the late 80's)</p> <p>EMS</p> <p>Equipment at the backup center is inspected monthly. Includes radio and telephone line checks. Backup procedures are tested by Sunday night shifts (call volume permitting). Involves everyone handling 1 or 2 calls in manual (paper) mode. One unplanned event in the past 2 years that involved a transition to the backup center (telephone system problem at primary center)</p>
<p>Toronto: Police, Fire and EMS</p> <p>The Police communications center houses 2 backup dispatch facilities: one for Toronto Fire and another for Toronto EMS. Police have a reciprocal arrangement at the Toronto Fire and EMS HQ. The two buildings are separated by a 20 minute drive.</p> <p>Police</p> <p>Operates a hot backup, which is almost fully redundant with telephones, radios and computers; albeit, operates remotely from the primary CAD. Outfitted with 34 work stations (compares to 51 at primary and weekday staffing at primary of about 35 to 40). Floor space is about 1/3 that of the primary. Under lock and key / occasionally used for training.</p>	<p>Police</p> <p>Documented operational continuity plan requires that the evacuation process and equipment testing be performed at least once a year. It is a full usage process, where the entire dispatch operates from the backup site for a minimum of 3 days. Staff recall at least 1 unplanned event in the past 15 years that involved an emergency transition to the backup center.</p>

Backup Center Features	Testing and Emergency Activation
<p>In the event of an extended evacuation, have access to rest areas, boardrooms and other amenities at Toronto Fire and EMS HQ.</p> <p>Plans to expand the backup center to achieve full dispatch and special events capabilities.</p> <p>Fire</p> <p>Operates a hot backup with a fully redundant CAD. Backup work stations are set up and equipped as per the primary center with telephones, radios and computers. Outfitted with 10 work stations (going to 12). Compares to 16 at primary and weekday staffing at primary of 10. Floor space is smaller than that of the primary. Under lock and key / not used for other purposes</p> <p>Plans to upgrade the backup facility in the near future. Work to include: relocation to a different floor, upgrade to a new telephone system and the addition of 2 work stations (bringing the total to 12). A subsequent telephone system upgrade is planned for the primary center. To accommodate the work, the primary center will be shut down for about 2 months. During this interval Fire will dispatch from the backup site.</p> <p>Fire also has a secondary backup containing two work stations located at another station about a 20 minute drive from the primary center.</p> <p>EMS</p> <p>Operates a hot backup with a fully redundant CAD. Backup work stations are set up and equipped as per the primary center with telephones, radios, computers and CAD. Outfitted with about 15 work stations (compares to 31 at primary and weekday staffing at primary of about 25). Does not have capacity for hospital destination and clearing, special events or tactical work stations. Backup also does not have station alerting. Under lock and key / not used for other purposes.</p> <p>Floor space at backup facility is about 1/4 that of the primary. When fire moves to a different floor (as above) then EMS will assume the vacated space. The resulting footprint will be about 1/2 that of the primary. Plan also to expand the number of backup work stations to 25.</p>	<p>Fire</p> <p>Equipment at the backup center is tested periodically. Staff recall 1 or 2 unplanned events in the past 10 years that involved an emergency transition to the backup center.</p> <p>EMS</p> <p>Equipment at the backup center is tested periodically (target is 1 to 2 times a year). Have incurred about 5 unplanned events in the past 2 years that involved an emergency transition to the backup center.</p>
<p>Orillia Fire Service</p> <p>Backup facility is in an office located at a fire station about 3 km from the primary center. The office normally serves administration. Floor space is about 1/3 that of the primary center. The office is outfitted with 1 work station equipped with telephone, radio, paging system and a fully redundant CAD (compares to 1 work station at primary). Bell would have to switch 9-1-1 lines.</p>	<p>Backup telephones are tested daily. Evacuation plan is tested sporadically. May have been 2 to 3 unplanned events in 15 years that involved a transition to the backup center (e.g., 4 years ago when a contractor accidentally cut the telephone lines).</p>
<p>Barrie Fire Service</p> <p>Barrie Fire and Police have a reciprocal arrangement where their HQ's respectively house backup dispatch facilities for one-another. Fire's backup facility is a training room located at Barrie Police HQ about 5 to 7 km away. There are no work stations. There is a locked cabinet that houses 2 telephones and 1 radio. Staff would operate in manual mode. In comparison, the primary center has about the same size footprint and is outfitted with 6 work stations (weekday staffing at primary is 3). Requires Bell to redirect the 9-1-1 lines. Presently investigating the use of a VPN connection by which they may remotely tie in to the CAD at the primary center.</p>	<p>Training on backup procedures is done annually and testing every other year. This involves the clients (13 in all) who man their stations during the process to test signal strength. Staff do not recall activating the backup plan due to an unplanned event.</p>

Backup Center Features	Testing and Emergency Activation
<p>Oshawa Fire Service</p> <p>The backup solution is to go to one of the following two Fire dispatch centers and operate in manual mode: Ajax or Clarington. At these locations they would have access to 1 or 2 desks (compares to weekday staffing at primary of 4 fully functional work stations). These fire departments operate off a common radio system and have access to the same tactical channels. Durham Regional Police is also migrating to the same radio system. Both Oshawa and Ajax use a Crisys CAD, and are jointly working with Crisys to implement a solution that will enable backup operations via CAD at one-another's sites.</p>	<p>Backup plans are tested sporadically. Staff do not recall activating the backup plan due to an unplanned event.</p>
<p>Newfoundland Eastern Health Authority</p> <p>Backup solution is to temporarily dispatch from the City's EOC. Are advocating for space and resources to establish a better backup capability. Plans include building a new primary center and retaining the current site as backup.</p>	<p>Have not had to evacuate the primary location due to an unplanned event; albeit, it was seriously considered on 3 to 5 occasions in the last 7 years.</p>
<p>Nova Scotia EHS</p> <p>Backup center is located about 15 minute drive from the primary center. Operates as a hot backup with a fully redundant CAD. Backup work stations are set up and equipped as per the primary center with telephones, radios and computers. Outfitted with 12 work stations. Compares to 15 at primary and weekday staffing at primary of 13. Floor space is smaller than that of the primary. Alliant (Bell equivalent) is required to switch 9-1-1. Under lock and key / occasionally used as a training center</p>	<p>Backup solution is tested twice a year. Tests have included drills (similar to unscheduled fire drills). May have been about 5 unplanned events in 15 years that involved a transition to the backup center (primarily due to the failure of external communications / once due to a threat of flooding).</p>
<p>Denver 911</p> <p>Hot / almost full redundant backup center is located at an off site location. Outfitted with 9-1-1 trunks, live radio and telephone (no switching needed), 28 work stations (compares to weekday staffing at primary of 30 to 34) and fully redundant information server. Serves as one of two disaster recovery locations for CAD. Voice recordings and CAD are backed up regularly. Under lock and key. Occasionally may be used for training</p>	<p>Equipment at the backup center is tested every other month. Staff spend a full shift working out of the backup facility. Backup center has been activated once or twice due to technological problems at the primary center</p>
<p>Halifax Integrated Emergency Services</p> <p>The backup dispatch center is a former communications center located about 90 minutes away. It is fully operational / equipped with redundant systems e.g., redundant CAD, separate UPS and generator. Outfitted with 14 work stations (compares to 16 at primary). Doubles as a training facility. Occasionally used to provide communications support during major events / significant emergencies.</p>	<p>Equipment at the backup center is tested quarterly. Drills are carried out annually. Backup center has been activated twice in the past 7 years due to unplanned events.</p>
<p>Calgary Public Safety Communications</p> <p>The backup dispatch center is the former Police communications center in downtown Calgary. The backup center is fully redundant. Same telephone system and technology. Equipped with about 30 work stations (compares to 67 at primary). Will facilitate about 50% of the business for a period of 2 weeks. Doubles as training facility for EOC</p>	<p>Equipment at the backup center is tested weekly. Evacuation drill is conducted annually. May have been activated once in the past 15 years due to an unplanned event</p>

Backup Center Features	Testing and Emergency Activation
Portland Bureau of Emergency Communications Backup facilities include a backup server at the downtown corporate data center (operates hot) and a trailer located at a fixed site about 2 miles away. Trailer is about 53' long and 12' wide, and is outfitted with: generator, 15 fully functional work stations, fully redundant servers and backup radios. Can also go manual if required.	Target is to test the backup plan and equipment quarterly. Have never had to vacate the primary center due to an unplanned event
Fairfax Public Safety Communications Backup facility is a former primary PSAP located about 7 miles from the primary center. Floor space is about 2,000 sq. feet (compares to 12,000 at primary). Outfitted with 27 fully functional work stations (compares to 97 at primary).	Backup procedures and equipment are tested monthly (live drills). Has not needed to activate the backup center due to an unplanned event.

6. Defining an Optimal Delivery Model for Niagara

Reflecting back, the principal study objective is to investigate ways in which Niagara's existing emergency dispatch services may be merged, amalgamated or streamlined to better and more cost effectively deliver the services.

To this end, the study has investigated Niagara's existing emergency communications services model involving separately operated police, fire and EMS communications centers, as well as alternative public safety dispatch models ranging from partial consolidation (integration of technology), to physical co-location, to complete integration of operations.

That research notwithstanding, the question that still needs to be addressed is which of the models would best serve as an optimal dispatch delivery model for Niagara. This section of the report contains an assessment designed to answer this question. The assessment is conducted using the following 3-step logic model.

- Step 1: Drawing from the aforementioned investigations, define a recommended set of attributes for a contemporary emergency dispatch operation (i.e., attributes that an optimal dispatch delivery model should possess).
- Step 2: Comparative assessment of alternative options – status quo to complete operational integration - using the recommended attributes as the criteria.
- Step 3: Comparison of the respective costs.

6.1 Recommended Attributes

Section 3 of this report assessed the emergency communications services in Niagara against peer agency operations. Section 4 investigated alternative North American public safety dispatch models ranging from partial consolidation (integration of technology), to physical co-location, to complete integration of operations. Section 5 expanded on this research to include a survey of off-site backup dispatch center capabilities.

Drawing from these investigations, IBI Group offers the following as a recommended set of attributes for a contemporary emergency dispatch operation. In our opinion an optimal dispatch delivery model for Niagara should possess these attributes.

1. Quality in the Delivery of the Critical Business Functions
2. Enabled by a Conducive Working Environment, Business Supports and Technological Systems
3. Communications Function is Adequately Resourced and Staffed
4. Interoperability of Communications Within and Across Agencies
5. Backup Solution that will Provide Uninterrupted Services
6. Cost-Efficient in the Delivery of the Services
7. Operations are Performance-Based, Accountable and Transparent
8. Operational Funding is Adequate and Sustainable
9. Governance Structure that Supports Expedient & Cost-Efficient Delivery of the Services
10. Progressive / Forward Looking in its Operations

The attributes are discussed individually on the following pages.

6.1.1 Quality in the Delivery of the Critical Business Functions

This attribute refers to the quality of the core services delivered by the emergency dispatch operation i.e., the capability to receive notification of an incident and to expediently dispatch the appropriate resource to address / resolve the occurrence. In particular,

- To swiftly answer a 9-1-1 call, determine the nature of the incident and route the call to the relevant emergency services organization
- To rapidly perform the call taking function (police, fire or EMS) including caller screening to determine the location and urgency of the incident, and an appropriate response. Also, to dispatch the appropriate resource(s) to address / resolve the occurrence, to monitor the call activity and to respond to field crew requests for additional information or resource support
- To expediently respond to / execute a coordinated regional (multiple agency) response to emergencies and other significant events, aligning resources as needed, when needed where needed.

6.1.2 Enabled by a Conducive Working Environment and Business Supports

This attribute refers to the working environment, business supports and technological systems that will enable expedient delivery of the emergency dispatch functions. In a contemporary operation this includes having in place, being properly trained in, and/or making effective use of the following:

- Communications center that is of a size, design and layout to comfortably serve the needs of the operation and the multiple personnel working concurrently (on a daily basis) in relatively close quarters for extended periods.
- Standard operating protocols that are documented and comprehensively cover all aspects of the operation including roles and responsibilities, call taking and dispatch operations, staffing / upstaffing, training, risk and quality management, emergency evacuation, inter-agency coordination and support, etc.
- State-of-the-art systems including telephone, radio and paging systems, and CAD system including enhanced 9-1-1 ANI / ALI and mapping integrated with in-vehicle AVL/GPS.
- User friendly records management system for record keeping, information management, performance management, incident management and reporting. The system would include pre-programmed user-friendly queries and templates for analysis and reporting.
- Technical support resources who are responsible for maintaining the technological systems, to effect repairs when necessary and to implement authorized system adjustments.

6.1.3 Communications Function is Adequately Resourced and Staffed

This attribute refers to having adequate resources to meet the demand for communications services and the flexibility to manage the use of the resources to effectively and expediently respond to planned / unplanned fluctuations (e.g., absenteeism, periodic upstaffing, special events coverage, etc). In a contemporary operation this includes:

- Communicator (call taker and dispatcher) resource complement consisting of full time and relief staff that is based on demand and recognized standards for service delivery.
- Minimum levels for communicator staffing that reflect peak and off peak shift demands.

- On-duty supervision based on acceptable span of control that will ensure quality, compliance and standards.
- Supervisors and management having authority to assign / reassign communicator resources (full time and relief) as needed to accommodate planned / unplanned fluctuations in demand. Said authority to be recognized by the provisions of the applicable collective agreement(s).
- Having access to adequate numbers of resources to support the needs of the dispatch operation, including: administration, operations support, technical support, training and professional development, performance, risk and quality management, inter-agency liaison, etc.

6.1.4 Interoperability of Communications Within and Across Agencies

This attribute refers to the establishment of a culture, policies and technological systems that will promote / support interoperability of communications among emergency services agencies, to complement their field interactions during routine day-to-day operations and in the management of large scale incidents requiring a multi-agency response. This includes:

- Emergency services agencies jointly establishing policies and protocols that will define their respective expectations in support of routine day-to-day operations and in the management of large scale incidents, e.g.: interoperability of communications capabilities between communications centers, between communications centers and field operations, and between their respective on-scene commanders.
- Use of communications protocols, talk groups, systems and technology to improve communications (and timing thereof) whether oral or by text messaging.
- Increased use of text messaging in lieu of voice (e.g., for concurrent dispatch, periodic information updates, etc).
- Increased use of CAD to CAD electronic messaging.
- Potential use of common communications and information systems / technology.
- Periodic simulation and testing to ensure that staff are familiar with the protocols and that the technology is working when needed.

6.1.5 Backup Solution that Will Provide Uninterrupted Services

This attribute refers to having in place a backup solution that will ensure the ongoing provision of uninterrupted 9-1-1 call taking and emergency dispatch services (Police, Fire and EMS) when the provision of such services by the primary communications operation(s) is impeded, e.g.: during a power outage, the loss of telephone communications, in the event of an unplanned evacuation of the communications center, etc. In a contemporary operation this includes having in place and being properly trained in the use of the following items:

- Backup power supply at the primary communications facility(s).
- Access to technical support resources to expeditiously effect repairs to technological systems (i.e., CAD, communications systems, information systems, etc)
- Backup facilities that are designed to recognized standards i.e. in terms of physical design (to post disaster standards), operational design (to sustain defined response time performance standards), having separate (uninterrupted) power and communications, use of separate (redundant) CAD system, auxiliary amenities to support an extended stay, etc.

- Emergency backup and evacuation protocols that are comprehensively documented and tested periodically e.g., protocols governing the use of backup equipment; protocols for partial, full, immediate or staged evacuations; protocols defining emergency backup and evacuation roles and responsibilities (including those by external resources); protocols for returning to a normal state and updating the records management system.

6.1.6 Cost-Efficient in the Delivery of the Services

This attribute refers to the establishment of an emergency dispatch services delivery model that will promote increased cost-efficiency through more effective service delivery approaches, and the containment of capital and operating costs. In a contemporary operation this may be achieved by such means as:

- Sharing of facilities, technological systems and resources (communicators, supervisory oversight, support staff).
- Inter-agency coordination of communications related activities.
- Dispatch services delivery approaches that translate to more cost-effective field operations.

6.1.7 Operations are Performance-Based, Accountable and Transparent

Establishing an accountability framework that will enable monitoring, measuring and reporting on operational performance and costs by such means as:

- Use of pre-defined Key Performance Measures
- Benchmarking to industry standards and peer operations
- A proactive quality management program
- Transparency by way of periodic and ad-hoc reporting.
- Reviews / audits undertaken in accordance with accreditation requirements.
- Open to peer review or third party audit.

6.1.8 Operational Funding is Adequate and Sustainable

Funding for the operations reflects the true cost of the services being delivered, and both the services and funding are sustainable.

- This, as may be demonstrated through peer review and benchmarking.
- Would include a defined policy and program for the replacement of key assets.
- Would take advantage of revenue / cost sharing opportunities where they arise.
- Would ensure that funding arrangements accurately reflect the cost of the services.
- Would include multi-year funding arrangements (with pre-defined formulae for annual increases).
- Would include forward looking planning into trends and their financial implications that serves as input to annual budget processes.

6.1.9 Governance Structure that Supports Expedient & Cost-Efficient Services

This attribute refers to having in place a governance arrangement that will support the expedient delivery of emergency dispatch services and will also promote enhancement of services and increased cost-efficiency by such means as: sharing of facilities, sharing of technological systems, sharing of resources, inter-agency coordination, etc. In a contemporary emergency dispatch operation the governance arrangement would include a terms-of-reference defining:

- The relationship of the participants (i.e., shareholder, partner, client, etc) as well as their roles and responsibilities vis-à-vis emergency dispatch oversight taking into account their respective governmental authorities for the provision of emergency services (upper/lower tier).
- Process and protocols for performance monitoring and reporting, decision making, problem resolution, etc.
- Annual operating costs, capital requirements and a fair and equitable formula for distributing the costs among the participants.

6.1.10 Progressive / Forward Looking in its Operations

This attribute refers to having in place a culture that actively promotes continuous quality improvement as a basic business practice, such that it is regarded by peers as an industry leader and its operations are cited as industry Best Practices. In a contemporary emergency dispatch operation this would include:

- Periodic reviews / planning ahead / input from internal and external sources
- Periodic benchmarking of performance and costs relative to peers
- Best practices reviews relative to peers
- Joint problem solving / inter-agency coordination

6.2 Assessment of Alternative Options

This section of the report presents a comparative assessment of the alternative options – status quo to complete operational integration - using the previously defined recommended set of attributes (for a contemporary emergency dispatch operation) as the criteria.

The assessment is predicated on the information, lessons learned and critical success factors assembled in the previous investigations of Niagara's emergency communications services, peer agency operations, as well as those of alternative North American public safety dispatch services. The alternative options specific to Niagara are defined below:

Status Quo

NRPS, NEMS, NFFD and SCFS deliver emergency dispatch services under separate (autonomous) governance structures and mandates, from four independently located emergency dispatch facilities, to service areas that vary in size and geographic coverage defined by jurisdictional / contractual authority. They operate using their own staff resources, training programs and operating procedures that are uniquely designed to attain and support their respective (individual) emergency responder activities. Their operations are supported by individual systems and backup solutions (CAD, RMS, radio, telephone) that vary in age, technological capability and inter-agency interoperability.

Integration of Technology

NRPS, NACS and NFFD operate with contemporary windows-based CAD systems that include GIS interface and mobile asset tracking by way of GPS/AVL. These agencies are not planning a major systems upgrade in the near term. The CAD used by SCFS is designed on a relatively outdated DOS platform, which the manufacturer continues to support and periodically update. SCFS is planning a wholesale upgrade of their CAD to a windows-based system within 16 months. The timing as such presents an opportunity to migrate to a shared CAD arrangement with one of the other agencies, e.g. with NFFD or NRPS.

While the timing as such may preclude the agencies other than SCFS from proactively investigating this option in the near term (other than as potential partner with SCFS), they may well wish to consider this option at a later date when their respective technological systems require upgrading. In this NEMS, which operates under the authority of MOHLTC, would also require Ministry approval for any proposed changes.

Physical Co-location

NFFD and NEMS operate from relatively new emergency communications centers that comfortably serve their respective operations. These agencies are not planning major facility changes in the near term. This is not the case at NRPS or SCFD. These agencies have outgrown the space available and they are planning a relocation of their communications centers to new facilities in the near term. The planned relocation of the two communications centers within somewhat similar near term timeframes presents an opportunity for these two agencies to consider co-locating in a common facility.

Depending on the availability of space, the facility could also be designed to house a backup dispatch for one or both of the other agencies (NEMS and NFFD) – and potentially one of the other agencies may establish a reciprocal arrangement for NRPS and SCFS.

An alternative near term option is the possibility that NRPS or SCFS (or both) co-locate with NACS in the Foster Wheeler building where space may be made available for this purpose. While the timing as such may preclude all four agencies from co-locating in one facility in the near term, they may well wish to consider this option at a later date.

Integration of Operations

In this option the communications functions of the four agencies would be consolidated into a single service having responsibility to provide 'public safety communications' services to Niagara Region. The consolidated service would operate out of one communications center, under a single governance structure and mandate, with one communicator complement, where some (or all) would be cross-trained in multiple dispatch functions. The consolidated service would operate as one program, with one set of procedures, one set of support resources and a single backup solution. The consolidated service would be supported by one radio system, one telephone system and one or more CADs. Agencies may continue to operate with separate RMS systems.

Provincial constraints may preclude NACS from fully consolidating with the other agencies in the near term; however, this would not prohibit the four agencies from commencing the requisite planning and migration process toward complete consolidation over time.

The comparative assessment is presented in Exhibit 6.1 (next page).

Exhibit 6.1
Comparative Assessment of Alternative Options

1. Quality in the Delivery of the Critical Business Functions			
1 Status Quo	2 Integration of Technology	3 Physical Co-location	4 Integration of Operations
<p>All 4 agencies - NRPS, NEMS, NFFD and SCFD are presently delivering the critical business functions associated with their respective emergency communications obligations, including:</p> <ul style="list-style-type: none"> NRPS rapidly performing 911 answering duties and call down-streaming to the appropriate agency, and Each agency meeting their respective dispatch response time standards. <p>The above notwithstanding, policing and EMS are regional level functions, oriented to public safety and emergency response coverage on a region wide basis; whereas, fire is at a local municipal level and is oriented to local public safety and local emergency response coverage.</p> <p>This delivery of emergency dispatch services to coverage areas that vary according to jurisdiction</p> <ul style="list-style-type: none"> Translates to agencies that operate independently With relatively little inter-agency activity between the communications centers with the exception of the transfer of 911 response data, and Impedes a coordinated regional response to emergencies. 	<p>While sharing common radio and CAD systems the emergency service organizations would continue to operate from independent facilities under separate governance structures and mandates (as per the police and fire departments of Ottawa and York Region).</p> <p>Under this criterion the potential advantages include:</p> <ul style="list-style-type: none"> Share the costs of the technology / less cost than if participants purchase stand alone CADs Share IT support services Less data duplication / access to common data e.g., mapping and street addresses Ease of information flow from one agency to another, complimenting responder safety and facilitating the work of communicators through system enhancements (drop downs, etc.) Supports automatic/mutual aid and interoperability Ease of information exchange via CAD messaging between terminals <p>In addition to the integration of systems, this option could also support integration of infrastructure, equipment, support and maintenance needs.</p> <p>Involvement of like minded agencies strengthens resolve and supports periodic investment in upgrades /</p>	<p>Examples of this model include: Toronto, where Fire and EMS communications are in the same building / different floors; and Peel Region, where Police and the JFCC are in the same building / same floor.</p> <p>As demonstrated by these organizations, co-location does not immediately translate to improved operations or enhanced service quality. The agencies continue to operate as though they were located in independent facilities:</p> <ul style="list-style-type: none"> Under separate governance structures and mandates With own staff, training programs and operating protocols that attain / support their respective emergency responder activities <p>While this option may present opportunities (as listed below) they have / are not being pursued in either Toronto or Peel:</p> <ul style="list-style-type: none"> Identification / resolution of common dispatch issues Consolidation of data sources (mapping) Inter-agency coordination of operations Sharing of functions / resources Opportunity to contain operating and capital costs via the above <p>Requisites to the achievement of such</p>	<p>In this model the major features include:</p> <ul style="list-style-type: none"> Single governance authority Single management oversight Consolidated set of operating protocols, procedures and/or guidelines Communications center with a portion of staff cross-trained Frequently, shared use of common CAD, radio and supporting systems Communicators are frequently represented by a single employer (albeit not in all cases) <p>Advantages include:</p> <ul style="list-style-type: none"> Broader focus on public safety communications Promotes a coordinated regional response to emergencies Increased interoperability Resources focussed to provide service as needed, when needed where needed System responsive to significant events Plus the potential advantages / benefits listed under Option 2 (integration of technology) and Option 3 (physical co-location) <p>Less costly than if participants purchase and operate with own technologies – as a result, more cost-effective and efficient services</p> <p>Requisites to the achievement of this</p>

	<p>supporting technologies (MDTs, GPS/AVL)</p> <p>Enables achievement of the above advantages while avoiding potential labour challenges associated with physical co-location (Option 3) and operational integration (Option 4)</p> <p>This option may support a future migration to a more integrated model if the agencies are interested in doing so.</p>	<p>opportunities may include:</p> <ul style="list-style-type: none"> • Mandate by a higher authority • Leadership (champion) • Change in culture and willingness • Integration of some technology, as per Option 2 (Denver 911) • Integration of operations (as per the JFCC in Peel) <p>This option is subject to potential labour challenges (different workforces, different entitlements, wages, workloads, restrictions on outsourcing, etc). However, as demonstrated by services that operate on an integrated basis (Peel JFCC, Halifax IES et al), where there is a desire to do so, such challenges can be managed.</p> <p>This option may support a future migration to a more integrated model if the agencies are interested in doing so.</p>	<p>model may include:</p> <ul style="list-style-type: none"> • Mandate by a higher authority • Leadership (champion) • Change in culture and willingness
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2. Enabled by a Conducive Working Environment and Business Supports

1 Status Quo	2 Integration of Technology	3 Physical Co-location	4 Integration of Operations
<p>Each agency is vigilant in the activities necessary to ensure operational continuity on a daily basis. In this regard, each has a documented set of protocols (SOPs) setting out procedures and parameters that will ensure reliable emergency communications services.</p> <p>Each agency operates from their own dispatch facility using their own technology (CAD, RMS, telephone, radio, recording, etc). The 4 systems generally provide a similar level of communications / dispatch capability; albeit, they vary by technological platform, age, operational deployment capabilities and business and performance management supports.</p> <p>Of the four systems, SCFD is the oldest with no GIS interface for mapping and is slated for upgrade or replacement.</p> <p>NRPS does not presently use GPS/AVL for incident location or mobile asset tracking. It also is considering an upgrade to include this feature.</p> <p>NRPS and SCFD are both planning upgrades to their radio systems.</p> <p>Potentially, with the exception of NEMS, there is little evidence that the RMS in any of the agencies can be referred to as "user friendly" with supporting drop down menu features for easy data query or that pre-programmed reports are a standard process. Agencies are using RMS for basic information management and reporting, not for quality assurance, performance</p>	<p>In respect to technological related matters, where the client agencies have interests in common or where they may benefit financially (or operationally) from a singular direction initiative, establishment / use of the following common elements could be considered:</p> <ul style="list-style-type: none"> • Area-wide radio network • Common CAD, RMS and mapping platforms • Common systems infrastructure • Common products / equipment (radios, telephones, MDTs) • Common product procurement and implementation process • Shared services arrangements for technical support, maintenance, etc • Shared space arrangements e.g., for equipment storage • Shared backup data center <p>This option does not require a change in governance nor is there a loss of autonomy. Agencies continue to use their respective SOPs. etc. but they would realize the financial and operational benefits afforded by a sharing of technology.</p> <p>Further, as demonstrated by York Region police and fire, this option potentially enables:</p> <ul style="list-style-type: none"> • Learning from one-another • Capitalizing on procurement / development of better systems and services • Streamlining of response SOPs and improved dispatch services by 	<p>In this model, agencies would be able to focus on collective issues, potentially make better use of technological systems and by working together can advance their respective services in ways not currently possible under their individual operations from separate locations.</p> <p>At a minimum, capital savings may be realized through a sharing of a common facility and everything that has to offer, in comparison to the current situation of four separate operations and the respective maintenance, support and capital budget implications.</p> <p>As noted above, such opportunities may not be achievable without:</p> <ul style="list-style-type: none"> • Mandate by a higher authority • Leadership (champion) • Willingness to consider cultural change, integration of some technology (as in Option 2) and potentially integration of some operations (as in Option 4). <p>This option provides an opportunity to address current communications center facility deficiencies at NRPS and SCFD and could be designed to meet the entire group's needs.</p> <p>The above notwithstanding, current plans by SCFD and NRPS to move ahead with separate facility projects, may impede this option and any associated opportunities.</p> <p>Irrespective of the above comments which pertain to the primary centers,</p>	<p>In respect of this criterion Option 4 affords the potential advantages listed under Option 2 (integration of technology) and Option 3 (physical co-location) plus it would have sufficient critical mass to potentially achieve the following service enhancement opportunities:</p> <ul style="list-style-type: none"> • Operations as a single (distinct) business unit • Consolidation to a single (common) set of operating protocols; albeit with responder specific triage (where necessary) • Communications center of a size, design and layout to comfortably serve the needs of the entire client agency group • Resolution / implementation of requisite changes in operations, technology, infrastructure, etc • Staffing flexibility to address service demands • Data sharing • Access to support staff when needed • Collective efforts to establish user friendly solutions • Transparency of reporting on performance and costs as it applies to the delivery of emergency communication services <p>Such benefits have been demonstrated by the integrated operational models that were visited including: Halifax IES, Calgary PSC, Peel JFCC, Portland, E-Comm and Fairfax Virginia.</p>

<p>management or future planning.</p> <p>The current communications center layouts of NEMS and NFFD are of a size, design and layout to comfortably serve the needs of the operation. This is not the case at NRPS or SCFD. Their communications center needs have outgrown the space available. NRPS' facility also is noisy and the lighting is not conducive to the operations.</p> <p>NRPS is planning to construct a new headquarters building with a 2015 move in date. A new communications center is an element of that project.</p> <p>A new SCFS fire station is scheduled for construction in 2013. The plan is to incorporate a new dispatch center in this facility.</p>	<p>taking advantage of shared CAD system capabilities and shared information across agencies.</p> <p>In this option NRPS and SCFD would still have to address the facility related needs (space constraints) identified under Option 1.</p> <p>This option may support a future migration to a more integrated model if the agencies are interested in doing so (as in Option 4).</p>	<p>potential opportunities could be realized in the establishment of a joint (common) backup dispatch facility.</p> <p>This option may support a future migration to a more integrated model if the agencies are interested in doing so.</p>	<p>The leadership teams of these integrated centers indicated that at the outset there will be challenges in moving forward with this option (i.e., reaching agreement on technological platforms, cost allocation, training, labour relations et al). However, they hasten to point out that it gets easier as one proceeds and they "would not consider going back to their former more conventional operating models involving separate operations under separate governance authorities, etc".</p>
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3. Communications Function is Adequately Resourced and Staffed

1 Status Quo	2 Integration of Technology	3 Physical Co-location	4 Integration of Operations
<p>Each emergency communications service operates with its own staff compliment of full time and part time communicators with supervisors and technical support staff.</p> <p>They also operate with their own procedures and minimum staffing level strategies to accommodate the fluctuations in service demands.</p> <p>Each of the agencies is capable of up-staffing during peak periods, or to accommodate special events.</p> <p>SCFS requires additional communicator staffing to accommodate the current workload demand.</p> <p>NRPS and SCFS both require additional communications supervisors. Additional supervisors will enable these agencies to put in place structured programs for quality and performance management, reporting and inter-agency liaison.</p> <p>Adding additional supervisors at SCFD will provide resources to help address the significant challenges of radio, telephone and CAD upgrades, establishing a backup dispatch and performing the liaison duties for their respective fire clients.</p> <p>In NFFD, the practice is to use trained fire fighters to fill in as relief communicators. While this practice may work under current demands for firefighting services, future increases in demand may impede this arrangement</p>	<p>Within this option, agencies would continue to operate separately, in their own centers with their own staff. In this respect, this option is similar to the status quo – where each is responsible to establish appropriate levels of staffing and supervision for their respective centers.</p> <p>The above notwithstanding, the potential advantages under this option include:</p> <ul style="list-style-type: none"> • Opportunity to streamline and enhance communications tasks through the use of common platforms • Sharing of data • Making better / more cost-effective use of technology • Sharing of IT support (as in the case of Ottawa and York Region where police manage plant and IT resources which are shared with fire). Note - both users jointly identify the necessary IT resource requirements. <p>The tasks required to transfer data externally and internally are greatly reduced because the participating agencies can share and access the data (with pre-determined clearances).</p> <p>The participating agencies can also combine their efforts in joint programs for training, technical support, etc.</p> <p>The integration of technological</p>	<p>Despite their being housed in the same building (or same center) the agencies would continue to operate separately, under their own managements, with their own SOP's and staffing (as is the case in Toronto, Peel and Denver). In this respect, this option is similar to the status quo – where each is responsible to establish appropriate levels of staffing and supervision for their respective centers.</p> <p>Potential opportunities / advantages under this option (as would be afforded by their proximity to one-another) include:</p> <ul style="list-style-type: none"> • Identification / resolution of common dispatch issues • Potential to evolve to common CAD/RMS/radio/telephone systems (as in the case of Denver 911) • Consolidation of data sources (mapping) • Inter-agency coordination of operations • Sharing of functions / resources (i.e., training, IT support, payroll and other administration) • Opportunity to contain operating and capital costs via the above <p>Requisites to the achievement of such opportunities may include:</p> <ul style="list-style-type: none"> • Mandate by a higher authority • Leadership (champion) • Change in culture and willingness • Integration of some technology, as per Option 2 (Denver 911) • Integration of operations (as per the JFCC in Peel) 	<p>Under this option the participating agencies would establish a single operation, under single governance and staff resources may be cross-trained to develop an effective model that addresses the needs for operations, supervision, management and peripheral supports such as; training, technical support, quality assurance, etc.</p> <p>Site visits to Halifax IES, Calgary PSC, Peel JFCC, Portland and Fairfax illustrate that the following benefits can be achieved if there is a collective desire to do so:</p> <ul style="list-style-type: none"> • A collective focus on area-wide public safety communications with streamlined operations and the requisite supervisor/managerial staff to ensure oversight and quality assurance to standards. • Flexibility to develop a more cost effective/efficient staffing model through the use of individual training, cross-training, position rotation, scheduling to reflect peak periods and a larger staff pool to call on when additional resources are needed due to a large scale event. • Staff can be organized to cover dispatch functions, geographic areas or specific time periods. • Less reliance on trained in-the-field resources to serve as relief dispatchers. • The use of single platforms promotes better systems support

and necessitate consideration to recruit additional staffing dedicated to the communications function.	systems offers opportunities for agencies to assist each other in crisis situations.		(one stop shopping) <ul style="list-style-type: none">• Assists when developing, delivering and maintaining training programs,• Consolidation of technology and establishing requisite support and maintenance reduces overlap and the requirement for staff to know (be trained in) duplicate systems and processes.
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4. Interoperability of Communications Within and Across Agencies			
1 Status Quo	2 Integration of Technology	3 Physical Co-location	4 Integration of Operations
<p>The agencies recognize and promote the importance of interoperability in communications during emergencies through face-to-face communications at the command level.</p> <p>The above notwithstanding, there is no strategy for attaining / sustaining interoperability of communications across the agencies, and with the exception of the items listed below, relatively little has been established / initiated:</p> <ul style="list-style-type: none"> NFFD and NACS have implemented CAD-to-CAD communications capability. SCFD and NACS are working toward a similar arrangement. SCFD, with multiple fire clients, are on the same radio and paging system and are dispatched from the same CAD. Fire senior officers are using software technology (ISTATUS) to exchange instant messaging. <p>To the credit of the Client group, their participation on this study demonstrates a willingness to work together. This notwithstanding, in this area each agency continues to make independent decisions, with little regard to the potential opportunities and benefits (operationally, financially or otherwise) that may be derived from a singular direction / joint region-wide initiative.</p> <p>For example, while most of the client agencies are advancing to a P25 radio communications platform (which in itself</p>	<p>This option establishes, promotes and provides the ability to maintain interoperability through the use of common (shared) technologies.</p> <p>As demonstrated by models that share common technology (Ottawa, York Region, Halifax IES, Portland et al), the potential benefits / advantages include:</p> <ul style="list-style-type: none"> Attainment of a single area-wide radio network More streamlined communications Increased interoperability Information sharing (common data bases for street addresses and mapping, etc) Ease of information exchange Concurrent notification where a multi-agency response is required <p>To ascertain the value of attaining the above one needs only to look at the lessons learned / achievements by one or two agencies who, aided by an integrated service and area-wide radio network) were capable of successfully responding to large scale incidents requiring a multi-agency response, e.g.: E-Comm in Vancouver (which responded most successfully to a large scale Stanley Cup riot)</p>	<p>Despite their being housed in the same building (or same center) the agencies would continue to operate separately, under their own managements, with their own SOP's and staffing (as is the case in Toronto and Peel Region).</p> <p>In this respect, this option is similar to the status quo – where each would likely continue to make their own independent decisions concerning CAD-COM systems.</p> <p>Potential opportunities / advantages as may relate to increased interoperability (as would be afforded by their proximity to one-another) include:</p> <ul style="list-style-type: none"> Potential to evolve to common CAD/RMS/radio/telephone systems (as in the case of Denver 911) Potential to attain a single area-wide radio network Consolidation of data sources (mapping) Inter-agency coordination of operations Sharing of functions / resources (i.e., training, IT support, payroll and other administration) <p>As noted above, physical co-location models seldom succeed without the necessary leadership, supportive culture and mandate.</p>	<p>This option provides considerable opportunities for clients/stakeholders to identify, develop and implement interoperability strategies. With the following in place, interoperability would be a regular part of doing business:</p> <ul style="list-style-type: none"> A single agency with a broader focus on public safety communications Single governance authority Single management oversight Consolidated set of operating protocols, procedures and/or guidelines Communications center with a portion of staff cross-trained Resources focussed to provide service as needed, when needed where needed Frequently, shared use of common CAD, radio and supporting systems System responsive to significant events Coordinated regional response to emergencies <p>The willingness and commitment of the user agencies will be the challenge to take a proactive approach to interoperability.</p>

<p>may enhance inter-agency interoperability) no consideration is being given to the opportunities that might be afforded via the establishment of a single area-wide radio network for the entire Region. To the contrary, individual efforts to rationalize individual radio infrastructures within their respective jurisdictions are continuing.</p> <p>Other areas that would benefit from a singular communications services direction include: use of common commercial products and associated equipment (i.e., telephone consoles, MDTs); use of a common product procurement process; establishment of shared technical support services and storage space arrangements.</p>			
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5. Solutions that will Provide Uninterrupted Services

1 Status Quo	2 Integration of Technology	3 Physical Co-location	4 Integration of Operations
<p>To minimize disruption to critical systems each agency has implemented built-in system redundancies, continuity protocols, auxiliary power, technical services support arrangements (in-house or under contract) and other back-up supports.</p> <p>The above notwithstanding, unforeseen events could potentially require that a communications center be vacated, potentially for an extended period. In this area the client agencies' respective capabilities vary.</p> <ul style="list-style-type: none"> NRPS: The backup facility is outfitted to handle telephone and radio communications; albeit, call taking and dispatch must be carried out manually. NEMS: In the event of a major outage at NACS, NEMS communicators will relocate to the Hamilton CACC, where they will operate in manual mode using radio and telephone. NFFD: The backup center located at the Crowland volunteer fire station is outfitted with a communications console, telephone, 9-1-1 lines and a point-to-point data radio link connecting this site back to the primary dispatch center. SCFS: SCFS does not currently have a backup dispatch capability. In the event of a major outage, SCFS and their clientele would 	<p>Under this option there is greater onus on the owner / manager of the shared system to ensure its integrity and uninterrupted operations - this primarily by way of such items as listed below. These are the expectations under the shared technology service arrangements that were investigated including those in Ottawa and York Region:</p> <ul style="list-style-type: none"> Continuity protocols Auxiliary power Built-in system redundancies including such items as: wired and wireless access, backup CADs, virtual CADs, etc In house technical services support, which in the event of an unplanned incident is available 24/7 to quickly assess and rectify the situation <p>The above notwithstanding, unforeseen events could potentially require (a) that the communications center housing the shared technology system be vacated, potentially for an extended period, or (b) that one or more of the dispatch centers tapping into the CAD system be vacated.</p> <p>In this, the partners will require backup solutions / facilities. This could include a facility that houses a fully operational backup CAD that would be accessible to the partners. Alternatively, it may involve the establishment of a virtual server environment where one server may be used primarily for CAD and a</p>	<p>Despite their being housed in the same building (or same center) the agencies would continue to operate separately, under their own managements, with their own SOP's and staffing (as is the case in Toronto and Peel Region).</p> <p>In this respect, this option is similar to the status quo – where, in support of their respective operations, each agency would require built-in system redundancies, continuity protocols, auxiliary power, technical services support arrangements (in-house or under contract) and other back-up supports.</p> <p>Potential opportunities / advantages as may relate to the provision of uninterrupted services (as may be afforded by their proximity to one-another) include:</p> <ul style="list-style-type: none"> Potential to evolve to common CAD/RMS/radio/telephone systems (as in the case of Denver 911) Potential to jointly establish common / shared system redundancies, continuity protocols, auxiliary power and technical services support arrangements <p>The above notwithstanding, unforeseen events could potentially require that the shared facility be vacated, potentially for an extended period.</p> <p>In this, the participants will require either their own respective backup facilities or a single backup solution housed in a single facility (as in the</p>	<p>Under this option the participating agencies would establish a single operation, under single governance and staff resources may be cross-trained to develop an effective model that addresses the needs for operations, supervision, management and peripheral supports such as; training, technical support, quality assurance, etc.</p> <p>To minimize disruption to critical systems this newly created integrated entity would be outfitted with system redundancies, continuity protocols, auxiliary power, technical services support arrangements (in-house or under contract) and other back-up supports.</p> <p>The above notwithstanding, unforeseen events could potentially require that the facility be vacated, potentially for an extended period.</p> <p>In this, the integrated entity will require an backup solution that mirrors the features of the primary dispatch center (as is the case in Calgary, Vancouver, Portland, Fairfax and in other jurisdictions where emergency dispatch services are delivered in an integrated fashion)</p> <p>For this purpose, one approach is to use a former communications center (prior to consolidation) as the backup facility (as in the case of Calgary, Halifax, Fairfax and others). A number of these facilities also serve as a training center.</p>

<p>have to rely on NFFD and neighbouring emergency services for support. Discussions with City Public Works are underway for the provision of space at the Lake Street Public Works facility to accommodate the establishment of an interim backup communications center.</p>	<p>second server (elsewhere) primarily for RMS, however each one is configured to serve as backup for the other (as in York Region).</p> <p>It may also involve establishing reciprocal arrangements where multiple agencies either house backup dispatch facilities for one-another (as in Toronto) or they grant one-another access to work stations within their respective centers for use during emergencies.</p>	<p>case of the Peel Region JFCC and Denver 911). This may include each agency establishing virtual server environments and reciprocal arrangements.</p>	<p>Having an integrated backup center also provides additional capacity to support the emergency communications function during significantly large (demanding) events.</p> <p>The solution may also involve establishing a virtual server environment where the primary center server may be used primarily for CAD and a second server (at the backup location) primarily for RMS, however each one is configured to serve as backup for the other.</p>
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6. Cost-Efficient in the Delivery of the Services

1 Status Quo	2 Integration of Technology	3 Physical Co-location	4 Integration of Operations
<p>Currently, each agency operates a separate dispatch service from independently located facilities, using their own staff resources, training programs and operating procedures that are uniquely designed to attain and support their individual emergency responder activities. Their respective operations are supported by individual systems and backup solutions.</p> <p>While there may be opportunities to share facilities, technology and resources that may result in cost savings (as listed below) the agencies are not taking advantage of such opportunities.</p> <ul style="list-style-type: none"> • Product procurement • Technical support • Maintenance • Equipment storage • Backup power • Utilities and communications infrastructure • Licensing <p>Relatively little inter-agency coordination of communications related activities / initiatives</p> <p>Aside from NEMS' development of a number of innovative software applications, there is relatively little in the way of innovative service delivery approaches that will translate to cost-effective field operations.</p>	<p>If successfully introduced the agencies would benefit financially from the features of this singular direction initiative (as listed below):</p> <ul style="list-style-type: none"> • Use of common platforms and databases (CAD, mapping, etc) • Bulk purchasing of desktop and mobile devices (radios, paging, telephones, GPS/AVL, MDTs) • Shared services arrangements for IT support, maintenance and procurement (as in the case of Ottawa and York region) • Savings related to maintenance, licensing et al <p>As demonstrated by models that share common technology (Ottawa, York Region, Halifax IES, Portland et al), the potential benefits / advantages (listed below) translate to more cost-effective field operations:</p> <ul style="list-style-type: none"> • Attainment of a single area-wide radio network • More streamlined communications • Increased interoperability • Information sharing (common data bases for street addresses and mapping, etc) • Ease of information exchange • Concurrent notification where a multi-agency response is required 	<p>Listed below are a number of potential advantages associated with a co-location arrangement:</p> <ul style="list-style-type: none"> • Capital savings for the participating agencies – in terms of facility infrastructure • Lower rent - depending on the choice of location • Savings derived by sharing supporting emergency communications infrastructure (9-1-1 lines, radio towers, telephone systems et al) • Opportunity to identify and jointly address dispatch issues that agencies have in common • Opportunity to consolidate data sources (mapping) • Opportunity to improve inter-agency coordination of operations • Opportunity to share support functions and resources • Additional financial savings that may be derived by taking advantage of the above opportunities <p>Potential advantages notwithstanding, experience shows that physical co-location does not translate to more cost-effective operations without it being mandated by a higher authority or a change in culture e.g., in Peel and Toronto, where despite their co-location, the dispatch services continue to operate as though they were situated in separate buildings (as in Option 1).</p>	<p>Listed below are a number of potential advantages associated with this option:</p> <ul style="list-style-type: none"> • Improves interoperability of communications / coordinated area-wide response • Resources focussed to provide service as needed, when needed where needed • Supports integration of infrastructure, equipment, resources, support and maintenance needs • Financial savings derived by operating from a single communications center, with one CAD-COM system, one supporting emergency communications infrastructure (9-1-1 lines, radio towers, telephone systems et al), one communicator complement (where some or all of the resources are cross-trained to perform multiple dispatch functions), one oversight complement, and one complement of support resources • Less data duplication / access to common data • Ease of information flow adds to responder safety and facilitates the work of communicators • Supports automatic / mutual aid and inter-agency coordination of field operations.

7. Operations are Performance-Based, Accountable and Transparent			
1 Status Quo	2 Integration of Technology	3 Physical Co-location	4 Integration of Operations
<p>Most of the agencies have documentation in place to support Quality Assurance (QA); however, with the exception of the approach taken by NEMS, QA is predominately a reactive process involving a response to an issue / complaint that has arisen.</p> <p>The process that most use for quality management involves the production of a daily report on the calls (particularly response time information) followed by a brief review / investigation of the exceptions (data outside of normal parameters).</p> <p>At NEMS the process is ongoing and proactive, not only involving periodic scrutiny by supervisors but it also is tied to each communicator's in-service update training.</p> <p>In terms of transparency, all of the agencies produce an annual report, which provides oversight authorities with information on such items as: volumes handled, operational and regulatory compliance, major initiatives throughout the previous year and future plans. SCFS provides relevant data to its clientele. To satisfy contractual requirements NEMS submits additional reports to MOHLTC.</p>	<p>While the systems would be integrated, the agencies would continue to deliver their respective dispatch services under governance structures that are autonomous, from their own facilities using their own staff, support resources, programs, procedures and backup solutions</p> <p>That being the case, one may anticipate that little would change from the Status Quo.</p> <p>The above notwithstanding, under this option there is an onus on the owner / manager of the shared system to ensure that each agency has access to their relevant data.</p> <p>Also, some performance, accountability and transparency synergies may be derived from the inter-agency coordination activities associated with a shared technology arrangement.</p>	<p>While multiple dispatch services would be housed in the same building and may even be co-located in the same communications center, each would continue to operate under their own (autonomous) governance structure and mandate, with their respective staff, support resources, programs, procedures and backup solutions.</p> <p>That being the case, one may anticipate that little would change from the Status Quo.</p> <p>The above notwithstanding, some performance, accountability and transparency synergies may be derived from periodic interactions.</p>	<p>The following features are demonstrated by fully consolidated services such as the Calgary PSC and Halifax IES:</p> <ul style="list-style-type: none"> • Attainment of a higher level of quality / performance (beyond those that the agencies attained by working on their own) • Visible governance oversight • Standards for performance management and service quality embodied in performance agreements between the participating agencies • Transparent and accountable process for performance management • Key performance indicators that are monitored, measured and reported • Routine and Annual Reports • In some cases reports posted on host web sites • Often participate in an accreditation process

8. Operational Funding is Adequate and Sustainable

1 Status Quo	2 Integration of Technology	3 Physical Co-location	4 Integration of Operations
<p>NEMS is fully funded by the MOHLTC and is subject to the reality of political influences. Their current facility, equipment, hardware and software is all looked at in terms of end-of-life and a rigorous process is in place to support and maintain their financial requirements.</p> <p>At NRPS communications is but one of numerous cost centers and therefore must compete for operating funds during the budget process. Looking forward, communications leadership is focussing on the needs for a new facility and the evolution or trends in emergency communications, e.g.: next generation 9-1-1.</p> <p>At SCFS the communications situation is similar to that of NRPS (i.e., must compete with other cost centers for operating funds). Price charged for contracted fire dispatch services needs to be reassessed and restructured to reflect true costs. Looking forward, communications leadership is focussing on the needs for a new facility and system upgrades.</p> <p>At NFFD the communications situation is similar to that of NRPS and SCFS (i.e., must compete with other cost centers for operating funds). In the future, the department should attribute the actual costs of providing relief fire fighters to the communications operating costs, therefore providing a more accurate financial accounting.</p>	<p>Provided this option is successfully implemented, agencies can potentially contain some costs but this should not be viewed as the means to solve pre-existing problems, such as staffing deficiencies.</p> <p>In conversation with agencies who have implemented this option, the following comments were received:</p> <ul style="list-style-type: none"> • Pre-agreement negotiations will address the financial objectives of the partners • Savings demonstrated through comparison of previous costs • Capital cost savings (avoidance) and pre-determined replacement strategy • Multi-year agreements with cost increase formula • Multi-year maintenance agreements or leases • Generates revenue for the host • Partners can cost share as opportunities are presented 	<p>Provided this option is successfully implemented, agencies can potentially contain some costs but this should not be viewed as the means to solve pre-existing problems, such as staffing deficiencies.</p> <p>In conversation with agencies who have implemented this option, the following comments were received:</p> <ul style="list-style-type: none"> • Pre-agreement negotiations will address the financial objectives of the partners (equal cost share versus tenant arrangement / establish formula for the division of costs) • Savings demonstrated through comparison of previous costs and is based on the arrangements established between the parties (facility, maintenance, etc) • Capital cost savings • Opportunity to share administrative functions when the agencies share the same employer • Potential to capitalize on common needs, i.e.: training (joint and shared), Quality Assurance, communications support, systems support 	<p>As an established, stand-alone business unit with a formal organization and requisite mandate, this option may be embodied with sufficient critical mass to attain / sustain adequate levels of funding, and to investigate potential additional partners and sources of funding</p> <p>In conversation with agencies who have implemented similar models, the following comments were received:</p> <ul style="list-style-type: none"> • Client contracts supporting fair and full cost recovery for services provided • Funding mechanism to support timely lifecycle replacement of critical infrastructure, technology and communications equipment • The impact of one-time capital costs and the timeline for the return on investment must be acceptable to the partners • How to give credit for sharing what was once mine versus now it's ours; facility, equipment and/or systems • If the system was underfunded and/or under resourced prior to the integration, the perception of savings may be skewed.

9. Governance Structure that Supports Expedient and Cost-Efficient Services

1 Status Quo	2 Integration of Technology	3 Physical Co-location	4 Integration of Operations
<p>NRPS, NEMS, NFFD and SCFS deliver emergency dispatch services under separate (autonomous) governance structures and mandates, from independently located emergency dispatch facilities.</p> <p>They operate using their own staff resources, training programs and standard operating procedures that are uniquely designed to attain and support their respective (individual) emergency responder activities.</p> <p>Their operations are supported by individual systems and backup solutions (CAD, RMS, radio, telephone).</p> <p>Each agency is responsible for its own service area. Service areas vary in size and geographic coverage defined by jurisdictional / contractual authority.</p> <p>To the credit of the Client group, their participation on this study demonstrates a willingness to work together. This notwithstanding, within the current situation, each agency seldom looks beyond their own operations, making independent decisions, with little regard to the potential opportunities and benefits (operationally, financially or otherwise) that may be derived from a singular direction initiative or by proactively working together.</p>	<p>While the systems would be integrated, the agencies would continue to deliver their respective dispatch services under governance structures that are autonomous, from their own facilities using their own staff, support resources, programs, procedures and backup solutions.</p> <p>Further, each would continue to be responsible for their own service area. Service areas vary in size and geographic coverage defined by jurisdictional / contractual authority.</p> <p>This being the case, one may anticipate that little may change from the Status Quo; albeit some performance, accountability and transparency synergies may be derived from the inter-agency coordination activities associated with the shared technology arrangement, e.g.: agreements between participants (as in Ottawa and York Region) that define roles and responsibilities, performance standards, means of measurement and reporting, and funding arrangements.</p>	<p>While multiple dispatch services would be housed in the same building and may even be co-located in the same communications center, each would continue to operate under their own (autonomous) governance structure and mandate, with their respective staff, support resources, programs, procedures and backup solutions.</p> <p>Further, each would continue to be responsible for their own service area. Service areas vary in size and geographic coverage defined by jurisdictional / contractual authority.</p> <p>This being the case, one may anticipate that little would change from the Status Quo; albeit some performance, accountability and transparency synergies may be derived from periodic interactions.</p>	<p>In this option the communications functions of the four agencies would be consolidated into a single service having responsibility to provide 'public safety communications' services to the entire Region.</p> <p>The consolidated service would operate out of one communications center, under a single governance structure and mandate, with one communicator complement, where some (or all) would be cross-trained in multiple dispatch functions.</p> <p>The consolidated service would operate as one program, with one set of procedures, one set of support resources and a single backup solution. The consolidated service would be supported by one radio system, one telephone system and one or more CADs. Agencies may continue to operate with separate RMS systems.</p> <p>From the perspective of this criterion the potential benefits / advantages would include:</p> <ul style="list-style-type: none"> • Attainment of a higher levels of quality / performance (beyond that attained on their own) • Single visible governance oversight • Transparent and accountable process for performance management embodied in performance agreements between the participating agencies

10. Progressive / Forward Looking in its Operations			
1 Status Quo	2 Integration of Technology	3 Physical Co-location	4 Integration of Operations
<p>Each agency, in their own way, endeavours to be progressive / forward looking within their respective areas, within the realities defined by existing operating authorities (mandates), labour agreements and available operating budgets, e.g.:</p> <ul style="list-style-type: none"> NRPS is focussing on the needs for a new facility and next generation system upgrades SCFS is focussing on the needs for a new facility, staffing and oversight requirements, and system upgrades NFFD recently upgraded their communications center, telephone and CAD systems, and backup dispatch facility. They also implemented a direct CAD-to-CAD link with NEMS <p>However, of the four only NEMS may be regarded by peers as an industry leader – this as a result of a recently completed pilot project (funded by MOHLTC) which has enabled NEMS to test and implement alternative business approaches and leading edge technologies. Further, only NEMS communications facility is accredited as a Center of Excellence.</p>	<p>Migrating to a shared technology arrangement would further demonstrate the agencies' respective aspirations vis-à-vis being progressive / forward looking i.e.:</p> <ul style="list-style-type: none"> Less data duplication / access to common data e.g., mapping and street addresses Ease of information flow from one agency to another, complimenting responder safety and facilitating the work of communicators through system enhancements Supports automatic / mutual aid and interoperability Working closely on technology may lead to other joint opportunities on dispatch related issues (problem solving and inter-agency coordination) Involvement of like minded agencies strengthens resolve and supports periodic investment in upgrades / supporting technologies. 	<p>Migrating to a physical co-location arrangement may demonstrate the agencies' respective aspirations vis-à-vis being progressive / forward looking. Opportunities afforded by this option include:</p> <ul style="list-style-type: none"> Opportunity to identify and jointly address dispatch issues that agencies have in common Opportunity to consolidate technology, data sources (mapping), etc Opportunity to improve inter-agency coordination of operations Opportunity to share support functions and resources <p>Research demonstrates that agencies often do not take advantage of co-location arrangements to pursue the above opportunities, and will be more likely to do so if:</p> <ul style="list-style-type: none"> Mandated by a higher authority Leadership promotes / serves as an example to a change in culture The model includes the integration of some of the technology or some operations. 	<p>This option would establish Niagara as an industry leader in terms of progressiveness and being forward looking (more so than many other jurisdictions), for the reasons set out below:</p> <ul style="list-style-type: none"> This arrangement comes closest to meeting all of the recommended attributes for a contemporary emergency dispatch operation. It promotes a relatively lengthy list of potential benefits, which as demonstrated by the previous charts, includes: improved service quality by way of a broad (area-wide) focus on public safety communications, increased interoperability of communications, cost-effective use of resources, financial savings derived by operating on an integrated basis, enhanced responder safety, and inter-agency coordination. Further, this option reflects current trends in major North American municipalities, and in the USA it is the direction promoted by federal and state authorities.

6.3 Comparison of Costs

The annual costs to deliver emergency dispatch services in Niagara are presented in Exhibit 6.2.

In total it costs approximately \$12.6 million a year to deliver the full range of services in Niagara Region (9-1-1 call taking and dispatch for police, fire and EMS). This figure works out to about \$29 per capita.

Exhibit 6.2
Annual Operating Costs

	Annual Operating Cost	
	Total	Per Capita
NRPS	\$6,049,000	\$14
NEMS	\$4,456,900	\$9
NFFD	\$555,000	\$7
SCFS	\$1,547,000	\$4
TOTAL	\$12,607,900	\$29

Among the alternative North American models that were investigated there are four that also provide the full range of emergency dispatch services. They are:

- Denver 911, which is a physical co-location model where the agencies not only operate from the same building, they also cohabitate in the same communications center. In this model the agencies operate with common CAD, radio and telephone systems, and they share a common IT support.
- Calgary PSC, Portland BOEC and Fairfax PSC, which are fully consolidated models that operate on an integrated basis. More specifically, at these locations the full range of communications functions are consolidated into a single 'public safety communications' service that operates under a single governance structure and mandate, out of one communications center, as a single program with a single resource complement. Portland and Fairfax operate with one technology system for radio, telephone and CAD. Calgary operates with two CADs (one that is specific to police dispatch).

Among these four agencies the annual cost per capita varies from \$23 to \$28. The median value is about \$25.

These figures suggest that potential savings may be realized by integrating the communications functions in Niagara in a manner similar to the above agencies. Adjusting for the difference in U.S. and Canadian wage rates, the potential savings could be in the order of 10 to 15 percent. At 10 percent the annual savings would be about \$1.25 million a year.

Among the alternative North American models that were investigated we also had sufficient information to perform a cost comparison to the following models, which deliver three of the four communications functions, specifically 9-1-1 call taking and dispatch for police and fire (i.e., they do not dispatch for EMS):

- Ottawa Police and Fire Communications, which operate using shared CAD and radio systems.
- Halifax IES and E-Comm in Vancouver BC, which are fully consolidated models that operate on an integrated basis providing 9-1-1 call taking and police and fire dispatch services under a single governance structure. Halifax operates with one technology system for radio, telephone and CAD. E-Comm operates with two CADs.

Among these three agencies the annual cost per capita varies from \$16 to \$20, with a median value of about \$18. Netting out NEMS, the corresponding figure for Niagara is \$19 per capita per year. To be clear, this figure includes the communications operations of NRPS, NFFD and SCFS but it excludes NEMS. These figures also suggest that potential savings may be realized by integrating the communications functions in Niagara.

Ours was a high level cost comparison. We did not drill down to ascertain specifics. For example, while we know that NFFD figures do not include the salaries of fire fighters who serve as relief communicators (and that if these were included then the Niagara figures would be higher than those shown above) we did not investigate the extent to which other agencies may be following a similar practice - albeit since most of the other agencies operate under governance structures that are separate from the field operations we may safely assume that most probably do not.

Similarly we do not have sufficient detailed information on a number of other factors to affirm that the above is an apple-to-apple comparison e.g.: internal IT support service capabilities, level of corporate support, degree of oversight, facility rental / lease costs, and the manner in which the budgets treat capital or technology replacements.

This notwithstanding, in consideration of the following items, its our opinion that by integrating the communications functions Niagara may either realize a potential savings in annual operating costs, or an enhanced quality of service.

A number of the integrated service models that were investigated are governed by standards that are more stringent than those which were used previously by the participants when they operated on their own (i.e., they deliver a higher quality / level of performance).

A number of the services that are fully consolidated (i.e., Portland BOEC, Fairfax PSC, E-Comm) are located in buildings that have been built to more expensive stringent (post disaster) standards. Further, unlike the Niagara situation, most of the fully consolidated services have viable backup dispatch facilities and the cost of these facilities is included in their budgets.

7. Summary and Recommendations

7.1 Summary of Findings

7.1.1 Existing Emergency Communications Services Model

NRPS, NEMS, NFFD and SCFS deliver emergency dispatch services under separate (autonomous) governance structures and mandates, from four independently located emergency dispatch facilities, to service areas that vary in size and geographic coverage defined by jurisdictional / contractual authority.

They operate using their own staff resources, training programs and standard operating procedures that are uniquely designed to attain and support their respective (individual) emergency responder activities. Their operations are supported by individual systems and backup solutions (CAD, RMS, radio, telephone) that vary in age, technological capability and inter-agency interoperability.

This emergency communications services model, involving separately operated police, fire and EMS communications centers, is similar to that employed by many jurisdictions. Nonetheless, responsibility for coverage areas that vary according to jurisdiction translates to emergency dispatch services that generally operate independently with relatively little inter-agency activity, and it occasionally impedes a coordinated regional response to emergencies.

To the credit of the Client group, they periodically consult one-another on matters of common interest and their participation on this study demonstrates a willingness to work together. This notwithstanding, for the most part the agencies make independent decisions with little regard to potential opportunities (operational, financial or otherwise) that may be afforded by a singular direction / joint region-wide initiative.

For example, while most of the client agencies are advancing to a P25 radio communications platform (which in itself may enhance inter-agency interoperability) and in the process they periodically consult one-another, little consideration is being given to the opportunities that might be afforded via the establishment of a single area-wide radio network for the entire Region.

To the contrary, efforts to rationalize individual radio infrastructures (including consoles, towers, MDTs et al) within their respective jurisdictions are continuing. In this, SCFS' effort on behalf of 11 locally-based fire services is of particular note – and it begs the following question: why is this initiative not being led regionally, to establish a single area-wide, fully interoperable radio network.

To ascertain the potential benefits that may be realized from a single area-wide radio network one needs only to look at the lessons learned by one or two jurisdictions that have successfully implemented such networks, including E-Comm in Vancouver and Fairfax County Virginia (both of which are discussed in this report).

7.1.2 Peer Agency Comparisons

NRPS, NEMS, NFFD and SCFS are presently delivering the critical business functions associated with their respective emergency communications obligations. With the exception of a few areas where improvement would be desirable (the main ones being those identified below) the agencies operate in a manner consistent and comparable to their peers in terms of organization, staffing, operating protocols, use of technology, workload, response time and operating costs.

Communicator workloads at NRPS, NACS and NFFD are consistent with those of their respective peers; whereas, at SCFS the workload per communicator is almost 50 percent higher than that of its peers. This statistic strongly suggests that SCFS requires additional communications personnel.

At NFFD and NEMS, span of control (defined as the ratio of communicators to supervisors) is consistent with that of their respective peers. In comparison, at NRPS and SCFS the values are 3 to 4 times higher, suggesting that these agencies require additional communications supervisors. The situation at SCFS is particularly problematic as the Divisional Chief of Communications currently serves as Divisional Chief, Manager and Supervisor, and is solely responsible for the administration of the emergency communications operations including oversight, quality assurance, procurement, contracting and funding. While SCFS clientele describe the management at SCFS as being generally responsive, they also make particular mention of the need to address the situation.

On a per capita basis the operating costs at NRPS, NACS and SCFS are generally consistent with those of their respective peers; whereas, at NFFD the per capita operating cost is almost 60% higher than that of its peers. In this, it is noted that at NFFD a relatively large number of fire fighters serve as relief communicators. Fire fighter salaries are administered from a separate cost account. If their salaries were included in the calculations then the per capita cost would be even higher.

For SCFS, another parameter to consider is the 'cost per call', which in the case of SCFS is about 25% below the median value among its peers. This comparatively low figure is attributed to the modest amount that SCFS charges its clientele. In order to sustain the dispatch operation at the current service level or to increase service quality (by way of additional communicators, supervisors and technical support) SCFS should consider developing a new fee structure.

7.1.3 Partial Consolidation (Integration of Technology)

NRPS, NACS and NFFD operate with contemporary windows-based CAD systems that include GIS interface and capability for mobile asset tracking by way of GPS/AVL. These agencies are not planning a major systems upgrade in the near term.

The CAD used by SCFS is designed on a relatively outdated DOS platform, which the manufacturer continues to support and periodically update. SCFS is planning a wholesale upgrade of their CAD to a windows-based system within 16 months. The timing as such presents an opportunity to migrate to a shared CAD arrangement with one of the other agencies, e.g. with NFFD or NRPS.

Ottawa is an example of a jurisdiction where police and fire successfully share a CAD as well as a common radio system. Another successful example is York Region, where radio and CAD are shared by the Regional police service and the Vaughan and Richmond Hill fire departments – with Markham fire department also planning to participate. While their systems are integrated, the police and fire departments of these municipalities continue to deliver their respective dispatch services independently from their own facilities and with their own staffs.

The potential advantages associated with such arrangements include:

- Share the costs of the technology / less cost than if participants purchase stand alone CADs
- Share IT support services
- Less data duplication / access to common data e.g., mapping and street addresses
- Ease of information flow from one agency to another, complimenting responder safety and facilitating the work of communicators through system enhancements (drop downs, etc.)
- Supports automatic / mutual aid and interoperability
- Ease of information exchange via CAD messaging between terminals
- Supports integration of infrastructure, equipment, support and maintenance needs.
- Involvement of like minded agencies strengthens resolve and supports periodic investment in upgrades / supporting technologies (MDTs, GPS/AVL).

In addition, the above advantages may be achieved while avoiding potential labour challenges associated with the physical co-location and operational integration options.

While the timing as such may preclude the agencies other than SCFS from proactively investigating this option in the near term (other than as potential partner with SCFS), they may well wish to consider this option at a later date when their respective technological systems require upgrading. In this NEMS, which operates under the authority of MOHLTC, would also require Ministry approval for any proposed changes.

7.1.4 Physical Co-Location

NFFD and NEMS operate from relatively new emergency communications facilities that are of a size, design and layout to comfortably serve the needs of their respective operations. These agencies are not planning major facility changes in the near term.

This is not the case at NRPS or SCFD. Their communications center needs have outgrown the space available. NRPS' facility also is noisy and the lighting is not conducive to the operations.

NRPS is planning to construct a new headquarters building with a 2015 move in date. A new 9-1-1 / police communications center is an element of that project. A new SCFS fire station is scheduled for construction in 2013. The present plan is to incorporate a new SCFS dispatch center in this facility.

The planned relocation of two communications facilities (by NRPS and SCFS) within a somewhat similar timeframe begs the following question: why are these two agencies not considering the possibility of physically co-locating their two emergency communications operations in one building i.e., as in the case of Peel Region where police and fire communications operate independently in the same building, or in the case of Toronto where fire and EMS deliver separate dispatch operations from a shared HQ facility.

Depending on the availability of space, the building could also be designed to house a backup dispatch for one or both of the other agencies (NEMS and NFFD) – and potentially one of the other agencies may establish a reciprocal arrangement for NRPS and SCFS. Toronto is one example of a jurisdiction having this type of reciprocal arrangement. In Toronto, the police communications center houses backup dispatch facilities for fire and EMS; and the HQ facility for Fire and EMS houses a backup dispatch for the police service. Other examples of reciprocal arrangements include Vaughan and Richmond Hill Fire Departments which serve as backup for one-another; similarly, in Vancouver, where E-Comm and the BC Ambulance Service house backup facilities for one-another.

In this, another factor to consider is the Ontario Building Code (OBC) requirement that new emergency communications facilities be constructed to 'post disaster' standards (i.e., to standards that are more stringent than those applied to conventional facilities vis-à-vis such items as wind load, snow load, earthquake load, etc). By consolidating the two operations in a single building, the total cost to achieve the more stringent standards may be less than if the agencies build separate facilities.

Another option that has been mentioned is to have NRPS or SCFS (or both) co-locate with NACS in the Foster Wheeler building where space may be made available for this purpose. One of the potential advantages afforded by this option is that this facility is already supported by an emergency communications infrastructure which includes 9-1-1, radio and telephone systems. This notwithstanding, we are advised that the building may not be fully compliant with post disaster standards and as such this option may serve only as an interim alternative (albeit it does not preclude a later decision by some or all of the agencies to move to a more integrated operation).

While the timing as such may preclude the four agencies from co-locating in one facility in the near term, they may well wish to consider this option at a later date. Listed below are the potential advantages associated with a co-location arrangement:

- Capital savings for the participating agencies – in terms of facility infrastructure
- Lower rent - depending on the choice of location
- Savings derived by sharing supporting emergency communications infrastructure (9-1-1 lines, radio towers, telephone systems et al)
- Opportunity to identify and jointly address dispatch issues that agencies have in common
- Opportunity to consolidate data sources (mapping)
- Opportunity to improve inter-agency coordination of operations
- Opportunity to share support functions and resources
- Additional financial savings that may be derived by taking advantage of the above opportunities

Potential advantages notwithstanding, it is important to note that physical co-location does not immediately translate to improved operations or enhanced service quality. For example, in both Peel and Toronto (where emergency dispatch services are physically co-located) they continue to operate as though they were situated in separately located facilities, with separate governance structures and mandates, using their respective staffs, training programs and operating protocols to attain / support their individual emergency responder activities (i.e., the Peel and Toronto agencies do not take advantage of the co-location arrangement to pursue the above opportunities).

In this respect, the situation in Denver is slightly better since the agencies not only cohabitate in the same building but are co-located in the same communications center, interacting frequently and therefore are more inclined to jointly pursue issues and opportunities of common interest.

As demonstrated by the research contained in the body of this report, the following factors will increase the likelihood that a physical co-location arrangement will contribute to improved operations or enhanced service quality:

- If mandate by a higher authority
- If the leadership promotes / serves as an example to a change in culture
- If it includes the integration of some of the technology (as in Denver where the agencies share a common CAD)
- If it includes the integration of operations (as per the JFCC in Peel where the communicators are cross-trained to perform multiple dispatch services).

This option may potentially be challenged by labour; however, as demonstrated by services that operate on an integrated basis (Peel JFCC, Halifax IES et al), where there is a collective desire to do so such challenges can be managed.

7.1.5 Integration of Operations

In this option the communications functions of the four agencies would be consolidated into a single service having responsibility to provide 'public safety communications' services to Niagara Region. The consolidated service would operate out of one communications center, under a single governance structure and mandate, with one communicator complement, where some (or all) would be cross-trained in multiple dispatch functions. The consolidated service would operate as one program, with one set of procedures, one set of support resources and a single backup solution. The consolidated service would be supported by one radio system, one telephone system and one or more CADs. Agencies may continue to operate with separate RMS systems.

Provincial constraints may preclude NACS from fully consolidating with the other agencies in the near term; however, this would not prohibit the four agencies from commencing the requisite planning and migration process toward complete consolidation over time.

The following are examples of emergency communications services that successfully operate on an integrated basis providing 'public safety communications' to broad service areas defined by their members' collective jurisdictional authorities: Peel JFCC (fire), Halifax IES (9-1-1, police & fire), E-

Comm (9-1-1, police & fire), Calgary PSC (9-1-1, police, fire & EMS), Portland BOEC (9-1-1, police, fire & EMS) and Fairfax Virginia PSC (9-1-1, police, fire & EMS).

Presented below is a relatively lengthy list of the potential benefits / advantages afforded by these and other “operationally integrated” emergency dispatch arrangements, as derived from on-site visits and discussions. The reader will note that “improving service quality and interoperability of public safety communications” is at the top of the list. This message was repeated frequently, as was the following: the primary objective should not be to save money – that will evolve eventually.

- Improves service quality and interoperability of public safety communications
- Broad (area-wide) focus on public safety communications
- Promotes a coordinated area-wide response to emergencies
- Increased interoperability of communications
- Higher quality / performance (beyond that which agencies may attain on their own)
- Resources focussed to provide service as needed, when needed where needed
- Communications system capable of responding to significant events
- Supports integration of infrastructure, equipment, resources, support and maintenance needs
- Financial savings derived by operating from a single communications center, with one CAD-COM system, one supporting emergency communications infrastructure (9-1-1 lines, radio towers, telephone systems et al), one communicator complement (where some or all of the resources are cross-trained to perform multiple dispatch functions), one oversight complement, and one complement of support resources
- Less data duplication / access to common data e.g., mapping and street addresses
- Ease of information flow from one agency to another, complimenting responder safety and facilitating the work of communicators through system enhancements (drop downs, etc.)
- Ease of information exchange via CAD messaging between terminals
- Strengthens resolve and supports periodic investment in upgrades / supporting technologies
- Supports automatic / mutual aid and interoperability in the field
- Supports inter-agency coordination of field operations.

7.1.6 Backup Dispatch Capabilities

To minimize disruption to critical systems each agency is outfitted with system redundancies, continuity protocols, auxiliary power, technical services support arrangements (in-house or under contract) and other back-up supports. The above notwithstanding, unforeseen events could potentially require that a communications center be vacated, potentially for an extended period.

In this area the client agencies’ respective capabilities vary. NRPS’ backup facility is outfitted with telephone and radio; albeit, call taking and dispatch is carried out manually. In the event of a major outage at NEMS, the communicators will relocate to the Hamilton CACC where they will operate in manual mode. The NFFD’s backup facility is outfitted with a communications console, telephone, 9-1-1 lines and a point-to-point data radio link connecting this site back to the primary dispatch center. SCFS does not currently have a backup dispatch capability. In the event of a major outage, SCFS and their clientele would rely on NFFD and neighbouring emergency services for support; albeit, work is underway to establish an interim backup dispatch facility.

A contemporary view among public safety agencies is that the use of separate backup dispatch centers contributes unnecessarily to duplication of technology, infrastructure, facilities, maintenance and financial requirements. Alternatives that are preferred include: (a) reciprocal arrangements where multiple agencies either house backup facilities for one-another (as in Toronto) or they grant one-another access to work stations within their respective centers during emergencies; (b) establishing virtual server environments where one server may be used primarily for CAD and a second server primarily for RMS, however each one is configured to serve as backup for the other (as in York Region); and (c) establishing a joint use backup dispatch facility.

In consideration of the above, as well as the Client group's interest-in-common to enhance interoperability, partnering in the establishment of a single joint use backup dispatch facility merits consideration in Niagara.

7.1.7 An Optimal Delivery Model for Niagara

An operationally integrated 'Public Safety Communications' model is the one that IBI Group favours as the optimal emergency dispatch delivery system for Niagara – this for the following reasons:

- As demonstrated by the research and assessment carried out in this report (and depicted by the Assessment Summary below), among the options considered this arrangement comes closest to meeting all of the previously recommended attributes for a contemporary emergency dispatch operation.
- This option promotes a relatively lengthy list of potential benefits / advantages (as above).
- This option reflects current trends in major North American municipalities, and in the USA it is the direction promoted by federal and state authorities. IBI Group is advised that in some states, emergency dispatch services will not receive 9-1-1 tax dollars unless steps are taken to consolidate dispatch operations.

Exhibit 7.1
Assessment Summary

Assessment Criteria	Alternative Options			
	1 Status Quo	2 Integration of Technology	3 Physical Co-location	4 Integration of Operations
1. Quality in the Delivery of the Critical Business Functions				
2. Enabled by a Conducive Working Environment, Business Supports and Technological Systems				
3. Communications Function is Adequately Resourced and Staffed				
4. Interoperability of Communications Within and Across Agencies				
5. Backup Solution that will Provide Uninterrupted Services				
6. Cost-Efficient in the Delivery of the Services				
7. Operations are Performance-Based, Accountable and Transparent				
8. Operational Funding is Adequate and Sustainable				
9. Governance Structure that Supports Expedient & Cost-Efficient Delivery of the Services				
10. Progressive / Forward Looking in its Operations				

Does Not
Meet Criterion



Fully
Meets Criterion

As demonstrated by the research contained in this report, it may take a number of years to transition to this model. However, the likelihood of establishing a successful operationally integrated 'Public Safety Communications' model increases substantially when:

- It is mandate by a high level authority
- The participating organizations express commitment and provide clear direction. In Niagara this would include a requirement for support at the local, regional and provincial levels (the latter because of MOHTLC's control and authority over changes that may affect the ambulance dispatch operation)
- There is an executive level sponsor (champion)
- Governance of the newly established organization is aligned to the delivery of public safety communications (i.e., as part of a Police, Fire, EMS and emergency communications public safety continuum)
- Governance is aligned to the delivery of service quality objectives, including consideration of such items as resourcing, access to technology, training et al
- Capital and operating budgets are similarly aligned
- The leadership (among agencies) promotes / serves as an example to a change in culture
- The Director has extensive previous experience as a uniformed officer of an emergency services organization (i.e., establishes trust / confidence)
- Employees and stakeholders are engaged in the change process.

Some may suggest that an operationally integrated 'Public Safety Communications' model will not work in Niagara due to items such as:

- Cultural differences among the agencies
- Concerns over loss of control over dispatch
- Collective agreements that prohibit outsourcing.

To this, IBI Group and others would reply that such concerns are not unique to Niagara. Further, as demonstrated by the above examples of emergency communications services that successfully operate on an integrated basis, where there is a collective desire to do so such challenges can be managed.

Clearly, at the outset there will be many challenges in advancing an operationally integrated 'Public Safety Communications' model, including reaching agreement on technological platforms, cost allocation, training, labour relations et al. Those who successfully deliver such services have stated that "it gets easier as one proceeds" and that they "would never consider reverting back".

7.2 Recommendations

7.2.1 An Optimal Delivery Model for Niagara

1. It is recommended that as a preferred long term direction, the Client group should adopt an operationally integrated “Public Safety Communications” model as the optimal emergency dispatch delivery system for Niagara. The system will include an area-wide radio network and a backup dispatch center.
2. Resolutions signifying local and regional Councils (and Authorities) commitments to the preferred long term direction should be secured. The resolutions should also authorize senior representatives of each of the Client group agencies to work with one-another in the development of a going forward plan.

7.2.2 Governance

3. As an interim governance arrangement, an Advisory Management Board should be established with responsibility to develop a going forward plan. The Board, to be chaired by Niagara Region, will consist of senior representatives of each of the Client group agencies.
4. The Advisory Management Board will also serve as a forum for dealing with matters arising from the implementation and management of the system, including plans that may conflict with the preferred long term direction (i.e., near term plans for new communications facilities, proposed CAD upgrades, etc).
5. It is recommended that a review of the governance arrangement be undertaken in 2 to 3 years.

7.2.3 Moving Forward

6. The provincial government should be informed and invited to participate in the establishment of the Public Safety Communications system. Similarly, key stakeholders and potential partners should be informed and invited to participate (e.g., Niagara Parks Commission).
7. The Advisory Management Board should retain an Executive having previous experience as a uniformed officer of an emergency services organization and applicable personal attributes to lead this initiative on behalf of the Board.
8. On behalf of the Board, the Executive should develop a going forward plan that will identify and address the elements that are integral to the establishment of the proposed Public Safety Communications system, including:
 - Change and risk management
 - Human resources and labour
 - Infrastructure and assets
 - Technology systems
 - Operating model and relevant business processes
 - Inter-agency coordination
 - Communications strategies for dealing with stakeholders, the province and others
 - Identification of potential partners and additional funding sources
 - Identification of early opportunities, time frames and targeted milestones
 - Financial resources (including multi-year budget estimates that align to plan components).