E-DAC Emergency Dispatch Advisory Committee
Powell River Regional District - Electoral Area "E" (Lasqueti)

Final Report

2016-12-29

December 29, 2016

To: Chair Brabazon
Powell River Regional District

On behalf of the Lasqueti Emergency Dispatch Advisory Committee, please find enclosed our Final Report, fulfilling our Terms of Reference.

This report includes our recommended dispatch system for Lasqueti Island emergency services, as well as detailed documentation of the options assessed, methods used to reach our recommendation, and consultation with the Lasqueti community and fire department.

If you require further information, please do not hesitate to contact me.

Sincerely,

Andrew Fall, Chair

Executive Summary

The Powell River Regional District (PRRD) Board established the Lasqueti Emergency Dispatch and Advisory Committee (E-DAC) to research, document and recommend to the PRRD Board an emergency dispatch system to be used by the Lasqueti Island Volunteer Fire Department (LIVFD) that effectively supports public and emergency responder safety and efficacy within Electoral Area 'E'.

This report represents the primary and final deliverable of the E-DAC. The items specified in the committee terms of reference were included in this analysis as "PRRD interests". A rigorous and comprehensive approach was used to compare options that were researched by the committee. As such, this report forms a supporting business case for the recommendation.

The dispatch system recommendation from E-DAC to the PRRD Board is:

Recommendation #1:

THAT the Lasqueti Emergency Dispatch Advisory Committee (E-DAC) recommend to the Powell River Regional District Board to adopt dispatch Option C, as described in the final report from E-DAC.

During its deliberative process, the E-DAC discussed a wide range of issues, and made the following secondary recommendations to the PRRD Board:

Recommendation #2:

THAT the Lasqueti Emergency Dispatch Advisory Committee (E-DAC) recommend to the Powell River Regional District Board to support the adoption of the Incident and Resource Locator Tool by the Lasqueti Island Volunteer Fire Department, as described in the final report from E-DAC.

Recommendation #3:

THAT the Lasqueti Emergency Dispatch Advisory Committee (E-DAC) recommend to the Powell River Regional District Board to continue to communicate with provincial and federal governments regarding inadequate maintenance and investment, and regarding the essential need to ensure reliable and available phone service on Electoral Area "E" for emergency dispatch.

Recommendation #4:

THAT the Lasqueti Emergency Dispatch Advisory Committee (E-DAC) recommend to the Powell River Regional District Board to facilitate changes to Bylaw 391 (Lasqueti Island Volunteer Fire Department Operations Bylaw) to authorize the Lasqueti Fire Chief to appoint fire department members with fire department support roles (i.e. not firefighter or medical first responder roles). Allowing fire department members with fire department support roles would enable the Fire Chief to create a fire department support committee, under the direction of the LIVFD, to provide volunteer assistance for the LIVFD to implement the selected emergency dispatch option, and that can include members with roles of firefighters, local dispatchers, medical first responders and fire department support.

The E-DAC applied an *interest-based process* to seek a solution that is acceptable to all parties (community, LIVFD and PRRD), that included the following basic principles:

- Focus on mutual respect and equality for all stakeholders,
- Focus on interests, not positions,
- Create options for mutual gain, and
- Determine objective criteria.

The stakeholders in this process are the community (who pays for and receives the service), the LIVFD (who volunteers to operationally provide the service) and the PRRD (who administers the service).

Effective and lasting solutions can most effectively be resolved regarding this service using a process based on a principal of fairness, in which all three stakeholder groups are treated with mutual respect as equal partners and with equal importance.

Interests represent goals, and may include aspects of hopes, fears, concerns and priorities. In the context of a dispatch system, objective criteria include legal requirements (statutes, regulations), geographic context (isolation and a low density, dispersed population), and cultural context (ability of Lasqueti taxpayers to pay for service, linkage between community and LIVFD regarding retaining and recruiting members, and demographics).

An interest-based approach represents a win-win (mutual gain) mentality, and is based on cooperative solution seeking. The goal in an interest-based process is to understand the goals of each stakeholder in order to design and evaluate solutions that meet broad acceptability.

In parallel with identifying and documenting interests, the E-DAC researched the statutory and regulatory requirements that must be met by a recommended dispatch system, as well as governance issues and guidelines related to dispatch. The requirements included:

- Intrinsic requirements (based functioning requirements of emergency dispatch),
- Worker safety requirements (Workers Compensation Act and Occupational Health and Safety Regulation),
- Training requirements (Fire Services Act, Office of the Fire Commissioner “Playbook”, Emergency Health Services Act, and Emergency Medical Assistants Regulation),
- Protection of personal information requirements (Freedom of Information and Protection of Privacy Act),
- Emergency communications requirements (Emergency Communications Corporations Act),
- Regional governance requirements (Local Government Act and Regional District Withdrawal Regulation), and
- Minimum legal dispatch requirements (based on legal opinion obtained by PRRD in Feb 2015).

Governance issues included:

- PRRD Bylaws (Lasqueti Island Fire Protection Service Establishment Bylaw No. 341, 2001, and Lasqueti Island Volunteer Fire Department Operations Bylaw No. 391, 2005), and
- Criminal liability issues (Bill C-45).

Guidelines and recommendations included:

- Fire Services Review, 2012,
- Fire Underwriters Survey, 2008, and
- NFPA Standards 1061 and 1221.

The E-DAC researched, documented, estimated costs, and evaluated 5 dispatch options:

- Option A: current system,
- Option B: North Island 9-1-1 system (NI 9-1-1),
- Option C: call centre + VHF radios & pagers,
- Option D: Public Safety Answering Point (PSAP) + VHF radios & pagers, and
- Option E: call centre + VHF radios & pagers + texting.

All options rely on the telephone system for people to call in emergencies, and on BC Ambulance dispatchers for medical emergencies. In addition, these options include the following key distinguishing elements:

- Option A (current system): commercial pagers and local dispatchers,
- Option B (NI 9-1-1): civic addresses, 9-1-1 service provided by E-COMM PSAP, North Island 9-1-1 dispatchers, VHF pagers & radios, and new VHF towers,
- Option C (call centre/VHF): call centre, local dispatchers, VHF pagers & radios, Incident and Resource Locator Tool, new local repeater, fire department support group,
- Option D (PSAP/VHF): same as Option C, except use a PSAP instead of a call centre, and
- Option E (call centre/VHF/text): same as Option C, but also adding text messaging capabilities.

The evaluations indicated that Options C and E would provide the best balance between meeting stakeholder interests. The E-DAC considered that Option E was best viewed as an incremental extension of Option C, and that further consideration of texting capabilities would best be done after Option C was implemented and operating.

This report includes steps that need to be taken by PRRD and LIVFD to implement dispatch Option C. In addition to adopting the recommendations, the PRRD Board would need to include appropriate funding provisions in the budget. Further, the E-DAC recommendation includes a suggested future review to assess how well the system meets objectives, and to make changes as desired or needed.

Also, if the Fire Chief chooses to create a fire department support committee within the LIVFD to carry out the implementation of Option C under his supervision, the PRRD could consider the minor changes to the LIVFD operations bylaw proposed in this report that would allow the LIVFD Fire Chief to create a fire department support committee that can include people with different roles in the fire department (i.e. fire fighters, medical first responders, local dispatchers or fire department support).

However it is structured, the fire department support group, once formed, would prioritize and implement, under the supervision of the Fire Chief, the elements of the dispatch system in a timely manner, but also at a rate that can be absorbed by LIVFD members, in particular the local dispatchers.

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1. Lasqueti Emergency Dispatch Advisory Committee

1.1 Committee Mandate

The Lasqueti Emergency Dispatch Advisory Committee (E-DAC) was formed by the PRRD (see Appendix A for the committee terms of reference) in January, 2016, with a purpose *to research and advise the Powell River Regional District (PRRD) on the best options to implement and support emergency dispatch within Electoral Area 'E'*, with a term ending December 31st, 2016.

The committee's goals are to:

1. *Recommend to the PRRD Board an emergency dispatch system that effectively supports public and emergency responder safety,*
2. *Research and explain all necessary components, and*
3. *Clearly identify all forecasted costs for the recommended system.*

This report represents the primary and final deliverable for the E-DAC. It includes a recommendation for an effective emergency dispatch system, with details for all components, including financial, technical and human resource requirements. It then describes the interest-based, consultative process used to reach a recommendation. The detailed items that the terms of reference specified to be addressed are included in this analysis as "PRRD interests" regarding the dispatch system. A rigorous and comprehensive approach was used to compare options that were researched by the committee. As such, this report forms a supporting business case for the recommendation.

1.2 Committee Composition

The E-DAC membership includes a diverse cross-section of the Lasqueti community, with good representation of the Lasqueti Island Volunteer Fire Department (LIVFD) and three former LIVFD fire chiefs (K. Darwin, R. Thompson and M. Anderson). The members included:

Richard Carlson (LIVFD Fire Chief)
Don Dempster (LIVFD dispatcher and pager coordinator)
Sue Kristinsson (LIVFD dispatcher)
Kristos Seiler (LIVFD firefighter)
Craig Houston (LIVFD first responder)
Karl Darwin
Andrew Fall (chair)
David Slik (secretary)
Ross Thompson (emergency coordinator)
Merrick Anderson (regional director)

The history of emergency dispatch on Lasqueti Island was summarized in the E-DAC interim report (Appendix B). The need for change to the dispatch system was driven by the discontinuation of the Telus pager service in late 2014. The E-DAC was formed as an outcome of discussions and meetings between the PRRD and Lasqueti community.

1.3 Committee Activities

The E-DAC members were informed of their inclusion on the committee on Jan 15, 2016, and the first meeting was held Feb 9, 2016. Committee meetings have been held monthly or bi-monthly. All meetings were open to the public.

Two public fora were held (July 2016 and Nov 2016) to engage with the community. The first public forum was held in the summer to ensure an opportunity for part-time residents (most of whom primarily spend time on Lasqueti in the summer months). This forum provided an opportunity for the community to have input into the process, in particular aspects regarding community interests (which were originally obtained in a community meeting held in May 2015).

The second public forum was held near the end of the process, after the E-DAC had researched options and evaluated options in terms of community interests, but before the E-DAC selected an option to recommend to PRRD. The forum provided an opportunity for the community to have input to the methods used to evaluate options. It also provided an opportunity for interested members of the community to indicate level of support for each option.

Several members of the E-DAC also met with LIVFD to provide an opportunity for input and to revise and confirm the LIVFD interests regarding dispatch (which were originally obtained in a meeting held in May 2015 with the LIVFD).

The E-DAC also undertook a number of activities outside of committee meetings and in-office work to research options, including:

- Mapping some roads, driveways, residences, ponds, waypoints, etc. using a GPS (Global Positioning System) to ensure feasibility and accuracy of the Incident and Resource Locator Tool developed by the E-DAC,
- Testing coverage improvements for a new VHF repeater location,
- Implementing VHF repeater linking to improve coverage,
- Testing cell phone boosters,
- Testing satellite phones, and
- Making a trip from Lasqueti to Sechelt to meet and discuss with a representative from an engineering firm that specializes in local communications systems in isolated areas (DesignIt).

2. Interest-based Process

2.1 Process Rationale

The E-DAC has taken an *interest-based process* to seek a solution that is acceptable to all parties (community, LIVFD and PRRD). The underlying principles of this process derive from *interest-based negotiation*[1], but differ slightly because this process is not strictly a negotiation. The basic principles of an interest-based process include:

- Focus on mutual respect and equality for all stakeholders,
- Focus on interests, not positions,
- Create options for mutual gain, and
- Determine objective criteria.

The stakeholders in the context of the Lasqueti fire protection service in general, and dispatch in particular, are the community (who pays for and receives the services), the LIVFD (who volunteers to operationally provide the service) and the PRRD (who administers the service). Effective and lasting solutions can most effectively be resolved regarding this service using a process based on a principal of fairness, in which all three stakeholder groups are treated with mutual respect as equal partners and with equal importance.

Positions, on the other hand, represent fixed and rigid concepts of outcomes, such as a pre-determined goal regarding the dispatch system. Positions represent a winner-takes-all mentality, and are often based on power and perceived authority. The goal in a positional-based process is to persuade others to accept the position, but the win-lose process often leads to resentment.

Interests represent goals, which are often rooted in human needs[2], and may include aspects of hopes, fears, concerns and priorities. Interests represent the underlying reasons why people or organizations become involved in a conflict. An interest-based approach represents a win-win (mutual gain) mentality, and is based on cooperative solution seeking. The goal in an interest-based process is to understand the goals of each stakeholder in order to design and evaluate solutions that meet broad acceptability.

An interest-based approach naturally leads to development of multiple options for a solution. The process fosters creating, brainstorming and thinking “outside the box”. By developing an objective criteria for evaluating options, options can be compared in terms of how well each meets the stakeholder interests. In the context of a dispatch system, objective criteria include legal requirements (statutes, regulations), geographic context (isolation and a low density, dispersed population), and cultural context (ability of Lasqueti taxpayers to pay for service, linkage between community and LIVFD regarding retaining and recruiting members, and demographics).

2.2 Process Overview

The interest-based process E-DAC has taken involves the following steps (Figure 1):

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[1] 1991.Fisher, R., Ury W., and Patton, B. Getting to Yes: Negotiating Agreement Without Giving in. New York, N.Y: Penguin Books

[2] 1995. Katz, N. and McMulty, K. Interest-Based Negotiation. Available on-line at https://www.maxwell.syr.edu/uploadedFiles/parcc/cmc/Interested-Based%20Negotiation%20NK.pdf

(1) Identify interests of the community, LIVFD and PRRD,
(2) Rank interests in terms of importance,
(3) Design and document options for dispatch systems,
(4) Evaluate each option in terms of how well it meets, or does not need, each interest,
(5) Weight evaluations by interest importance, and obtain an overall option evaluation rating
(6) Compare these option evaluations to a hypothetical "ideal" dispatch system that takes the best ratings from each option (without regard to feasibility),
(7) Choose and vote on one option to recommend to the PRRD Board for approval, and
(8) Document the process and make a recommendation.

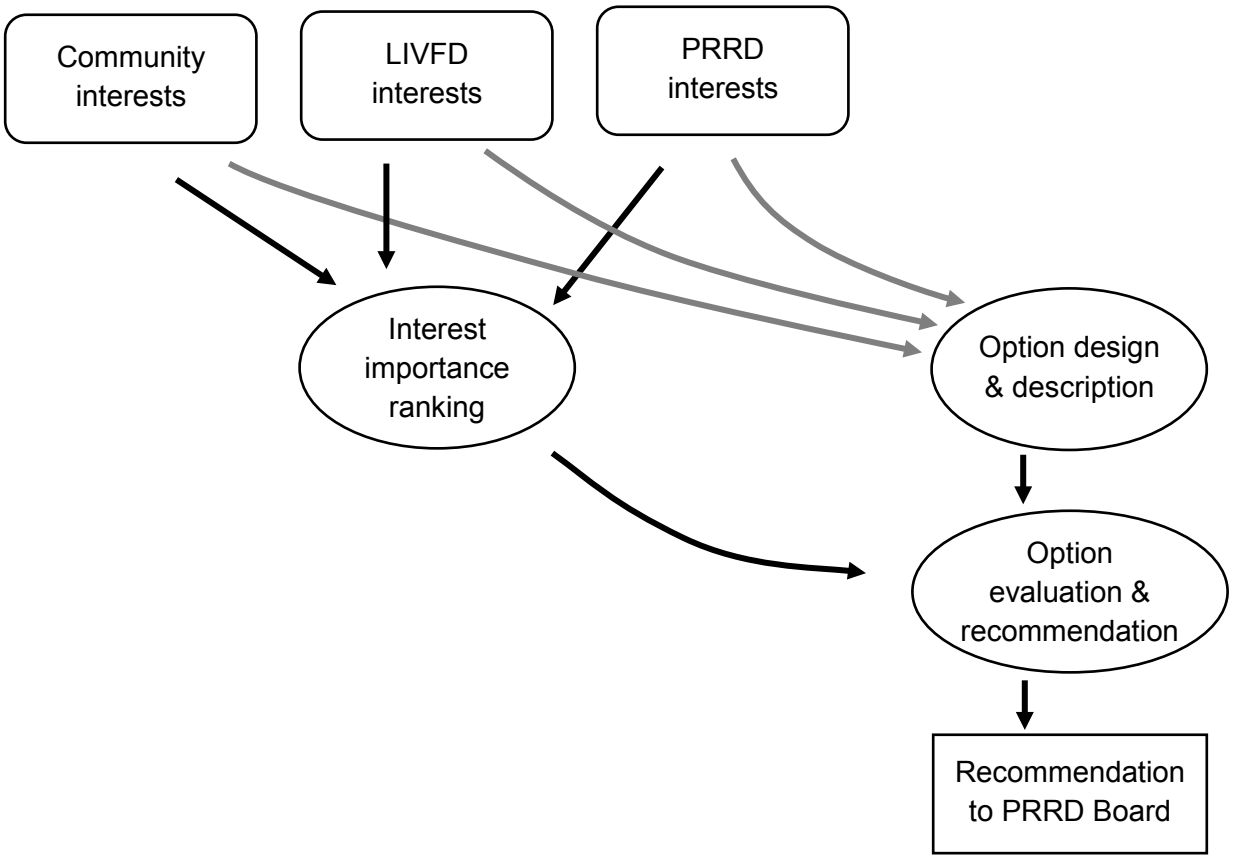

Figure 1 - Process used by E-DAC to reach a recommendation

2.3 Process Implementation

2.3.1 Identify interests of the community, LIVFD and PRRD

A community meeting was held May 2015 to identify community interests regarding the dispatch and communication system used by the LIVFD. These were reviewed by the E-DAC, and confirmed at a public forum held July 2016. Several interests were identified as synonymous and removed, and several were clarified. The forum was also used to

discuss and confirm the importance ranks that the E-DAC assigned to each community interest (see next step).

A meeting was held with LIVFD May 2015 to identify LIVFD interests. A second meeting was held Oct 2016 to revise and confirm these interests.

An initial set of PRRD interests were obtained from the Terms of Reference for the E-DAC (Appendix A). These were sent to PRRD for confirmation.

As interests were often expressed using a simple phrase, it was important for the E-DAC to have a consistent understanding of what exactly an interest represented. An "interpretation" was documented for each interest to clarify, in one or a few sentences, how the E-DAC understood the interest.

2.3.2 Rank interests in terms of importance

Each interest was assigned one of the following importance ranks by individual E-DAC members:

(a) High (3): the interest is critically important to the stakeholder,
(b) Moderate (2): the interest is very important to the stakeholder, but some flexibility is possible,
(c) Low (1): the interest is important to the stakeholder, but either not shared broadly within the stakeholder group, or has substantial flexibility, or
(d) Not applicable (0): the interest is not applicable to the dispatch system.

The values 0-3 represent the weights of each importance rank (as a simple scale from 0 to 3).

The importance ranks from the 10 individual E-DAC members were then combined for each interest to obtain:

(a) Committee importance rank: average of individual ranks from 0 to 3, and
(b) Committee agreement: average difference of individual ranks from the average.

The level of committee agreement helped to identify if there was consensus, near consensus, general agreement or a diversity of views regarding the interest importance. Since interests related to individual values, it was expected that some interests would have a diversity of views given the diversity of the E-DAC membership. However, in most cases, the committee importance rank (average of individual ranks) provided a reasonable measure of relative importance of each interest regarding dispatch.

2.3.3 Design and document options for dispatch systems

The E-DAC process began with two options: the current dispatch system, and the North Island 9-1-1 system. One of the primary tasks of the E-DAC has been to explore alternatives for various aspects of dispatch (call-in, alerting, communications between dispatchers and responders, locating incidents, etc.). As a creative process, a number of elements were researched and discussed by the E-DAC, but discarded as infeasible for various reasons. The interests provided a context to direct research towards solutions to maximize mutual benefit of the stakeholder groups.

In Sept 2016, the E-DAC decided to evaluate 5 options: the two original options plus three variations of locally developed options. In order to facilitate evaluation, each of the 5 options was documented with a focus on technical capabilities and not on details of procedures that are best defined by LIVFD (Chapter 6), as well as the degree to which each interest was met or addressed by each option (Chapter 7). This documentation provides a description of each option from the multitude of perspectives represented by the interests.

2.3.4 Evaluate each option in terms of how well it meets, or does not meet, each interest

Each option was evaluated in terms of how well it met or didn't meet each interest by individual E-DAC members. That is, for each option, each interest was assigned one of the following evaluation ratings:

(a) High (3): the interest would be very well met by the option,
(b) Moderate (2): the interest would be moderately or adequately met by the option,
(c) Low (1): the interest would be poorly met (but still met to some degree) by the option, or
(d) Not met (0): the interest would not be met at all by the option.

The values 0-3 represent the weights of each evaluation rating (as a simple scale from 0 to 3).

The evaluation ratings from the 10 individual E-DAC members were then combined for each interest/option to obtain:

(a) Committee evaluation rating: average of individual evaluation ratings from 0 to 3, and
(b) Committee agreement: average difference of individual ratings from the average.

As with the interest importance ranking, the level of committee agreement helped to identify if there was consensus, near consensus, general agreement or a diversity of views regarding the interest evaluations. Since the degree to which an option meets, or does not meet, each interest is often fairly objective, it was expected that most interests would have general agreement or near consensus among the E-DAC membership. Overall, the committee evaluation ratings (average of individual ranks) provided a reasonable measure of how well the E-DAC believed that each interest would be met by the dispatch options evaluated.

2.3.5 Weight evaluations by interest importance, and obtain an overall option evaluation rating

The interest importance ranks quantify the relative importance of each interest regarding a dispatch system, while the option evaluations for each interest quantify the relative degree to which each interest is met by each option.

One simple, objective way to combine these was to use the importance ranks as *weights* on the evaluation ratings. That is, multiply interest evaluation ratings for each option by the corresponding importance rank.

The resulting weighted evaluation ratings were then summed up over all interests for each stakeholder group to obtain an overall option evaluation rating.

2.3.6 Compare these option evaluations to a hypothetical "ideal" dispatch system that takes the best ratings from each option (without regard to feasibility)

To provide a benchmark against which to compare overall option evaluations, E-DAC defined a hypothetical "ideal" dispatch system as a system that takes the maximum ratings from each option. This ideal system does not represent a feasible solution point because of inherent trade-offs and incompatibilities among some interests with respect to the various options. However, it provided a bar against which options could be compared because it represented an upper limit on option evaluation ratings.

The overall option evaluation ratings were compared with the ideal by calculating the percent to which the option meets the ideal (i.e. divide the option evaluation rating by the ideal evaluation rating).

This comparison against the ideal helped to clarify both how close or far each option was from the theoretical maximum, but also the degree of difference between options.

2.3.7 Choose and vote on one option to recommend to the PRRD Board for approval

The overall evaluation ratings for each option, as well as their comparisons relative to the theoretical ideal, provided objective information with which the E-DAC discussed the relative merits of each option.

The goal of the process was to reach broad agreement through deliberation. A vote was held to identify the level of support for each option. The option with the highest level of support was chosen as the option to recommend to the PRRD Board for approval.

2.3.8 Document process and recommendation

This report provides documentation of the E-DAC process and recommendation. It describes

- the problem being addressed, including the legal requirements,
- the interests of the stakeholder groups, how they were obtained and how they were ranked,
- the options explored, including details of each alternative system, costs, and the degree to which each interest was met,
- outreach to the stakeholder groups,
- the E-DAC evaluation process,
- the E-DAC recommendation, and
- implementation steps and process for the recommended option.

This report also provides a detailed business case for the recommendation by providing a detailed analysis of options in terms of stakeholder interests, in terms of meeting statutory and regulatory requirements, in terms of costs, and in terms of implementation.

3. Stakeholder Interests

3.1 Interests Process

As described in Chapter 2, interests from the community, fire department and regional district were obtained directly from those stakeholders. This chapter documents each interest. The text for each interest was kept close or identical to the way it was expressed by the stakeholders, often using a simple phrase. To help E-DAC members to have a consistent understanding of what exactly an interest represented, an "interpretation" was documented for each interest to clarify how the E-DAC understood the interest. In cases where interests between stakeholder groups were synonymous or very close, a cross-reference was included with one of the interests. Further, in some cases, general text applicable to all dispatch options was included.

3.2 Community interests

3.2.1 Firefighter and first responder safety

The degree to which the dispatch system increases firefighter and first responder safety.

The most significant safety risks associated with LIVFD operations are fire-fighting activities, medical response activities, and vehicle operation. Dispatchers do not experience any of these significant safety risks associated with the execution of their dispatching duties as they can perform their duties from any operational phone wherever they are at the time the system is activated.

3.2.2 Appropriateness of cost/benefit given Lasqueti situation

The relative costs to benefits of the dispatch system given the needs of the community, the remote nature of Lasqueti Island, the size of the population and the ability to pay for the service.

3.2.3 Ensure dispatch involves appropriate training

The degree to which the dispatch system supports and facilitates appropriate training of dispatchers, first responders and firefighters.

3.2.4 Local knowledge

The ability to use LIVFD's local knowledge to dispatch, locate, and respond to incidents. Use of local knowledge is valuable because it increases the effectiveness and appropriateness of emergency response. However, local knowledge can be unavailable, ad-hoc and informal.

Examples of local knowledge include:

- General property location,
- Driving directions to property,
- Driving/access directions to structures,
- Restrictions when accessing property/structures,
- Hazards,
- Nearby firefighting resources, and

- Property owner.

3.2.5 Minimal points of failure

The degree to which the dispatch system has the fewest parts that if they fail, service is disrupted.

3.2.6 Redundancy

The degree to which the dispatch system continues to operate in the presence of failures and faults, including technological failures, operational failures, and human error.

3.2.7 Easy to use and understand

The degree to which the dispatch system can easily be understood by all involved parties, including the public, and the degree to which the system is easy for dispatchers to successfully dispatch firefighters and first responders.

3.2.8 Happy first responders and firefighters

The degree to which the first responders and firefighters are happy with the dispatch system, and feel that it meets their needs.

3.2.9 Local dispatch

The degree to which the dispatch system allows for dispatching to be done by dispatchers on Lasqueti.

3.2.10 Retain B.C. Ambulance understanding about Lasqueti situation

The degree to which the dispatch system allows for the relationship between B.C. Ambulance and Lasqueti LIVFD to be retained for medical emergencies.

3.2.11 Local control

The degree to which a local group (e.g. LIVFD) are able to make decisions regarding management and operation of the dispatch system.

3.2.12 Accessible to all

The degree to which the dispatch system is accessible to all areas of Lasqueti Island where emergency services are provided.

3.2.13 Locate people accurately & effectively

The degree to which the dispatch system is able to accurately and effectively locate incidents.

3.2.14 Not tied to a contract we can’t get out of

The degree to which the dispatch system can be adjusted and changed as needed. Refers in part to the “No Withdrawal" regulation for regional emergency telephone services.

3.2.15 Feedback when a dispatch is successful

The degree to which the dispatch system lets the public calling in know that help is on the way.

3.2.16 Local repairability

The degree to which the dispatch system can be maintained and modified by a local group (e.g. the LIVFD).

3.2.17 Future-proofing

The degree to which the dispatch system can be future-proofed, upgraded, and be resilient to technological changes and changes in needs.

3.2.18 Knowing what we are getting into/committing to

The degree to which the groups responsible for the dispatch system clearly communicate with the community regarding decisions and consequences associated with those decisions.

3.2.19 Simplicity

The degree to which the dispatch system is simple, both with respect to its design and use.

3.2.20 Tax implications & costs

The degree to which the dispatch system requires or avoids high short-term and/or long-term tax costs.

3.2.21 Dispatch recognizes that some people are accessible by trail or water access only

The degree to which the dispatch system recognizes that some residents and locations on Lasqueti Island have no road access.

3.2.22 Equal value and access for everyone

The degree to which all people who pay for the dispatch system receive equal service.

3.2.23 Not dependent on systems that will be non-functional in a disaster

The degree to which the dispatch system will continue to function in the event of a major disaster, such as an earthquake or major storm.

3.2.24 Ability to be involved

The degree to which the public can be involved in decisions that affect the local dispatch system.

3.2.25 Takes advantage of existing local infrastructure

The degree to which the dispatch system uses local infrastructure, such as communication towers, etc.

3.2.26 Avoid intermediaries who may not understand the situation on Lasqueti

The degree to which the dispatch system avoids external dependencies that may not understand or may not be interested in accommodating the situation on Lasqueti.

3.2.27 Being local helps with disaster scenarios

The degree to which the dispatch system assists with local disaster preparedness and response.

3.2.28 Get better telephone system

The degree to which the dispatch system can improve reliability of land-lines or cellular coverage.

3.2.29 Broader questions about how to help LIVFD

The degree to which the dispatch system can assist with other investments needed to help the LIVFD. Does this system fit into/assist with broader strategic planning?

3.2.30 Minimize follow-on implications and obligations

The degree to which the dispatch system minimizes additional requirements that may occur due to aspects of the system or associated contracts or investments.

3.2.31 Don't want to be dependent on Vancouver/Victoria

The degree to which the dispatch system avoids dependencies on the major metropolitan areas (via call routing) that are likely to be overloaded or down in the event of a major event.

3.2.32 Not invest in old analogue system that will need to be replaced

The degree to which the dispatch system avoids use of older technologies that are likely to be retired in the near future.

3.2.33 One point of contact

The degree to which the dispatch system uses a single point of contact (phone number) to call for emergency services.

3.2.34 Retaining the character of the community

The degree to which the dispatch system retains the character of the Lasqueti community.

3.2.35 Retain insurance coverage

The degree to which the dispatch system assists in retaining insurance coverage (e.g. for mortgages) by meeting a sufficient protection grade set by the Fire Underwriters Survey.

3.2.36 Need to recognize that Lasqueti is willing to accept a higher level of risk

The degree to which the dispatch system reflects the attitude of many residents that our community accepts a "higher level of risk" associated with emergencies.

This subject refers to response time which in most cases is determined by ease of access.

3.2.37 Easier than remembering a phone number

The degree to which the means by which the public reaches the dispatch system can be easier than remembering a phone number, for example, having a single button to press.

3.3 LIVFD interests

3.3.1 When reporting a fire, caller should be able to talk to a person

Whether or not the dispatch system provides 24/7 capability by which a caller can directly talk to a person.

3.3.2 Easy to use and understand

The degree to which the dispatch system is user friendly and available to all, including kids, adults, infirm, visitors.

This interest is closely related to the community interest “Easy to use and understand” (section 3.2.7).

3.3.3 Equal provision of service

The degree to which the dispatch system serves all residents equally, subject to local conditions.

This interest is closely related to the community interests “Accessible to all” (section 3.2.12), and “Equal value and access for everyone” (section 3.2.22).

3.3.4 Call-outs (e.g. pagers) that work everywhere

The degree to which system provides good geographic coverage to receive incident alert calls.

3.3.5 Reliable call-outs

The degree to which alerting system provides continuous and resilient coverage.

This interest is similar to the PRRD interest “Effective communications network linking dispatchers and emergency responders” (section 3.4.3).

3.3.6 System should be able to pass reliable messages (numeric or voice)

The degree to which alerting system provides a reliable method to communicate between dispatchers and responders.

This interest is similar to the previous interest as well as the PRRD interest “Effective communications network linking dispatchers and emergency responders” (section 3.4.3).

The ability to pass reliable messages depends on coverage (see LIVFD interest “Call-outs that work everywhere”, section 3.3.4) as well as usability, functionality, training, and reliability.

3.3.7 Effective, easy-to-use home location (with consideration of confidentiality)

The degree to which the dispatch system is able to accurately and effectively locate incidents.

This interest is closely related to the community interest “Local people accurately & effectively” (section 3.2.13).

This interest also adds concerns regarding protection of personal information, as covered by the Freedom of Information and Protection of Privacy Act (FIPPA). Compliance with the provisions of the FIPPA is a requirement (see PRRD interest “Ensure compliance with all relevant statutes and regulations”, section 3.4.17).

3.3.8 Streamlined system: no extra steps

The degree to which the dispatch system minimizes steps needed by callers, dispatchers and responders to use the system.

This interest is related to the community interest “Simplicity” (section 3.2.19), but with a focus on steps required during use of the system.

3.3.9 Secure communication system

The degree to which the emergency communication system protects personal information and privacy.

Protection of personal information is legislated by the Freedom of Information and Protection of Privacy Act (FIPPA). Compliance with the provisions of the FIPPA is a requirement (see PRRD interest “Ensure compliance with all relevant statutes and regulations”, section 3.4.17).

3.3.10 No changes to First Responder dispatch

The degree to which the dispatch system supports the continued role of local dispatchers.

3.3.11 System that functions over the long term (i.e. avoid changing system again in near future)

The degree to which the dispatch system remains stable, with little or incremental change for improvements over time.

3.3.12 Eliminate non-emergency calls

The degree to which the dispatch system reduces likelihood of non-emergency calls, and unnecessary response efforts in case of non-emergency calls.

3.3.13 Maximum local control and ownership (ability to have a voice)

The degree to which local groups (e.g. LIVFD and community) are able to make decisions regarding management and operation of the dispatch system.

This interest is closely related to the community interest “Local control” (section 3.2.11).

3.3.14 Community is happy with service

The degree to which the dispatch system supports good relations with community, implements a service supported by the community, and not get squeezed between community and regional district.

This interest is the complement to the community interest “Happy first responders and firefighters” (section 3.2.8).

The community interests represent the key issues of concern regarding the dispatch system. The better the dispatch system meets these interests, the more the community will support the system.

3.3.15 The system meets PRRD requirements

The degree to which the dispatch system complies with relevant statutes and regulations.

The PRRD requirements were included in the terms of reference for the E-DAC, and represented in the PRRD interests.

This interest is closely related to the PRRD interest “Ensure compliance with all relevant statutes and regulations”, section 3.4.17).

3.3.16 That a community team puts together a reliable system that PRRD will be OK with

The degree to which the dispatch system meets requirements and supports good relations with the regional district.

The PRRD requirements were included in the terms of reference for the E-DAC, and represented in the PRRD interests.

The E-DAC was formed to make a recommendation for a reliable system that meets requirements, as well as meets community, LIVFD and PRRD interests to the degree possible.

This interest is closely related to the PRRD interest “Ensure compliance with all relevant statutes and regulations”, section 3.4.17).

3.3.17 To help increase and maintain LIVFD membership

The degree to which the dispatch system protects firefighters / first responders safety and morale, and supports the degree to which the community is happy with fire service and operations.

Maintaining LIVFD membership is directly linked with the morale and safety of department members. In terms of the dispatch system, this is related to the degree to which LIVFD interests are met, as this represents the issues of concern to members regarding dispatch.

Increasing LIFVD membership is directly linked with the degree to which the community supports the LIVFD. In terms of the dispatch system, this is related to the degree to which community interests are met.

3.3.18 To have adequate resources to implement the service

The degree to which the dispatch system ensures adequate funding and administrative support for the service.

Providing adequate funding to implement the LIVFD operations is a mandate of the PRRD. In principle, the LIVFD operations must be consistent with the related Service Establishment Bylaw. When there are differences, either the bylaw should be changed to reflect operational implementation, or the operations must be changed to comply with the bylaw.

Provided the LIVFD operations are consistent with its Service Establishment Bylaw, the LIVFD needs to ensure that PRRD is informed about the resources required to implement the service. In turn, the PRRD needs to ensure that these resources are included in the annual tax requisition for the service.

This context and process are the same for any dispatch option.

3.3.19 That funding is not lost

The degree to which the dispatch system ensures that funding levels are maintained, that the LIVFD has input to funding needs.

This interest is essentially synonymous with the previous interest. Provided that the LIVFD protection service is consistent with its Service Establishment Bylaw, funding cannot be lost. Funding via the PRRD for the LIVFD would only be lost if the regional service was withdrawn, at the end of a lengthy regional service withdrawal process.

3.3.20 To have clear, feasible service polices to implement

The degree to which the Fire Protection Service Establishment Bylaw is consistent with implementation of fire protection service.

In principle, the LIVFD operations must be consistent with the Lasqueti Island Fire Protection Service Establishment Bylaw No. 341, and the related Lasqueti Island Volunteer Fire Department Operations Bylaw No. 391. When there are differences, either these bylaws should be changed to reflect operational implementation, or the operations must be changed to comply with these bylaws.

Hence, it is important for Bylaws No. 341 and No. 391 to set clear and feasible policies for the LIVFD to implement.

3.3.21 That dispatch service not influence land-use; limit follow-on implications (e.g. changes to road requirements)

The degree to which the dispatch system minimizes additional requirements that may occur due to aspects of the system or associated contracts or investments.

This interest is closely related to the community interest “Minimize follow-on implications and obligations” (section 3.2.30).

3.3.22 Educate public about fire safety (e.g. Fire Smart)

The degree to which the dispatch system supports individual efforts to reduce fire risks.

While safety education is not within the mandate of the E-DAC, the discussions and community engagement over the past two years has elevated the profile of fire and medical safety issues in general.

3.3.23 Need to consider equipment upgrades

The degree to which there is an appropriate cost/benefit allocation for dispatch to maintain options for funding for other department equipment and training needs (e.g. fire-fighting boat for beach fires and waterfront homes that are water access only; or a quad, etc).

There are always tradeoffs and opportunity costs when considering how to allocate a limited resource, such as tax dollars. Hence, this interest is closely related to the community interest “Appropriateness of cost/benefit given Lasqueti situation” (section 3.2.2).

3.3.24 Simplify documentation

The degree to which the dispatch system supports documentation of incident dispatch.

Documentation is an important requirement for emergency response. It is important to help LIVFD in debriefing and operational improvement. Documentation that shows that response was done according to procedures, within the ability of the department given the resources provided and context, is also important to limit liability.

3.4 PRRD interests

3.4.1 Effective support for public and emergency responder safety

The degree to which the dispatch system increases public, firefighter and first responder safety.

This interest is closely related to the community interest “Firefighter and first responder safety” (section 3.2.1). In relation to dispatch, increased public safety risks are primarily associated with delays to emergency response, and risk of no response.

3.4.2 Comprehensive dispatch system description

The recommended dispatch system must be a complete description including usage, operations, infrastructure and costs.

More specifically, the dispatch system description should include (i) public phone number(s) to reach dispatchers; (ii) all costs, for equipment purchasing, training, ongoing maintenance, licences, contracts, professional fees and any other anticipated necessary expenditures for the system's first ten years; and (iii) any major capital items (i.e. communications towers), including anticipated lifecycle and replacement costs.

3.4.3 Effective communications network linking dispatchers and emergency responders

The degree to which the communications network used for emergency response supports communications among LIVFD members.

This interest is similar to the LIVFD interest "Reliable call-outs" (section 3.3.5).

The effective communications network depends on coverage (see next interest regarding coverage) as well as usability, functionality, training, and reliability.

3.4.4 Communications system effectiveness/coverage across the service area

The degree of coverage for communications devices used by LIVFD members.

This interest is closely related to the LIVFD interest "Call-outs (e.g. pagers) that work everywhere" (section 3.3.4).

3.4.5 Meets communications equipment standards

The degree to which the equipment used for dispatch communications meets relevant standards.

3.4.6 Communications equipment redundancies in case of main system failure

The degree to which the dispatch system continues to operate in the presence of failures and faults, including technological failures, operational failures, and human error.

This interest is closely related to the community interest "Redundancy" (section 3.2.6).

3.4.7 Surge capacity for times of major emergencies or disasters

The degree to which the dispatch system will continue to function under high call volumes in the event of a major disaster, such as an earthquake or major storm.

This interest is related to the community interest "Not dependent on systems that will be non-functional in a disaster" (section 3.2.23), but with a focus on the capacity of the system to handle large call volumes rather than on dependencies on components that are relatively more likely to fail in a disaster.

3.4.8 Plan for alternative power supply for all necessary components in case of power failure

The degree to which there is backup power supply available for components of the dispatch system.

3.4.9 Dispatcher training

The degree to which the dispatch system supports and facilitates appropriate training of dispatchers.

This interest is closely related to the community interest "Ensure dispatch involves appropriate training" (section 3.2.3).

3.4.10 Dispatching staffing to ensure 24/7 service

Whether or not the dispatch system provides 24/7 service.

This interest is closely related to the LIVFD interest "When reporting a fire, caller should be able to talk to a person" (section 3.3.1).

3.4.11 Longer term dispatch succession plan

The degree to which the dispatch system supports recruitment and training of new dispatchers to replace retiring dispatchers.

3.4.12 Ensure applicable PRRD obligations to meet Workers Compensation Act Occupational Health and Safety Regulations regarding dispatcher operations

The degree to which the dispatch system supports meeting legal worker safety requirements (statutes and regulations).

The LIVFD is required to meet the provisions of the Workers Compensation Act and Occupational Health and Safety Regulation. There are a range of provisions that must be met in relation to fire protection and emergency First Response services. The LIVFD is obligated to provide working conditions that reduce the risk to personal injury. See Section 5.2 and Appendices C.1 and C.2 for details.

Further, the LIVFD maintains a "joint health and safety committee" at which workplace risks and hazards can be discussed, and solutions identified.

3.4.13 Ensure PRRD obligations are met per Bill C-45 for effective workplace safety

The degree to which the dispatch system meets the provisions of Bill C-45 regarding criminal liability of an organization such as PRRD

The LIVFD is required to meet the provisions of Bill C-45 regarding potential claims leading to criminal liability of an organization such as PRRD. There are a range of provisions that must be met in relation to fire protection and emergency First Response services. Since the LIVFD fire chief "has complete responsibility and authority over the Fire Department, subject to the direction and control of the Board" (Bylaw 391, 2005), he/she should ensure an ongoing workplace health and safety program is implemented for the fire service, which should aim to identify, communicate and reduce workplace hazards. See Section 5.2 and Appendices C.1 and C.2 for details.

Further, it is important for the regional Lasqueti Island Fire Protection Service Establishment Bylaw 341, and Lasqueti Island Volunteer Fire Department Operations Bylaw No. 391 to be consistent with the operations of LIVFD, including the dispatch system. After adopting a recommended dispatch option, the regional board should ensure that these two bylaws are consistent with the dispatch system, and make revisions if necessary.

3.4.14 House numbering or other property/location identifier system

The degree to which the dispatch system is able to accurately and effectively locate incidents.

This interest is closely related to the community interest “Local people accurately & effectively” (section 3.2.13).

3.4.15 Ability to implement any “next generation” communications

The degree to which the dispatch system is able to implement a text message option for hearing impaired, or other media usage (e.g. pictures).

3.4.16 Appropriate dispatch recording practices and records management system

The degree to which the dispatch system includes and supports a dispatch documentation practices and records management system, including maintenance of dispatch personnel, training, and operations (with call times) records, appropriate storage and retention of records, and ensuring privacy concerns are addressed.

This interest is related to the LIVFD interest “Simplify documentation” (section 3.3.24).

3.4.17 Ensure compliance with all relevant statutes and regulations

The degree to which the dispatch system complies with relevant statutes and regulations, including:

- Industry Canada
- *Canadian Radio-television and Telecommunications Commission (CRTC)*
- *Freedom of Information and Protection of Privacy Act (FIPPA)*
- *Office of the Fire Commissioner (OFC)*
- *BC Building Code*
- *Workers Compensation Act*

Under the Office of the Fire Commissioner “Playbook”, LIVFD has been designated an “Exterior Operations Service Level” Department. This service level defines minimum requirements for fire services personnel and department operational competencies. These requirements relate to LIVFD firefighter training and operations, and do not refer to dispatch.

3.4.18 Ensure compliance with any relevant PRRD bylaws and policies

The degree to which the dispatch system is consistent with applicable PRRD bylaws and policies

The primary PRRD bylaw related to dispatch is Lasqueti Island Volunteer Fire Department Operations Bylaw No. 391, 2005, enacted “to provide for the operation of the Lasqueti Island Volunteer Fire Department”. It is very important that the LIVFD operations are consistent with this bylaw. Divergence between LIVFD operations and this bylaw can be resolved in two primary ways: (i) the PRRD board can revise the bylaw to match operations (as may be required for changes to the dispatch system); or (ii) the LIVFD can revise operations to match the bylaw.

4. Interest Importance

4.1 Interest Ranking

The stakeholder interests documented in this Chapter form the basis for assessing the "goodness" of a dispatch option. Provided that a dispatch option meets the intrinsic and legal requirements, and, the better it meets community, LIVFD and PRRD interests, the more likely that option will be viewed as acceptable to those stakeholders. While it is unlikely that any dispatch option can meet all interests very highly, the goal is to seek an option for recommendation that reasonably meets as many interests as possible.

Clearly, not all interests should be treated as having equal importance regarding this evaluation process. Some interests may be relatively more important (or relatively higher priority) because

- they have more widespread support by the stakeholder groups,
- they are likely viewed by the stakeholder groups as more essential (less optional) to meet, and
- they are more directly linked to the dispatch system.

Hence, preferable options will meet the most important interests of all stakeholders reasonably, and as many of the less important interests as possible.

4.2 Ranking Evaluation

The E-DAC assigned "importance ranks" to each interest of each stakeholder group as follows:

(i) Each individual E-DAC member rated each interest as High, Medium, Low or Not Applicable in terms of how important they understood the interest to be for the community/LIVFD/PRRD as it related to the emergency dispatch system.

A High rating was intended for interests that were understood to be critically important (i.e. essentially requirements). A Moderate rating was for interests that were understood to be very important, but perhaps not critical. A Low rating was for interests that were understood to be relatively less important (but still important, as are all interests). "Not Applicable" was for interests that were either not related to dispatch or not affected by the choice of a dispatch system.

(ii) Ratings were converted to numerical "weight" values:

- High = 3
- Moderate = 2
- Low = 1
- Not Applicable = 0

(iii) The average importance ranking across all 10 committee members reflected the general view of the committee. Interests were assigned interpretations (and colours in the tables) based on the average importance rankings as follows:

Interpretation	Average importance value	Colour
• Very important	2.5 or more	green
• Important	2 to 2.5	orange
• Relatively less important	less than 2	blue

(iv) The average deviation (average difference between individual rankings and overall average) reflected the degree of agreement among the committee members. Values were assigned interpretations (and colours) as follows:

Interpretation	Average deviation	Colour
• Consensus	0	green
• Near consensus	less than 0.33	green
• Majority view	0.33 to 0.66	orange
• Diverse views	more than 0.66	blue

The interest importance values, average deviations and interpretations are shown in Tables 1, 2 and 3 for the community, LIVFD and PRRD interests respectively. For each group, interests were sorted according to average importance rating (highest to lowest). The “interest #” corresponds to the sequence interest descriptions in Chapter 3 (i.e. the last part of sub-section numbers).

These importance ratings will now be used as part of the process to assess and compare different options (see Chapter 7).

A preliminary version of the community importance ranks were presented to the community at the July 2016 public forum, and received broad confirmation from the attendees, with two exceptions:

(i) The attendees broadly agreed that the “Local control” interest should have a higher ranking than that assigned by the E-DAC, and

(ii) Several of the interests related to large-scale disasters were seen as synonymous.

To deal with the first item, the E-DAC agreed to evaluate options using different values for the “Local control” interest (e.g. to compare outcomes with the ranking assigned by the E-DAC vs. maximally important). To deal with the latter item, two interests were removed.

4.3 Ranked Interests

4.3.1 Community interests ranking

The ranked community interests are shown in Table 1.

Table 1. Importance rankings for community interests

Interest #	Interest	Average Importance	Committee Priority	Average deviation	Committee Agreement
1	Firefighter and first responder safety	3.0	Very important	0.00	Consensus
2	Appropriateness of cost/benefit given Lasqueti situation	2.9	Very important	0.18	Near consensus
4	Local knowledge	2.9	Very important	0.18	Near consensus
3	Ensure dispatch involves appropriate training	2.8	Very important	0.32	Near consensus
5	Minimal points of failure	2.8	Very important	0.32	Near consensus
6	Redundancy	2.8	Very important	0.32	Near consensus
9	Local dispatch	2.7	Very important	0.42	Majority view
10	Retain B.C. Ambulance understanding about Lasqueti situation	2.7	Very important	0.42	Majority view
7	Easy to use and understand	2.6	Very important	0.48	Majority view
8	Happy first responders and firefighters	2.6	Very important	0.48	Majority view
11	Local control	2.6	Very important	0.48	Majority view
12	Accessible to all	2.6	Very important	0.56	Majority view
13	Locate people accurately & effectively	2.6	Very important	0.56	Majority view
14	Not be tied into a contract we can't get out of	2.6	Very important	0.56	Majority view
15	Feedback when successful dispatch	2.5	Very important	0.50	Majority view
16	Local repairability	2.5	Very important	0.50	Majority view
17	Future-proofing	2.5	Very important	0.60	Majority view

18	Knowing what we are getting into/committing to	2.4	Important	0.48	Majority view
19	Simplicity	2.4	Important	0.48	Majority view
20	Tax implications & costs	2.4	Important	0.48	Majority view
21	Dispatch recognizes that some people are accessible by trail or water access only	2.4	Important	0.60	Majority view
23	Not dependent on systems that will be non-functional in a disaster	2.4	Important	0.60	Majority view
24	Ability to be involved	2.4	Important	0.60	Majority view
22	Equal of value and access for everyone	2.3	Important	0.56	Majority view
25	Takes advantage of existing local infrastructure	2.3	Important	0.42	Majority view
26	Avoid intermediaries who may not understand the situation on Lasqueti	2.3	Important	0.56	Majority view
27	Being local helps with disaster scenarios	2.3	Important	0.56	Majority view
30	Minimize follow-on implications and obligations	2.2	Important	0.64	Majority view
31	Don't want to be dependent on Vancouver/Victoria	2.2	Important	0.80	Diverse views
32	Not invest in old analogue system that will need to be replaced	2.1	Important	0.72	Diverse views
34	Retaining the character of the community	2.1	Important	0.90	Diverse views
28	Get better telephone system	2.0	Important	0.80	Diverse views
29	Broader questions about how to help LIVFD	2.0	Important	0.60	Majority view
33	One point of contact (one phone number)	2.0	Important	0.80	Diverse views
36	Need to recognize that Lasqueti is willing to accept a higher level of risk.	1.9	Relatively less important	0.72	Diverse views
35	Retaining insurance coverage	1.7	Relatively less important	0.90	Diverse views
37	Easier than remembering a phone number (e.g. one button to press)	1.5	Relatively less important	0.60	Majority view

4.3.2 LIVFD interests ranking

The ranked LIVFD interests are shown in Table 2.

Table 2. Importance rankings for LIVFD interests

Interest #	Interest	Average Importance	Committee Priority	Average deviation	Committee Agreement
1	When reporting a fire, caller should be able to talk to a person	2.9	Very important	0.18	Near consensus
5	Reliable call-outs	2.8	Very important	0.36	Majority view
6	System should be able to pass reliable messages (numeric or voice)	2.8	Very important	0.36	Majority view
11	System that functions over the long term (i.e. avoid changing system again in near future)	2.7	Very important	0.42	Majority view
13	Maximum local control and ownership (ability to have a voice)	2.7	Very important	0.42	Majority view
15	The system meets PRRD requirements	2.7	Very important	0.48	Majority view
2	Easy to use and understand (system that is user friendly and available to all, including for kids, adults, infirm, visitors)	2.6	Very important	0.56	Majority view
4	Call-outs (e.g. pagers) that work everywhere	2.6	Very important	0.56	Majority view
7	Effective, easy-to-use home location (with consideration of confidentiality)	2.6	Very important	0.56	Majority view
8	Streamlined system: no extra steps	2.6	Very important	0.56	Majority view
16	That a community team puts together a reliable system that PRRD will be OK with	2.6	Very important	0.56	Majority view
20	To have clear, feasible service polices to implement	2.6	Very important	0.48	Majority view
10	No changes to First Responder dispatch	2.4	Important	0.49	Majority view
3	Equal provision of service	2.4	Important	0.60	Majority view
17	To help increase and maintain LIVFD membership	2.3	Important	0.8	Diverse views
18	To have adequate resources to implement the service	2.3	Important	0.7	Diverse views
19	That funding is not lost	2.3	Important	0.8	Diverse views

9	Secure communication system	2.2	Important	0.32	Near consensus
21	That dispatch service not influence land-use; limit follow-on implications (e.g. changes to road requirements)	2.2	Important	0.64	Majority view
24	Simplify documentation	2.2	Important	0.32	Near consensus
12	Eliminate non-emergency calls	2.1	Important	0.54	Majority view
14	Community is happy with service	1.9	Relatively less important	0.8	Diverse views
23	Need to consider equipment upgrades	1.9	Relatively less important	0.56	Majority view
22	Educate public about fire safety (e.g. Fire Smart)	1.4	Relatively less important	1.4	Diverse views

4.3.3 PRRD interests ranking

The ranked PRRD interests are shown in Table 3.

Table 3. Importance rankings for PRRD interests

Interest #	Interest	Average Importance	Committee Priority	Average deviation	Committee Agreement
1	Effective support for public and emergency responder safety	3.0	Very important	0.00	Consensus
2	Comprehensive dispatch system description	3.0	Very important	0.00	Consensus
3	Effective communications network linking dispatchers and emergency responders	3.0	Very important	0.00	Consensus
16	Appropriate dispatch recording practices and records management system	3.0	Very important	0.00	Consensus
9	Dispatcher training	2.9	Very important	0.18	Near consensus
4	Communications system effectiveness / coverage across the service area	2.8	Very important	0.32	Near consensus
6	Communications equipment redundancies in case of main system failure	2.8	Very important	0.32	Near consensus
12	Ensure applicable PRRD obligations to meet Workers Compensation Act Occupational Health and Safety Regulations regarding dispatcher operations	2.8	Very important	0.32	Near consensus

13	Ensure PRRD obligations are met per Bill C-45 for effective workplace safety	2.8	Very important	0.32	Near consensus
14	House numbering or other property / location identifier system	2.8	Very important	0.32	Near consensus
17	Ensure compliance with all relevant statutes and regulations	2.8	Very important	0.32	Near consensus
8	Plan for alternative power supply for all necessary components in case of power failure	2.7	Very important	0.42	Majority view
10	Dispatcher staffing to ensure 24/7 service	2.7	Very important	0.42	Majority view
5	Meets communications equipment standards	2.3	Important	0.70	Diverse views
18	Ensure compliance with any relevant PRRD bylaws and policies	2.3	Important	0.70	Diverse views
7	Surge capacity for times of major emergencies or disasters	2.0	Important	0.80	Diverse views
11	Longer term dispatcher succession plan	2.0	Important	0.67	Diverse views
15	Ability to implement any “next generation” communications	1.9	Relatively less important	0.54	Majority view

5. Requirements, Governance, and Guidelines

5.1 Definitions

In any emergency response service, it is important to distinguish between *what must be done (intrinsic and legal requirements)* from *what may be done (e.g. guidelines and recommendations)*. *Intrinsic requirements* relate to the basic needs of providing the service (i.e. what is needed for the service to function), while *legal* requirements refer to applicable statutory acts, regulations and other legislation (and related requirements pursuant to those acts, regulations and other legal requirements).

Regional district bylaws define the governance context for a regional service. While these bylaws must be adhered to, the regional district also has the authority to make appropriate changes. Other regional governance issues relate to liability risks.

Guidelines and *recommendations* refer to documents that include expert advice and suggestions (e.g. best practices), but are not required by law.

5.2 Intrinsic Requirements

The *core*, or *intrinsic*, requirements for fire and medical response services in general, and dispatch in particular, refer to the nature of the service. The following are the basic aspects of a general fire and medical emergency response process (Figure 2).

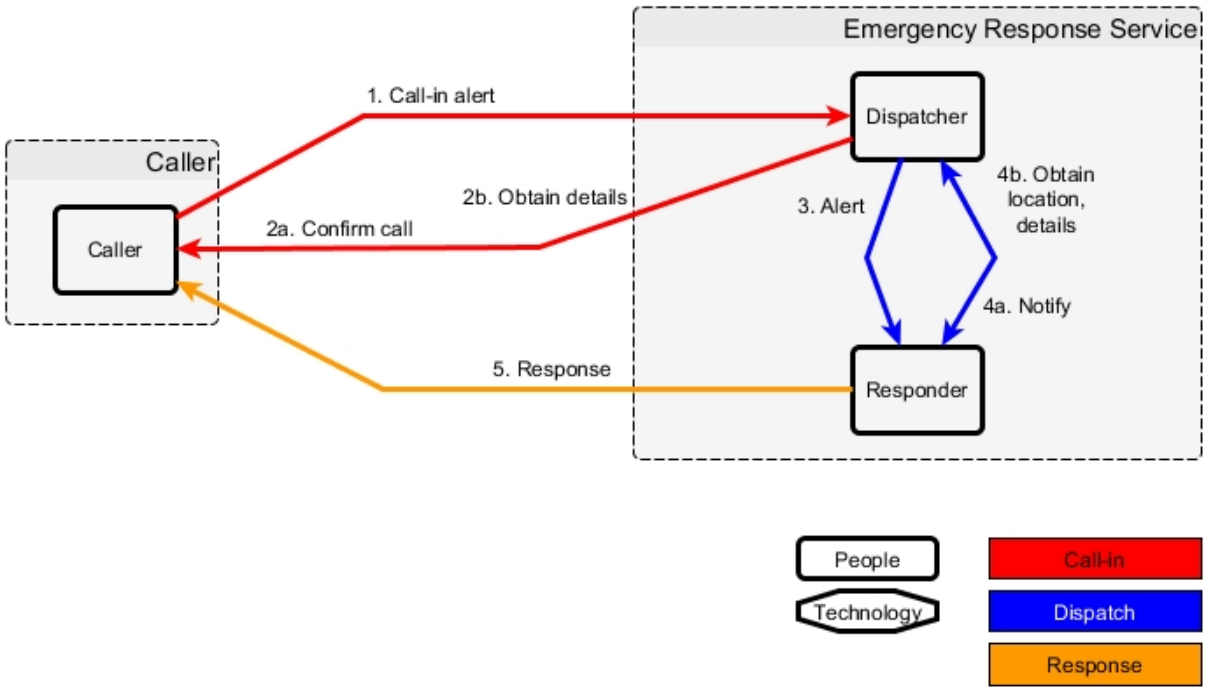

Figure 2 - General fire and medical emergency response process

A. Emergency Incident Call-in (in “red”)

1. When a medical or fire incident is identified by a person, that person (the “caller”) needs to be able to “call in” for help (step 1 in Figure 2). At a minimum this requires a functioning telephone service (land-line, cellular) or a reliable internet service (e.g. for voice-over-internet). Whether by voice or text message, it is critical that a dispatcher can be alerted quickly and reliably about the incident.

2. It is important for the caller to receive confirmation that their call has been received and that help is on the way (step 2a in Figure 2), and that the dispatcher can obtain relevant details regarding the nature of the incident including location and severity (step 2b in Figure 2).

B. Emergency Alerting and Response Notification (in “blue”)

1. When a fire or medical emergency call has been received by the emergency response service, on-duty fire and medical responders need to be alerted about the incident (step 3 in Figure 2).

2. Each available responder needs to notify the dispatcher handling the call that they are able to respond to the call (step 4a in Figure 2), and they need to obtain relevant information and instructions for their initial response actions (step 4b in Figure 2).

C. Emergency Incident Response (“orange”)

1. Once fire and/or medical responders have relevant information about an incident, they can take response actions, such as heading to the appropriate fire hall for appropriate equipment and further instruction (step 5 in Figure 2). Depending on the nature of the emergency, responsibility for directing the response (personnel, resources, etc.) may shift at some point from the dispatcher to the incident commander. This aspect of the emergency response process is outside the mandate of the E-DAC, although the communications tools used are clearly inter-related.

5.3 Statutory and Regulatory Requirements

A number of statutory and regulatory requirements are applicable to emergency services in general, and dispatch in particular. Key statutes, regulations and legislation include:

- Workers Compensation Act and Occupational Health and Safety Regulation (for ensuring LIVFD member safety),
- Fire Services Act and Office of the Fire Commission Playbook (for ensuring appropriate firefighter training),
- Emergency Health Services Act and Emergency Medical Assistants Regulation (for ensuring appropriate medical first responder training),
- Freedom of Information and Protection of Privacy Act (for ensuring protection of private information),
- Emergency Communications Corporations Act (for defining special corporate rules that apply to emergency communications corporations such as the NI 9-1-1 Corporation),
- Local Government Act (for defining authorities, duties and limitations of PRRD),

- Regional District Service Withdrawal Regulation 398/2000 (for defining regional services that cannot be withdrawn), and
- Federal Bill C-45 (for establishing new legal duties for workplace health and safety).

A number of other statutes and regulations also apply, but do not have a direct bearing on dispatch (e.g. Motor Vehicle Act).

In addition, any buildings constructed for an emergency service are subject to the BC Building Code. VHF radio frequency licencing and use must be done according to the requirements of Industry Canada and the Canadian Radio-television and Telecommunications Commission. Applicable aspects of these will be documented with dispatch option descriptions, when appropriate.

5.3.1 Worker safety requirements

The Workers Compensation Act and the Occupational Health and Safety Regulation are the primary legal requirements that must be met in any "workplace" (see Appendices C.1 and C.2 for details). Work Safe BC is the principal organization responsible for enforcing these requirements. In terms of the LIVFD, under the Workers Compensation Act, the PRRD is considered an employer, while the volunteer fire department members (firefighters, dispatchers and first responders) are considered as workers and employees of PRRD under this Act. The Fire Chief is considered a supervisor, and the PRRD Board are considered directors.

Responding to emergencies can be hazardous; so the worker safety laws are designed to ensure that fire department members are properly equipped, properly trained and properly informed. Dispatchers are not typically involved in the most hazardous aspects of operations, but attention must still be made to ensure their safety when performing their duties.

In addition, the LIVFD must maintain a joint health and safety committee compliant with the Act, which provides opportunities to discuss and identify risks, and risk reduction measures. The LIVFD is responsible for identifying, documenting and taking steps to reduce workplace hazards.

Specific to the emergency dispatch system, LIVFD must:

- Ensure equipment meets safety standards, and that dispatchers are informed about proper use, and
- Ensure local dispatchers understand the importance of health and safety in the home environment where dispatch takes place, in particular regarding equipment used for dispatch.

This may include ensuring proper use of communications equipment to minimize fatigue and injury (e.g. from improper posture during communications, or from dangerous placement of electrical cords). The LIVFD can ensure safety of the work environments for local dispatchers through the joint health and safety committee, and site visits where appropriate.

Dispatch options that make use of outside agencies (e.g. E-COMM) would need to ensure that these agencies meet worker safety requirements.

5.3.2 Training requirements

The Fire Services Act[1] and the Office of the Fire Commissioner (OFC) "Playbook[2]" are the primary legal requirements that must be met for fire protection agencies such as LIVFD.

The Fire Services Act defines the authority of the Fire Commissioner regarding investigation, prevention and suppression of fire. According to section 3(3)(b), the Fire Commissioner must "*establish, in consultation with the advisory board and subject to the minister's approval, minimum standards for selection and training of fire services personnel.*" The OFC Playbook fulfils this section, and hence is a legal requirement under this Act, as is made clear on the cover page which states that these training standards are pursuant to the Fire Services Act.

According to the OFC Playbook, each fire department must be assigned a "service level", and the department members must meet the training requirements of the playbook associated with that service level. PRRD has assigned LIVFD as an "Exterior Operations" level service department. The training standards for this service level include a number of sections from NFPA 1001 related to fire incident operations. One item relates to competencies required by firefighters to make proper use of the available safety & communications equipment according to the department's standard operating procedures.

The medical first responder aspect of the LIVFD is governed by the Emergency Health Services Act[3]. This Act defines the purposes of the British Columbia Emergency Health Services Corporation, which includes providing ambulance services and emergency health services, collaborating with local governments to recruit and train emergency medical assistants, making available the services of emergency medical assistants, and recruiting and training emergency medical assistants (section 5.1(1)).

An LIVFD medical first responder is technically an "emergency medical assistant first responder" or EMA FR, according to the Emergency Medical Assistants Regulation[4], which is associated with the Emergency Health Services Act. This regulation specifies the medical response services permitted by medical first responders, and associated licencing and registration requirements.

The Fire Services Act and OFC Playbook do not make reference to dispatch, nor do the Emergency Health Services Act and Emergency Medical Assistants Regulation.

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[1] http://www.bclaws.ca/civix/document/id/complete/statreg/96144_01
[2] http://www2.gov.bc.ca/assets/gov/public-safety-and-emergency-services/emergency-preparedness-response-recovery/embc/fire-safety/playbook.pdf
[3] http://www.bclaws.ca/civix/document/id/complete/statreg/96182_01
[4] http://www.bclaws.ca/civix/document/id/complete/statreg/210_2010

5.3.3 Protection of personal information

The Freedom of Information and Protection of Privacy Act (FIPPA) specifies rights of access to public information (freedom of information), rights of individuals to access and request correction of personal information about themselves, and requirements to prevent unauthorized collection, use or disclosure of personal information (protection of privacy). See Appendix C.3 for details.

In terms of the LIVFD, personal information may be used for locating incidents, and may also be received by responders at an incident during the course of the response operations. At present, the latter situation is handled by LIVFD members signing a non-disclosure statement.

At present, no personal information is used explicitly for locating incidents. The NI 9-1-1 system would use civic addresses to associate people's names and residence locations with their phone numbers, which would be available to agencies involved in providing emergency response. Likewise, a local mapping tool may make similar use by local dispatchers of a "reverse directory" to identify residential structure location information given a person's name or phone number. Both of these cases constitute personal information according to FIPPA, and protection of personal information must be ensured with regard to collection, storage, use, disclosure, security and retention.

5.3.4 Emergency communications

The Emergency Communications Corporations Act[5] defines a corporation as an "emergency communications corporation" if its primary purpose is to provide emergency communications and related services to its members. In this regard, North Island 9-1-1 would be considered an emergency communications corporation.

According to section 6 of this act, emergency communications corporations must hold radio licences for its members. Specifically:

Corporation must hold transferred radio licences

6 *(1) Subject to the applicable federal legislation, a member of an emergency communications corporation must assign or transfer to the emergency communications corporation all licences and authorities for radio spectra held by the member that are related to the services that the corporation provides to the member.*

(2) Subject to the applicable federal legislation, an emergency communications corporation

(a) must acquire and hold the licences or authorities for radio spectra assigned or transferred under subsection (1), and

(b) must manage and allocate the use of those spectra.

[5] http://www.bclaws.ca/civix/document/id/consol21/consol21/00_97047_01

5.3.5 Regional governance

The Local Government Act (LGA)[6] is the primary statute that governs regional districts. The LGA specifies that most regional services, including the Lasqueti Fire Protection Service, require "service establishment bylaws" The LGA also specifies the process by which regional service establishing bylaws are approved, changed and withdrawn (Part 10).

In addition, the LGA defines the relationship of legal proceedings to regional districts (Part 18). Of relevance, this part specifies that no action for damages may be instituted against "local public officers" (including PRRD directors, officers and employees, and members of LIVFD):

> *(a) for anything said or done or omitted to be said or done by that person in the performance or intended performance of the person's duty or the exercise of the person's power, or*
> *(b) for any alleged neglect or default in the performance or intended performance of that person's duty or the exercise of that person's power.*

unless:

> *(a) the local public officer has, in relation to the conduct that is the subject matter of the action, been guilty of dishonesty, gross negligence or malicious or wilful misconduct, or*
> *(b) the cause of action is libel or slander.*

This does not absolve the PRRD as an entity from "*vicarious liability arising out of a tort committed*" by one of these individuals, but it does mean that liability related to regional services is only an issue for individuals if they are found guilty of dishonesty, gross negligence, malicious or willful misconduct, libel or slander.

5.3.6 Withdrawal of regional protective services

The Regional District Service Withdrawal Regulation (BC Reg. 398/2000),[7] associated with the Local Government Act, states:

Services that are not subject to withdrawal

1. *The following services are exempted from withdrawal under Division 4.5 [Dispute Resolution in relation to Services] of Part 24 of the Local Government Act:*
(a) an emergency telephone system, including an emergency 911 system;
(b) a transit service;
(c) a regional parks service established under the Local Government Act;
(d) the service of the regulation, storage and management of municipal solid waste and recyclable material.

As a consequence, if a regional emergency telephone service is adopted for Lasqueti, such as the NI 9-1-1 system via the proposed bylaw 317.1 "Powell River Emergency Telephone Extended Service", it could never be withdrawn according to the above regulation. A service that has no option for withdrawal warrants extra care during

[6] http://www.bclaws.ca/civix/document/id/complete/statreg/r15001_00
[7] http://www.bclaws.ca/Recon/document/ID/freeside/72_398_2000

establishment to be sure that all other options have been explored, in particular other options to which this regulation does not apply. Note that this regulation refers to withdrawal of regional services, and does not limit potential for making alterations to the referenced types of services.

5.3.7 Minimum dispatch service requirements

In Feb 2015, PRRD staff sought a legal opinion regarding the minimum dispatch service that LIVFD is legally obligated to provide (Appendix D). In this legal opinion, the lawyer addressed three questions. The E-DAC understanding of the responses to these questions will be addressed in reverse order from the legal memorandum.

(a) Who will be liable if the LIVFD is negligent in implementing a dispatch service?
The legal opinion was unsurprising: the PRRD is liable for negligence if bylaws are broken by their regional service operations. This highlights the importance of ensuring consistency between the service establishing bylaws and the service operations.

(b) Can the Board prescribe a standard of dispatch that is different from NI 9-1-1?
The answer states clearly that “the board may prescribe or allow different dispatch services”, or “allow the Fire Chief to choose a different type of dispatch service”. This can be done by amending Bylaw 391, which would seem to be a logical remedy if that item is a perceived source of liability risk.

(c) What is the minimum dispatch service that the LIVFD must provide?
The legal opinion states that “In the case of volunteer fire departments, there is no minimum level of service provision.” The legal opinion goes on to state "The writers were unable to identify any statute or regulation that prescribes a level of dispatch service", and further “The B.C. Court of Appeal has found that the duty of care for a volunteer fire department and its members is that "with the resources available to them, they will do their best to put the fire out."” and “the Court will not interfere with the level of service prescribed by the Board so long as the decision is reasonable”. In other words, the NI 9-1-1 service is not a requirement, and other options for dispatch are legally feasible and would pose no particular legal risks. This is supported by the legal opinion which states “our advice can be that the Board may consider alternative dispatch services.” This latter statement provides an endorsement of the E-DAC process established by the PRRD Board to compare options, one of which is NI 9-1-1.

The cover letter for the legal opinion provides some guidance as how PRRD may change the dispatch service on Lasqueti: “The PRRD Board can amend Bylaw No. 391 if it wishes to change the dispatch services to Lasqueti Island. By doing so, the Board could enact presumably a lower or different standard for fire dispatch on Lasqueti Island.”

5.4 Regional District Governance Issues

5.4.1 Regional Fire Protection Service establishment bylaw

The LIVFD service is created by two PRRD bylaws:

(a) "*Lasqueti Island Fire Protection Service Establishment Bylaw No. 341, 2001*" (see Appendix E.1) is the effective establishing bylaw for the Lasqueti fire protection service. Bylaw No. 341 essentially modified and replaced "*Lasqueti Island Fire Protection Area Establishment Bylaw No. 50, 1976*", and defined the area covered by the service (most of Electoral Area "E"); and the tax requisition details and limits.

(b) "*Lasqueti Island Volunteer Fire Department Operations Bylaw No. 391, 2005*" (Appendix E.2) defines the structure and operation of the LIVFD, based on the Fire Protection Service Establishment Bylaw No 341. Bylaw No. 391 states that LIVFD "shall operate in accordance with the provisions of this bylaw". This bylaw defines the Fire Chief as an officer of the PRRD, and defines member appointments and qualifications, authority and responsibilities of the Fire Chief, and some operational authorities of the LIVFD.

The only references to dispatch in either of these bylaws is in Bylaw No. 391, Schedule D (Fire Department Administrative Responsibilities), Communications:

- *Maintenance of alarms and dispatch apparatus in proper working order.*
- *Preparation of specifications for new communication systems and additions to existing communication systems which are compatible with NI911 dispatch services.*

5.4.2 Criminal liability issues

Bill C-45 amended the Canadian Criminal Code to enable the Crown to apply criminal liability to organizations, including regional districts, when criminal liability is committed in the context of the organization (see Appendix E.3 for details). Bill C-45 deals only with the criminal responsibility of an organization and makes no change in the current law dealing with the personal liability of directors, officers and employees. Bill C-45 provides that an organization is responsible for the negligent acts or omissions of its representatives.

Bill C-45 established a legal duty for all persons "directing the work of others" to take reasonable steps to ensure the safety of workers and the public. Bill C-45 is additional to the Occupational Health and Safety Regulation (enforced in BC by WorkSafeBC). The federal government has commented that "*the criminal law must be reserved for the most serious offences, those that involve grave moral faults... The Government does not intend to use the federal criminal law power to supplant or interfere with the provincial regulatory role in workplace health and safety*."

Organizations can limit liability and reduce the chances of being charged under the provisions of the Criminal Code by implementing an effective workplace health and safety program. To minimize exposure under Bill C-45, the PRRD should ensure:

- employees, directors and volunteers are properly informed about the legal obligations of the PRRD under the Occupational Health and Safety Regulation,
- workplace health and safety programs are implemented that cover all relevant regional services. Separate programs may be needed for some services, and
- there is ongoing effort by employees, directors and volunteers to identify and reduce workplace hazards, and opportunity to communicate concerns about workplace hazards.

The Lasqueti Fire Protection Service is managed by the Fire Chief who is an officer of the PRRD and "*has complete responsibility and authority over the Fire Department, subject to the direction and control of the Board*" (Bylaw No. 391, 2005). As such, the Fire Chief should ensure an ongoing workplace health and safety program is implemented for the fire service, which should aim to identify, communicate and reduce workplace hazards.

As part of the fire department, local dispatch should be included in the fire department workplace health and safety program. In addition:

- the dispatch system should be designed and implemented to meet the Occupational Health and Safety Regulation, and
- the service establishment bylaw should be revised to be consistent with the adopted dispatch system.

5.5 Applicable Guidelines and Recommendations

5.5.1 Fire Services Review

In 2012, PRRD undertook a formal and comprehensive review of regional fire services[8]. As stated in the introduction, the Lasqueti (and Savary) fire departments "*have focused on developing and delivering an emergency service (fire and medical) which best suits the respective demographics, access by water, road networks and water supplies. This has required improvisation and ingenuity and both have developed locally-respected services.* "

The only references related to LIVFD dispatch were:

- "*Lasqueti Island does not utilize the PRRD's 911 emergency telephone service, or participate with a central dispatching service.*" This was followed by a description of the fire and medical call-in process.
- "*Use of the fire department's radio system is reported as good, but with some 'dark' areas*"

The service review identified and prioritized "*several risk exposures*" (page 36). These identified risks did not mention dispatch, and primarily related to bylaw gaps (e.g. lack of specifying medical fire responder services), aging fleet, Occupational Health and Safety program, and records management.

The service review also made some suggestions regarding "*recruitment and retention difficulties expressed by all PRRD departments.*" Notable items were related to insurance coverage for firefighters, coverage of mileage at the same rate as paid PRRD staff, coverage of expenses incurred during training, developing an honorarium structure (e.g. based on participation in practices and emergency calls), and providing fire chiefs and deputies with Smart Phones.

[8] 2012. Powell River Regional District, Fire Services Review, by MJ (Jack) Blair Services. 66pp.

The review concluded with a number of recommendations. Relevant recommendations included:

- Review incentives and honorarium structure for all departments and develop policies,
- Develop public information brochures explaining levels and limits of PRRD fire service and fostering volunteerism, use of house numbers, fire safety tips, etc,
- Acquire a records management system as a software item or as a service provided by dispatch, and
- Develop and provide detailed area mapping to all departments showing house numbers, road names and boundaries.

5.5.2 Fire Underwriters Survey

In 2008, a Fire Underwriters Survey (FUS)[9] was done to evaluate LIVFD fire protection service, with a purpose "*to determine whether the community's current fire insurance grading classifications are representative of the fire protection programs and fire protection resources that are currently place within the community."*

It is important to note that the FUS was done by and for the insurance industry, with the main objective being to set gradings used by member insurers for insurance provision and rates.

The primary outcome of the FUS is to set Public Fire Protection Classification (measure of overall program of fire protection) and Dwelling Protection Grade (measure of ability of fire department to control or extinguish fires in small buildings). The Public Fire Protection Classification includes fire services communications (10%) in conjunction with operations, fire safety control in the community and water supplies. The Dwelling Protection Grade includes benchmarks for fire department organization, membership, training, apparatus, fire suppression capability and alarm notification.

For a Dwelling Protection Grade 4 (semi-protected), a minimum of 10 volunteer firefighters (fully equipped) are required per fire station. At the time of the FUS, LIVFD had 11 firefighters. Hence, the FUS was not able to recognize the two fire halls. Assuming that at least 10 firefighters would be located at the North fire hall, the FUS assigned the area within 8km by road of that hall a provisional Dwelling Protection Grade 4 (semi-protected), and a provisional Public Fire Protection Classification of 9 (out of 10). The remainder of Lasqueti was assigned a Dwelling Protection Grade 5 (unprotected; lowest grade) and a Public Fire Protection Classification of 10.

However, the provisional classifications were later revised to Dwelling Protection Grade 5 (unprotected) and a Public Fire Protection Classification of 10 everywhere on Lasqueti, as stated in the 2012 PRRD Fire Services Review: "*The fire suppression area is currently classified as "Unprotected" because the department cannot comply with the Fire Underwriters' Survey requirements. In order to comply, a structural fire department must meet specific firehall, apparatus, manpower and operational requirements. There is very little likelihood (nor is there any local expectation) of classification as "protected".*"

[9] 2008. Fire Underwriters Survey. Review of Fire Protective Services for Fire Insurance Grading, Lasqueti Island, BC. 98pp

The FUS notes that "*the strength of fire defence within a community depends largely on the will and financial ability of the community to support this emergency service."*

A secondary objective was to make recommendations for improvements to the fire protection service, as well as future assessments of fire insurance grading classification. Recommendations related to dispatch included:

- Develop fire department standard operating guidelines and administrative documents,
- Improve available the fire force to meet minimum requirements.
- Develop a training curriculum and use a database to monitor progress,
- Change to a emergency communications centre based system in accordance with NFPA 1221, or contracting this service to a nearby communications centre,
- Implement 9-1-1 emergency call service,
- Train dispatchers to NFPA 1061 standard, and
- Develop a proper structure for communications repeater.

In regard to emergency communications in general, the FUS noted that they considered the current emergency system to be unreliable for notification and dispatch because of minimal levels of redundancy. The FUS also noted that "*electricity would be required consistently*."

5.5.3 NFPA Standards (NFPA 1061 and 1221)

The National Fire Protection Agency (NFPA) establishes a wide range of standards to serve as guidelines for fire protection related issues. In some cases, sections of NFPA standards are referenced in statutes and associated regulations and requirements (e.g. sections of NFPA 1001 related to firefighter training are established as requirements in the Office of the Fire Commissioner Playbook, pursuant to the Fire Services Act).

NFPA 1061[10] relates to professional qualifications for dispatchers that work in emergency communications centre based systems, such as the NI 9-1-1 dispatch centre in Campbell River. For distributed, local dispatchers, such as the current system on Lasqueti, this standard provides some useful information that may provide guidance to improve dispatcher performance, and should be considered during implementation and dispatcher training for the recommended dispatch option.

NFPA 1221[11] relates to emergency communications systems. Large emergency communications institutions, such as E-COMM, aim to meet this standard. This standard may provide some useful guidance for small-scale, local emergency communications systems, such as some of the options explored by the E-DAC, and should be considered during implementation if such options are recommended.

[10] NFPA 1061 Standard for Professional Qualifications for Public Safety Telecommunicator
[11] NFPA 1221 Standard for the Installation, Maintenance, and Use of Emergency Services Communications Systems

6. Options

6.1 Local Mapping for Emergency Dispatch and Response: Incident and Resource Locator Tool

6.1.1 Background on the need for an incident locator tool

The physical geography and pattern of residential structures poses a number of challenges to locating emergency incidents on Lasqueti, including:

- no street or civic addresses,
- long, narrow, unpaved driveways in heavy forests, which limits visibility of structures, and
- many shared property arrangements, with multiple residences accessed from a shared driveway network.

To address these challenges, an *incident and resource locator tool* could help fire department personnel to identify:

(a) The location of a reported incident,

(b) The access route for firefighters and First Responders to reach the incident,

(c) Nearby resources (e.g. ponds and other water sources), and

(d) Nearby risks (e.g. location of propane tanks, tight turn-arounds).

As in any rural community, local knowledge about incident location, access, and characteristics of the incident location are very important. An *incident and resource locator tool* should enable and support use of local knowledge when available, but should not be reliant on local knowledge to support situations for which local knowledge is lacking.

Since the E-DAC mandate relates to dispatch, the focus in this document is from the perspective of dispatchers. However, the tool described could also be utilized by responders using mobile devices in response vehicles.

6.1.2 Civic addresses in the rural context of Lasqueti

Civic addresses assign a unique street number + street name for each property parcel or residential structure. At present, while all public roads on Lasqueti are named, there are no civic addresses.

Civic addresses can be useful to identify emergency locations in specific, generally urban, contexts where the primary challenge for dispatchers and responders is to identify the location where the private driveway to access the incident joins the public road. This is the case for urban environments, where there may be many alternate routes from a fire hall to the start of a private driveway, but once at the driveway, the structure is clearly visible or identifiable.

The benefit of civic addresses is not as high in many rural contexts, including most of Lasqueti. On Lasqueti, it is relatively straight-forward to identify the route from either fire hall to the start of the private driveway at the public road because (a) the simple road network has no loops, and so there is only one way to go from each fire hall to the start of a driveway, and (b) the low population density means that there are few driveways between known points (e.g. between public road junctions, or along the many short, dead-end roads). The primary challenge for dispatchers and responders on Lasqueti is to locate residential and other structures along private driveways, in part because:

(a) There are a number of properties with shared ownership by multiple owners. These may

have a single civic address or one address per house, but access is commonly along long private, branching driveways. Civic addresses alone are not sufficient.

(b) Some large, single owner properties have multiple structures, also accessed from long, branching driveways. A civic address would help to reach the start of such a driveway, but would be of limited utility to reach structures within such large properties.

While civic addresses seem to meet some of the needs for incident location, they are inadequate in the rural, low-density context of Lasqueti. Further, there is a need for locating nearby resources (e.g. water sources), risks (e.g. steep hills, tight turnarounds) and other characteristics of an incident location (e.g. whether building materials have low or high flammability).

6.1.3 Goals of a locally developed incident and resource locator tool

Purpose: To identify locations of structures for fire and medical emergencies, as well as nearby resources and risks, given information provided from an incident call-in (e.g. resident name, phone number, structure identifier, lat/long, etc.).

Specifically, the tool should include a variety of spatial and non-spatial information, including:

- Roads (public and private) and trails,
- Waypoints (e.g. key road junctions),
- Structures (residential, public, etc.),
- Resources (e.g.. ponds, wells, ocean water access),
- Risks (information about location and size of propane tanks, turnaround potential), and
- Other relevant information (e.g. primary building materials).

Further, a tool should be simple to use, operate stand-alone (i.e. not depend on an internet connection) and protect personal information.

6.1.4 Steps for development and potential adoption of a local mapping tool

The following are the general steps for the development and deployment of an incident locator and resource mapping tool:

(i) Research and development,
- evaluate alternative options,
- develop prototype tool,
- develop procedures to gather required data and meet FIPPA,
- develop a draft notification for use if personal information is to be collected, and
- develop a draft Privacy Impact Assessment for use if tool is adopted.

(ii) Tool evaluation
- LIVFD dispatchers to assess utility and limitations, and degree to which it meets related interests,
- LIVFD responders to provide feedback, and
- community to assess if it meets related interests.

(iii) Decide whether or not to adopt use of tool
- E-DAC to decide whether or not to recommend adoption of tool,
- LIVFD to decide whether or not to they would like to adopt use of tool, and
- PRRD Board to decide whether or not they support LIVFD adoption of tool.

(iv) Fully implement tool
- develop and submit Privacy Impact Assessment to Information and Privacy Commissioner,
- send notification / request to residents,
- collect remaining GPS data, plus names and phone numbers, and
- construct fully functional version of tool, including validation and correction of spatial information.

(v) Integrate tool with LIVFD operations
- develop procedures and training material,
- conduct training session,
- modify confidentiality agreement, and
- distribute to appropriate LIVFD members.

6.1.5 Prototype Incident and Resource Locator Tool

To address the needs for incident, resource and risk location during emergency response, the E-DAC developed a tool using Keyhole Markup Language (KML) that can be loaded into Google Earth. This tool combines the freely available and powerful imagery available in Google Earth with spatial information specific to emergency response on Lasqueti, while protecting personal information. The prototype has been developed by volunteer efforts at no cost, and can be fully built-out and maintained by volunteer effort at little to no cost.

The following sub-sections describe relevant aspects of this tool.

6.1.5.1 Structure locator identifiers

Each residential and other important structure is assigned a unique identifier, to be displayed in Google Earth, and that supports spatial searching. To balance ability to make use of local knowledge with spatial accuracy and parsimony, E-DAC developed a 3-level identifier system that combines “sector number” (Lasqueti divided into 6 large sectors based on main road system and junctions), “neighbourhood number” (Lasqueti divided into about 30 neighbourhoods with a group of structures that have some commonality regarding access and resources) and “structure number” (number of structure within neighbourhood) (see Appendix F.1).

Hence, the “structure locator identifier” assigned to each residential and other important structure on Lasqueti has the form:

Sector# – *Neighbourhood#* - *Structure#*, where

i) Sector# is a number from 1 to 6 to denote the general area of Lasqueti (e.g. Northwest: Spring Bay),

ii) Neighbourhood# is a number from 1 to 34 to denote the local neighbourhood of the structure (e.g. Grant Road), and

iii) Structure# is a number from 1 to about 20 (depending on the neighbourhood) that enumerates the structures within each neighbourhood.

For example, structure locator identifier 1-3-14 means: structure 14 in neighbourhood 3 (Scotty Bay) in sector 1 (Northwest: Spring Bay). This meets the need of being concise (at most 5 digits to uniquely identify any structure) and capable of utilizing local knowledge (users can

easily learn the 6 sectors, and would likely become familiar over time with the 30+ neighbourhoods). Further structure locator identifiers are compatible with the (disaster) emergency plan managed by the Lasqueti Emergency Coordinator.

6.1.5.2 Non-personal spatial information

The following non-personal spatial information can also be useful in emergency incident location and response:

- Roads and trails, including private driveways,
- Waypoints (i.e. key references points), including key road junctions, fire halls, etc.,
- Structures, including residences, public buildings, reference buildings (e.g. barns), etc., and
- Resources, in particular water sources, including ponds, wells, ocean water access, etc.

In addition, related non-spatial, non-personal information may include the location and size of propane tanks, turnaround potential at road access, building materials, and, equipment that may be available at incident, etc.

This spatial information can, and has been, obtained from several sources, including

- Elements visible in remote sensing imagery in Google Earth (e.g. some sections of roads, some structures, some ponds, etc.),
- GPS data collection (local volunteers collecting GPS tracks on roads, as well as point locations of structures, ponds, waypoints, etc.),
- Digital Road Atlas, and
- Local knowledge.

A KML (Keyhole Markup Language) file was developed using this information that was designed to be automatically loaded into Google Earth (or other tools that can load KML files). Different colours and icons were used to distinguish features (e.g. house symbols for structures, water symbols for water sources). Some information was designed to be displayed by default (e.g. primary road network and waypoints), while other information was designed to be enabled when needed (e.g. details within a neighbourhood containing a target structure).

Users can search and automatically zoom to an area with a target structure, or pan and zoom manually. Users can display detailed information about structures, resources, etc. simply by checking the appropriate box in the list of sectors, neighbourhoods, structures and resources. Users can also display text information about structures and resources simply by clicking on its spatial icon.

The preliminary information in this tool was developed and validated using GPS mapping data collected by the E-DAC, the provincial Digital Road Atlas and local knowledge (see Appendix F.2).

The following figures illustrate use of the Lasqueti emergency routing finding KML file in Google Earth. Figure 3 shows the route to structure 6-28-8 (sector 6 Southeast: Firehall #2 to Squitty Bay; neighbourhood 28 Grant Road; 8th structure), as well as the nearest pond water source. Figure 4 shows all information for the neighbourhood, including other structures, road forks and ponds. Figure 5 is a close-up of this neighbourhood information, clarifying details of access and resources near structure 6-28-8. Figure 6 shows example text information that can be included with structures, water sources, forks, etc., and displayed by clicking on the relevant icon.

Figure 3 - Lasqueti Mapping for Emergency Route-finding: routing to structure 6-28-8, as well as nearest water sources.

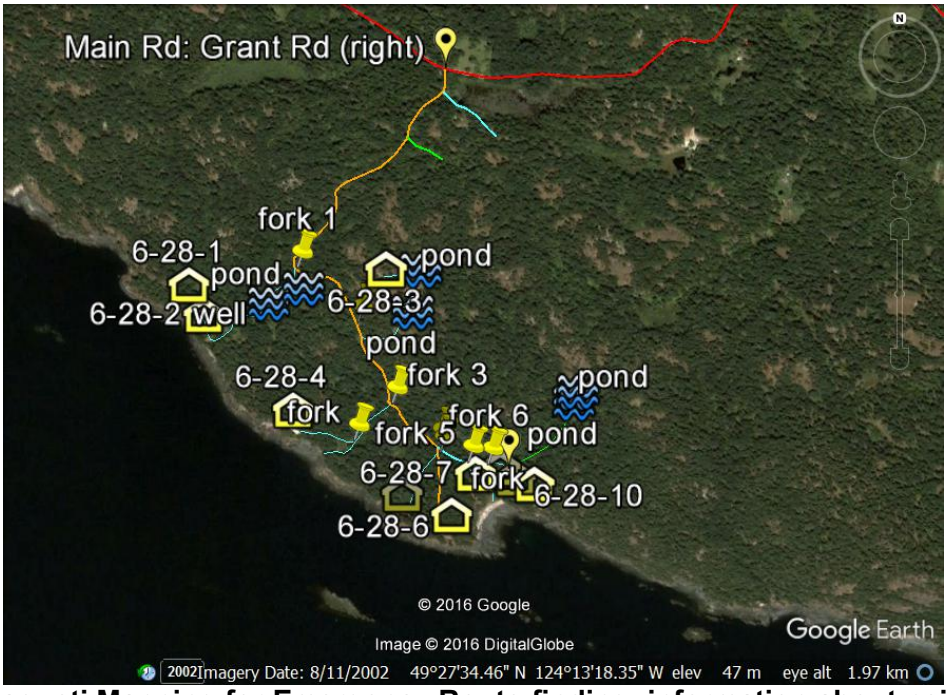


Figure 4 - Lasqueti Mapping for Emergency Route-finding: information about neighbourhood of structure 6-28-8.

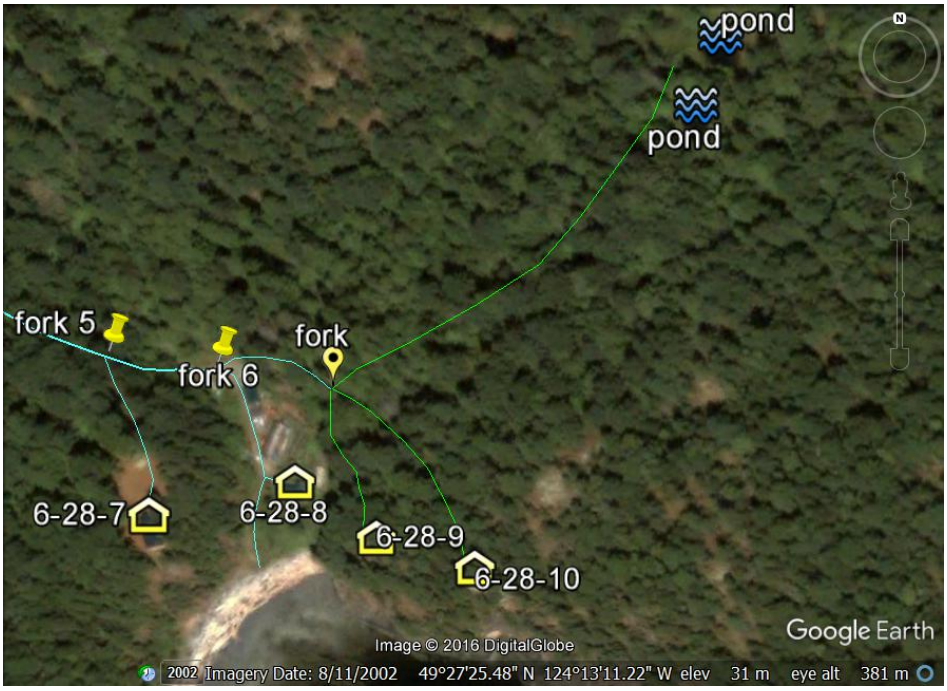


Figure 5 - Lasqueti Mapping for Emergency Route-finding: close-up of information about neighbourhood of structure 6-28-8.

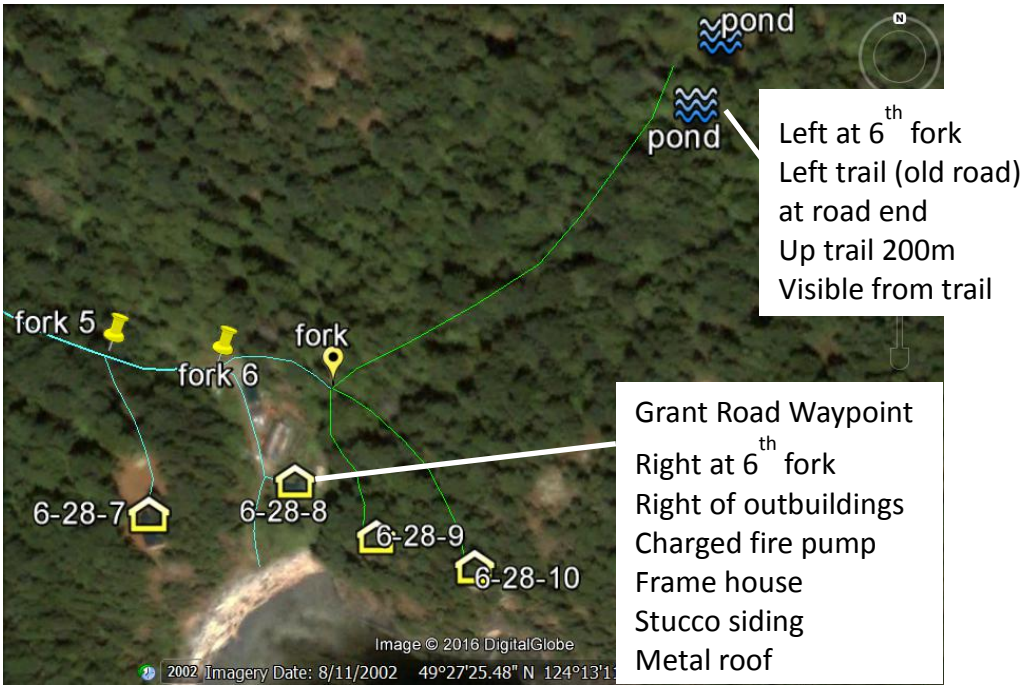


Figure 6 - Lasqueti Mapping for Emergency Route-finding: example text information available for structures and water sources.

6.1.5.3 Reverse directory

The spatial information included in the KML file described in the previous section does not contain any personal information. This was done by design to meet the following benefits:

- To simplify maintenance, since new structures are built (or existing structures removed) much less frequently than people move,
- To simplify searching, since search in Google Earth is very basic. Searching for a unique structure locator id is simple, while searching with more detailed data (e.g. multiple fields, such as names, phone numbers, etc.) isn't well supported by the tool,
- To minimize clutter in the mapping tool spatial information,
- To avoid including personal information as defined by the Freedom of Information and Protection of Privacy Act (FIPPA) in the mapping tool itself (i.e. the KML file loaded in Google Earth) and
- To address privacy concerns since the risk of accidental or intentional distribution of mapping information (e.g. via hacking, malicious upload over the internet, etc) would be limited to non-personal information (structure locator identifiers, roads, ponds, etc), most of which is already visible in Google Earth imagery.

These benefits imply, however, that the personal information is not available in the Google Earth mapping tool. In cases where local knowledge is not sufficient, additional information is needed to identify structure locator ids. That is, given a caller's name or phone number, a user would first need to find the relevant structure locator id. Note that this is analogous to how the 9-1-1 service provided by Telus associates caller names and locations using the Automatic Number me Identifier (ANI) and Automatic Location Identifier (ALI) processes.

The E-DAC proposes that a separate "reverse directory" be developed and used in association with the Google Earth KML tool (see Appendix F.3 for more details). This data file would be stored using a spreadsheet (e.g. a Microsoft Excel file) that could be constructed to facilitate simple look up of a structure locator id given a name, phone number or other identifying information. This would enable user-friendly searching and simple maintenance. To use the reverse directory, a user would simply open the file, search using available information (e.g. name, phone number), and then note the associated structure locator id. Note that a structure locator id could be associated with more than one set of identifying information (e.g. for different residents at a structure). Once the structure locator id is found, the spatial location can be easily found with a quick search in the Google Earth tool.

6.1.5.4 Protection of personal information

Since the reverse directory would contain personal information, the provisions of FIPPA would apply to this file (e.g. to include any personal information would require notification and collecting data directly). Residents should be given the option of which, if any, personal information they would like to be included in the reverse directory, and they should be provided with clear information on the reasons the data is being collected, how it would be used, and how it would be protected from misuse and inappropriate disclosure. Further, a Privacy Impact Assessment would need to be completed. Drafts of a Privacy Impact Assessment and data collection notification have been developed (see Appendix F.4)

6.1.5.5 Installation and maintenance

Installation would involve four simple steps:

(i) Install a current version of Google Earth,

(ii) Pre-load the underlying base imagery for Lasqueti into Google Earth. This ensures that the tool functions in the absence of an internet connection,

(iii) Install the Lasqueti emergency route finding KML file and set up Google Earth to automatically load this file on startup, and

(iv) Install, if needed, a read-only copy of the reverse directory.

This installation would only take a few minutes per device. When Google Earth is started, it will automatically zoom to Lasqueti Island, and will not depend on the existence of an internet connection. Base mapping information will be displayed (main roads and waypoints). The reverse directory can be opened simply with a double click.

In the event that the underlying imagery is lost from the Google Earth archive, a simple "Lasqueti imagery restore" tool has been developed and would be included with the installation. Restoration of imagery would simply require a double-click on the icon for this restoration tool.

Maintenance of the KML file would primarily involve correcting erroneous information and adding new structures. Changes to the "source" KML is straight-forward, and can be done incrementally as the need for changes or additions is identified. Since few new structures are built in a year, this would only require at most a few changes a year.

Maintenance of the reverse directory would require more changes per year as people move and change phone numbers. Periodic notices could be published in the newsletter to encourage people to update the LIVFD of changes. Neighbourhood representatives, in coordination with the emergency plan, could also be tasked with identifying, when possible, residence changes in their areas. Note that historic information in the reverse directory may sometimes be of use (e.g. many houses are referred to by past owners of the house).

An annual meeting could be held to discuss maintenance needs and issues.

6.1.5.6 Cost to construct and maintain tool

The tool has been developed using freely available software (Google Earth) and volunteer efforts to collect data and build the tool. Also, a volunteer donated use of a GPS. Full implementation and maintenance would be done the same way. There may be some modest costs associated with hardware that may be needed to complete the implementation of the prototype.

Start-up Costs:

Tool research and construction:	$0 (volunteer effort by E-DAC committee members)
Software licenses	$0 (free-use software)
Hardware	$2,000
Training:	$0 (in-kind commitment from E-DAC committee members)
Total start-up costs:	$1,000

Annual cost for tool maintenance (est.): $0

6.1.6 Prototype mapping tool summary and status

The following summarizes the status of the development and deployment of the incident locator and resource mapping tool:

(i) Research and Development:

- evaluate alternative options: done (other mapping tools, such as PocketEarth and Avenza were evaluated, but GoogleEarth was deemed to be the preferred base mapping tool),
- develop prototype tool: done,
- develop procedures for data collection to gather required data and meet FIPPA: done (see Appendix F.2),
- develop draft notification for use if personal information is to be collected: done (see Appendix F.4), and
- draft Privacy Impact Assessment for use if tool is adopted for use: done (see Appendix F.4).

(ii) Tool Evaluation:

- LIVFD dispatchers to assess utility and limitations, and degree to which it meets related interests: some local dispatchers have provided positive feedback on tool demonstrations, regarding potential benefits and improvements of using this tool,
- LIVFD responders to provide feedback: some local firefighters and first responders have provided positive feedback on tool demonstrations at meetings and community forums, and
- community to assess if it meets related interests: done at community forums

(iii) Decide whether or not to adopt use of tool:

- E-DAC to decide whether or not to recommend adoption of tool: E-DAC made the following recommendation adopted unanimously at the May 17, 2016 E-DAC meeting:

  THAT given the dispatch gaps identified to date, including the NI9-1-1 option, all options to be recommended by EDAC shall include a local mapping component

- LIVFD to decide whether or not to they would like to adopt use of tool: to be done, and
- PRRD Board to decide whether or not they support the LIVFD adoption of the tool: to be done as part of deliberations on E-DAC recommendations.

(iv) Fully implement tool: to be done after PRRD Board adopts E-DAC recommendations

(v) Integrate tool with LIVFD operations: to be done after PRRD Board adopts E-DAC recommendations

Development of a fully functioning Incident and Resource Locator tool from the prototype can be accomplished quickly to ensure timely provision of this tool to LIVFD. Full implementation would involve the following steps:

(a) Reviewing and finalizing the draft sector, neighborhood and structure numbering boundaries and process. For example, there is a proposal for neighbourhood numbers to be sequential within sectors (i.e. ranging from 1 to up to 8 within each neighbourhood instead of 1 to 34 over the entire island),
(b) Completing and submitting the Privacy Impact Assessment and making any required revisions,
(c) Collecting a complete set of GPS information. This can be done with volunteer teams,

(d) Updating the KML file using a complete set of spatial and non-spatial information,
(e) Sending out personal data notification to all residents for collecting information for the reverse directory,
(f) Collecting information from willing residents for inclusion in reverse directory,
(g) Training dispatchers on use of tool, and
(h) Installing the tool on dispatcher devices.

6.2 Option Descriptions and Process Diagrams

This section provides overviews of options, with a focus on a high-level view of how they meet the core service requirements as described in section 5.1. Details for each option are also provided, including failure analysis, cost analysis, and how each interest is affected by the option. The focus of the option descriptions is on technical capabilities, and not on details of procedures that are best defined by LIVFD.

Process diagrams are provided for each option to show the main sequence of steps, flow of information, people involved, and technologies used for dispatch, from incident call-in until an effective response is underway. The goal of these diagrams is to present the normal flow of communications and information, and an option may support communications links that are not shown (e.g. additional return calls to the caller). Process diagrams for fire and medical emergencies are shown separately. People involved in the process (caller, dispatchers, call takers, dispatchers, and responders) are shown in rounded rectangles, within an enclosing agency (e.g. LIVFD, BC Ambulance). Technologies used for communication are shown in octagons (e.g. telephone, VHF radio).

Arrows represent communication connections made between people via communication technologies. The direction of the arrow points from the person who normally initiates the communication connection to the person/agency to whom the communication is directed. Labels on the arrows indicate the step in the sequence from initial call-in through to response, with the basic information transmitted. The text in the overview for each option provides a description of these steps.

Note that the different communications technologies support different types of connections:

(a) A one-way pager system allows a person to initiate a page via telephone and or radio (with numeric codes, tones or other information), which can be received by many people simultaneously. However, the connection is brief and one-way. People receiving a page may also initiate a new page via telephone or radio, depending on system design, but that would be considered in these overviews as a new connection.

(b) A telephone connection provides two-way information flow, normally between two people (e.g. a caller may receive confirmation that their call is receiving a response, while the call taker may receive relevant details about the incident). One person initiates the call. The connection may be transferred (e.g. from a call taker to a dispatcher), and the connection is maintained until a person hangs up.

(c) A VHF radio connection provides two-way information flow between multiple people. Any person with a radio turned on to the appropriate channel will hear all communications on that channel. People can make their presence known in the connection via a notification communication. Information can be communicated by voice simultaneously to all people with active radios. A radio connection will remain active as long as necessary (even if the signal is temporarily lost). Because

communication can be initiated by anyone with a radio, double-ended arrows are used to represent radio connections.

6.2.1 Option A: current system

6.2.1.1 System description

6.2.1.1.1 Overview

This section provides an overview of Option A, with a focus on a high-level view of how it meets the core service requirements as described in section 5.1. Fire and medical emergency response processes are described in sections 6.2.1.1.2 and 6.2.1.1.3.

6.2.1.1.2 Fire emergencies

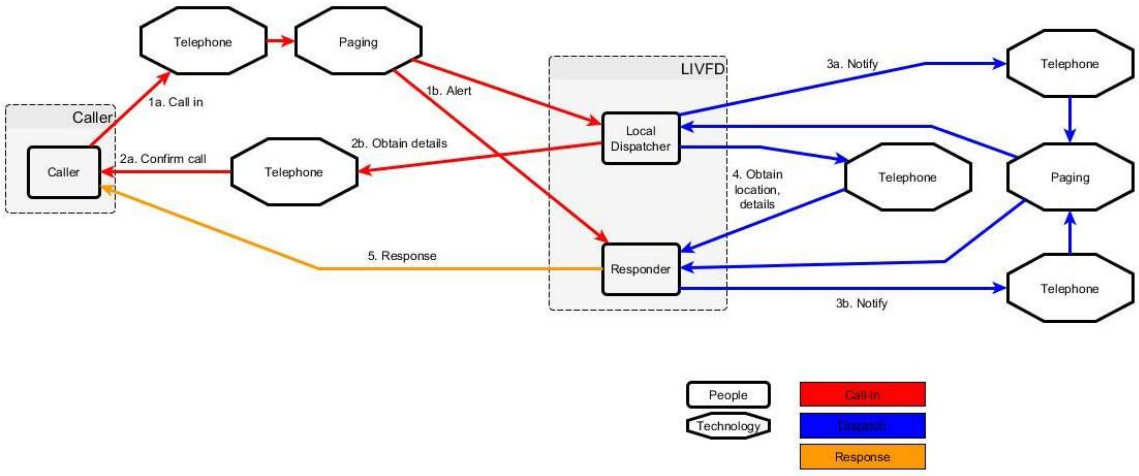


Figure 1 - Fire emergency response process in Option A (current system)

Emergency incident call-in

When a fire incident is identified by a person, that person alerts the Fire Department by phoning the fire reporting number 250-954-4432. The caller will hear a message that identifies they have reached the LIVFD fire reporting number and for the caller to enter the number they can be reached at followed by 555 and to stand by the phone for a call-back from a LIVFD dispatcher if it is safe to do so (step 1a in Figure 1).

The call in automatically sends an alerting page to all on-duty local dispatchers and responders (step 1b in Figure 1). The pager's display the caller's phone number plus the 555 code, indicating a fire call. In this way, the responders are alerted at the same time as the local dispatcher and hence there is no need for a separate step for the local dispatcher to alert the on-duty responders.

As soon as possible, the local dispatcher taking the call notifies all other department members with pagers enabled that they are taking the call by using their phone to call the same number (250-954-4432) and sending a page with appropriate identifying

information (step 3a in Figure 1). Also as soon as possible, the local dispatcher taking the call phones the caller back to provide confirmation that their call has been received and that help is on the way (step 2a in Figure 1), and to obtain relevant details regarding the nature of the incident including location and severity (step 2b in Figure 1).

Emergency alerting and response notification

Simultaneous to the actions of the local dispatcher, after receiving the fire alerting page, each available fire responder accesses a phone to call the same number (250-954-4432) to send a page with appropriate information which identifies who they are and which phone number they are standing -by at (step 3b in Figure 1). In the same way as for the initial call-in, the notification pages sent by local dispatchers and fire responders ensure that all department members attending to the call receive the notification pages sent by all other members.

The dispatcher managing the call refers to the list of pages on their pager that have come in while they have been gathering info from whom ever initiated the alert, and calls these responders to relay info gathered and deploy resources as prescribed by the LIVFD Standard Operating Guidelines (step 4 in Figure 1).

Emergency incident response

Responders are directed as per the LIVFD Standard Operating Guidelines what actions to take. Once fire responders have been contacted by the dispatcher and have received relevant information and instructions, they take response actions as directed by dispatch such as heading to the appropriate fire hall for appropriate equipment (as per SOG) or heading directly to the fire scene (step 5 in Figure 1).

6.2.1.1.3 Medical emergencies

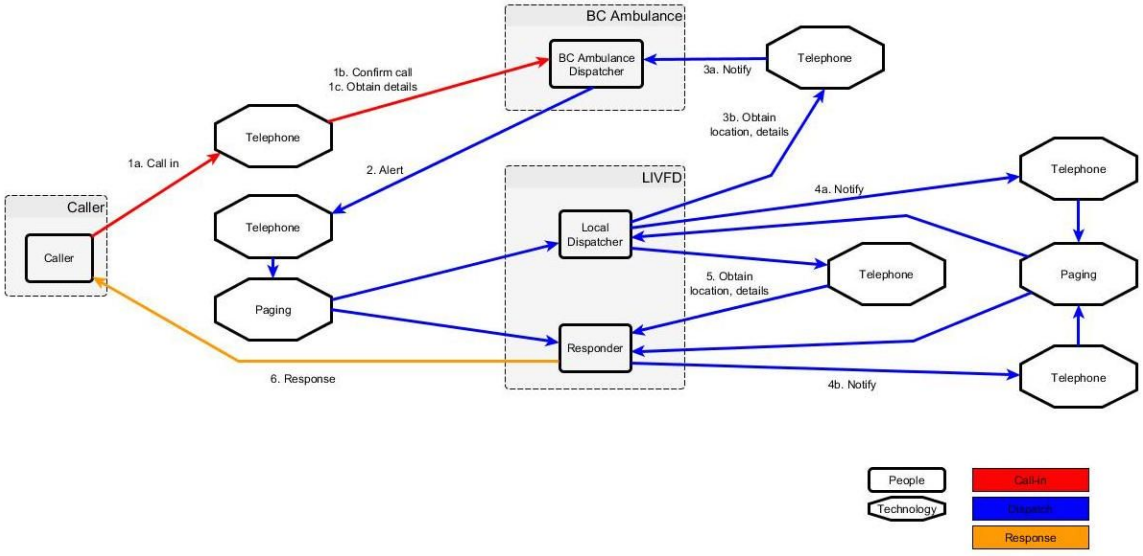


Figure 2 - Medical emergency response process in Option A (current system)

Emergency incident call-in

When a medical incident is identified by a person, that person calls for help by dialing BC Ambulance in Victoria directly at 250-248-3511 (step 1a in Figure 2).

The BC Ambulance dispatcher provides confirmation to the caller that their call has been received and that help is on the way (step 1b in Figure 2), and obtains relevant details regarding the nature of the incident including location and severity (step 1c in Figure 2).

Emergency alerting and response notification

The BC Ambulance dispatcher uses their phone to call 250-954-4432* plus 192 or 193 to send an alerting page to all on-duty local dispatchers and responders (step 2 in Figure 2). The codes 192 or 193 identify that a medical response is required and the level of the alert. Note that responders are alerted at the same time as the local dispatcher and hence there is no need for a separate step for the local dispatcher to alert the on-duty responders.

The first action that the local dispatcher takes is to call into the paging system (250-954-4432) and enter their personal identifying info (phone number and dispatch crew number) this identifies to all other dispatchers and responders that they are calling BC Ambulance (step 4a in Figure 2). The dispatcher then calls BC Ambulance to notify that LIVFD is responding (step 3a in Figure 2) and to gather info regarding the medical alert (step 3b in Figure 2).

Simultaneous to the actions of the local dispatcher, on-call medical responders call into the paging system and enter their personal ID numbers and the phone number at which they are standing by (step 4b in Figure 2). By the time the local dispatcher has gathered relevant info from BC Ambulance there will be a list of pages on the pager system sent by medical responders ready to be deployed. The dispatcher calls these individuals, relays info provided by BC Ambulance, deploys ambulance/medical responders and any other resources that may be necessary and generates documentation as per LIVFD procedures (step 5 in Figure 2).

Emergency Incident Response

Once medical responders have relevant information about an incident, they take response actions as directed by dispatch such as heading to the appropriate fire hall for appropriate equipment or proceeding directly to the incident scene. (step 5 in Figure 2).

6.2.1.1.4 Key components and characteristics of Option A (current system)

The following are key components related to dispatch (equipment, outside and local services, etc.) of Option A:

- Telephone system: common to all options for call-in, but also used for sending alerting and notification pages between and among dispatchers (BC Ambulance dispatchers and local dispatcher) and responders, for local dispatchers to contact the caller, and for responders to obtain initial information and instructions from the local and/or BC Ambulance dispatcher.

- Paging system and pagers: at present Rogers paging system is used, along with pagers provided by Rogers.
- VHF radios: used during the response step for between LIVFD members.
- Basic reverse directory: to obtain resident name given phone number.

The following are key distinguishing characteristics related to dispatch of Option A:

- Use of, and reliance on, local knowledge to identify incident location, risks and resources.
- Fire calls requiring caller to directly send a page to the LIVFD that identifies their number and a code to indicate a fire.

6.2.1.2 System narrative

It was a chilly spring morning on Lasqueti Island. Upon hearing the rooster crow, Alex exchanged his cup of tea for a jacket, and walked out over to the garden shed to collect the morning's eggs. This will make for a nice breakfast, he thought.

Throwing the light switch in the shed, he was startled as the LED light exploded in a shower of sparks raining down upon the hay below. In the dark, he could already see strands of straw starting to catch on fire. "$&%#!" he thought frantically — where was the extinguisher? Was there any water in that bucket in the corner? Smoke was starting to fill the room, and he retreated outside, coughing.

Running back to the house, he opened the front door and ran over to the telephone. Beside the telephone was a card with emergency numbers, ready for just such an event. Alex dialled the nine digit number listed for fire emergencies, and listened to the phone ring.

A voice message instructed him to key in the phone number he is calling from followed by 555 hang up and stand by the phone for a call-back from the LIVFD (this procedure is stated on the Emergency Numbers card). Alex keyed in his phone number, followed by "555", and hung up. "I hope it works", thought Alex, as he paced back and forth, while the smoke from the burning coop grew denser outside.

Behind the scenes, dispatcher's and first responder's pagers go off, triggered by Alex's call. Megan, the on-duty dispatcher, took one look at the number, and immediately called Alex back (after accessing the pager system and leaving their ID info)

For Alex, it felt like an eternity, but finally, the phone rang. Alex explained that his shed was on fire, and Megan gathered any relative info from Alex and told him that the Fire Department was being deployed. Knowing that help is on the way, Alex hangs up, and goes out to try to find hoses.

Meanwhile, Megan continued to communicate and coordinate with the other Lasqueti dispatchers and first responders, using the in-house mapping tool to direct resources. Soon, the tanker is on the way, and first responders are arriving at Alex's front yard. A scene assessment provides Incident Command with the info necessary to develop a fire plan based on hazards/risks, and available resources such as personnel, equipment, water, etc. A perimeter is quickly established to prevent fire spread, and ensure public safety, after fifteen minutes, the fire is knocked down and Incident Command identifies the fire as under control. Once Incident Command identifies the fire as out, dispatch initiates a "stand-down" page. Sadly, the shed was a complete loss, but the chickens had smartly let themselves out into the garden, and were happily pecking away.

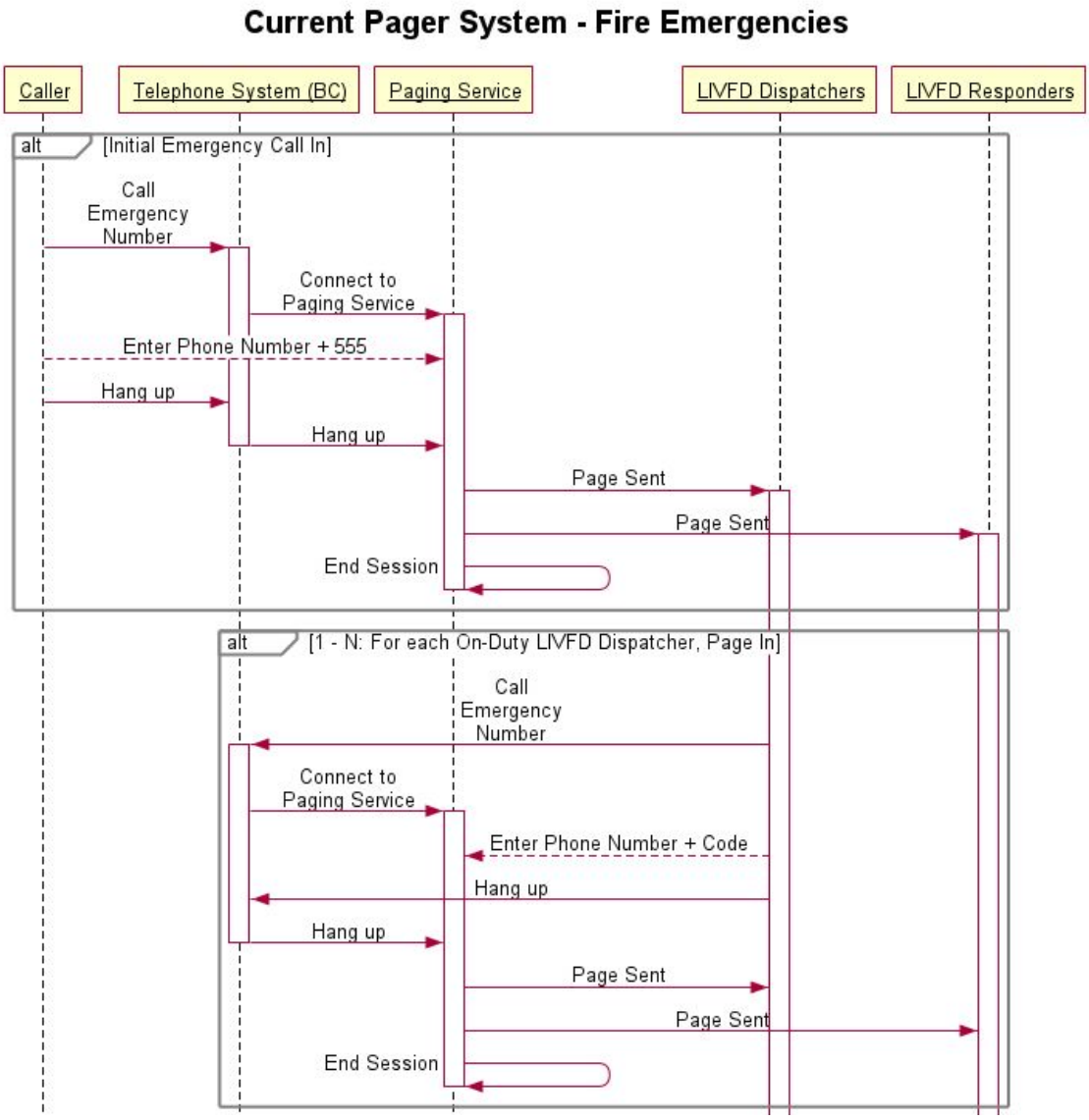
At the debriefing meeting between the firefighters and dispatchers, the dispatcher's hand-written notes are attached to the incident report, satisfying the fire department requirement for audit and reporting. That evening, the fire chief sent an e-mail to the local island mailing list, reminding people to ensure access to any fire they report is not restricted or limited do to parked equipment or vehicles that could be moved before the Department arrives.

6.2.1.3 Technical analysis

6.2.1.3.1 Interactions diagram

6.2.1.3.1.1 Fire emergencies

The below UML Interaction Diagrams[1] show interactions between the different entities involved in the current pager system for fire emergencies:



[1] More details on how to read a UML Interaction Diagram can be found at https://archive.is/bKD4

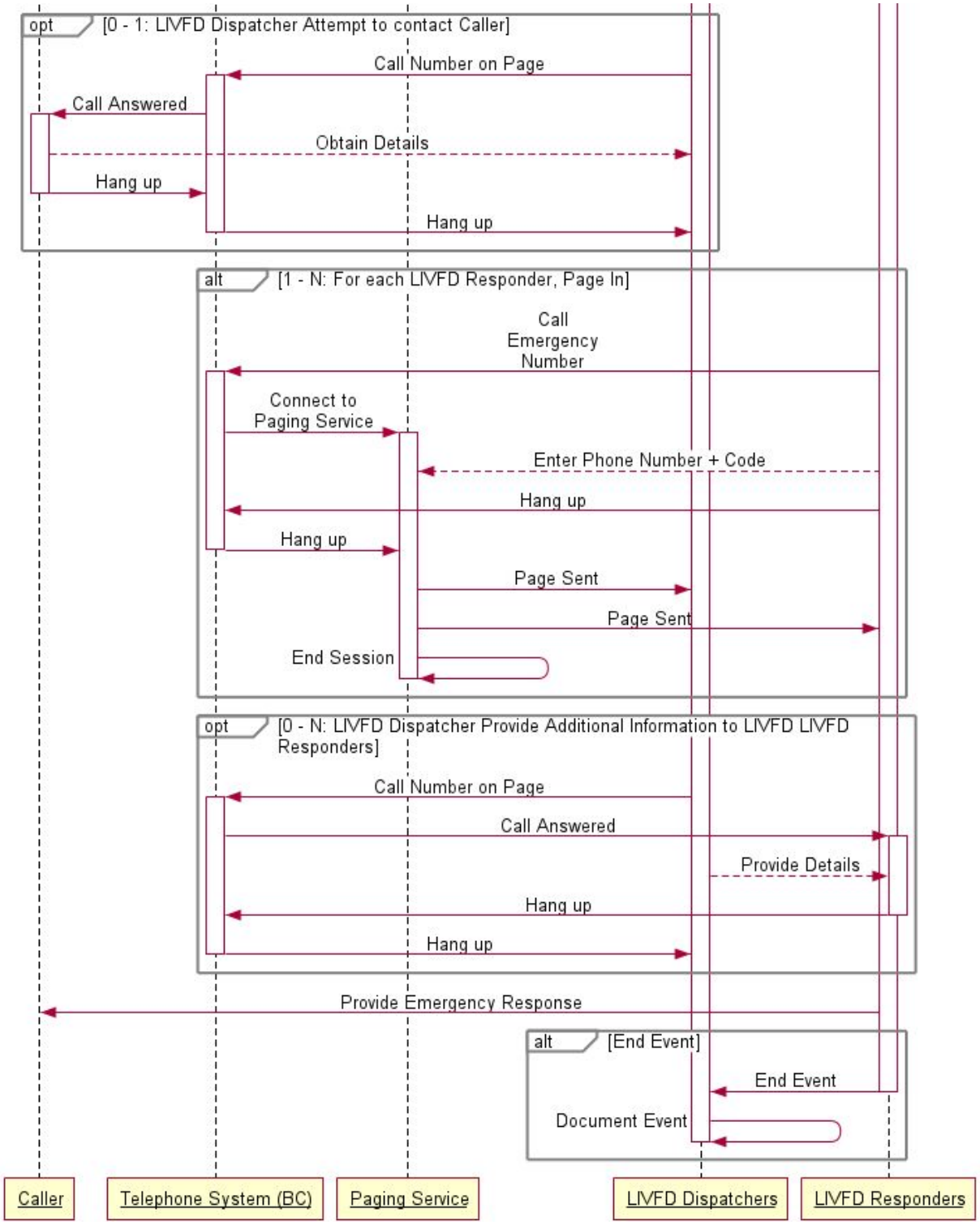
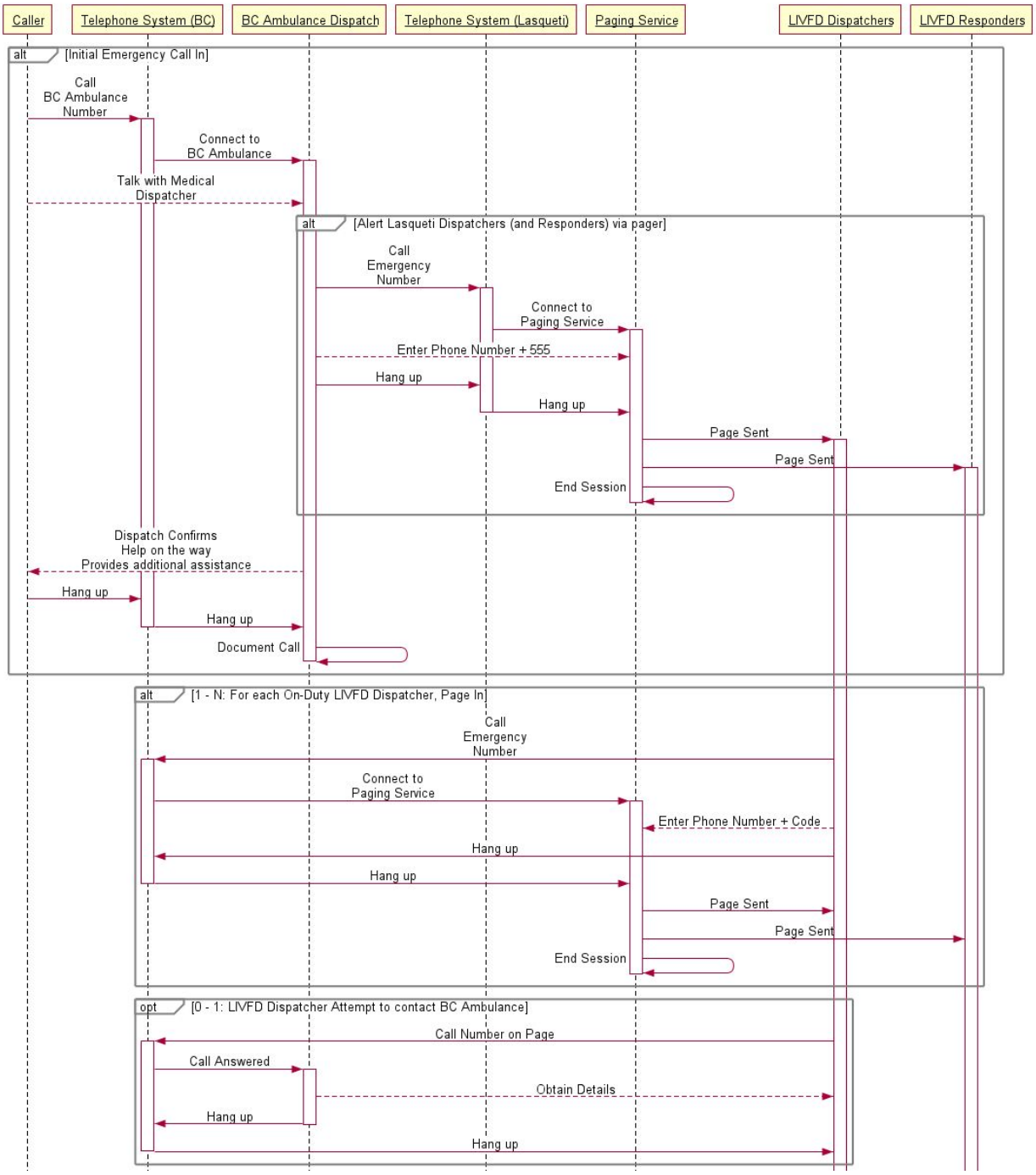


Figure 3 - Current Pager System Fire Interactions Diagram

6.2.1.3.1.2 Medical emergencies

The below UML Interaction Diagrams show interactions between the different entities involved in the current pager system for medical emergencies:

Current Pager System - Medical Emergencies



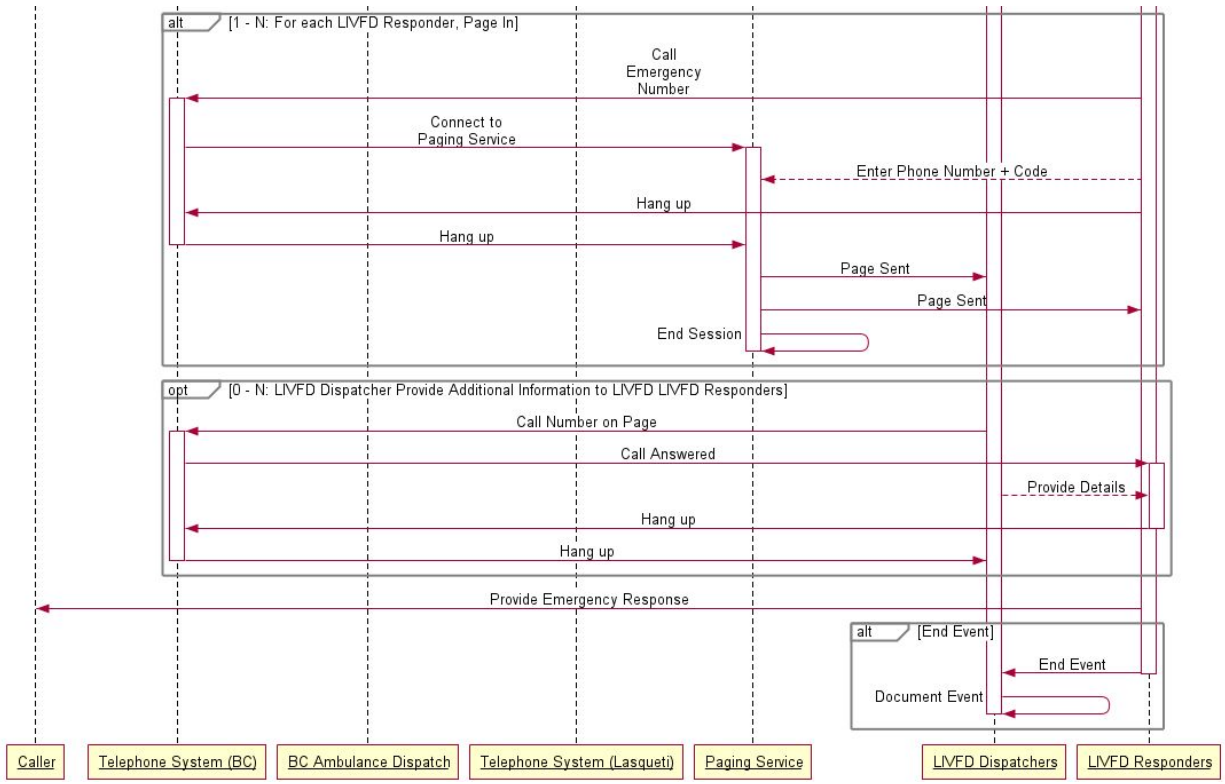


Figure 4 - Current Pager System Medical Interactions Diagram

6.2.1.3.2 Failure analysis

6.2.1.3.2.1 Fire emergencies

This section describes the worst-case consequences of various failures on the success of the dispatch system for fire emergencies. Each relevant interaction from the corresponding diagram is listed, along with a description of the failure and the resulting consequence.

Caller -> Telephone System (BC): Call Emergency Number

- Caller unable to reach telephone — No dispatch
- Caller unable to dial telephone — No dispatch
- Caller does not know number — No dispatch
- Caller's phone service out (Telus) — No dispatch
- Caller's phone service overloaded (Telus) — No dispatch
- Caller has no cell coverage — No dispatch
- Caller's phone service unavailable due to fire — No dispatch

Telephone System (BC) -> Paging Service: Connect to Paging Service

- Paging Service unreachable (Telus) — No dispatch
- Paging Service down — No dispatch

- Paging Service overloaded — Increased dispatch time

Caller -> Paging Service: Enter Phone Number + 555

- Caller forgets procedure — No dispatch
- Wrong phone number/miskeyed — Increased dispatch time
- Call dropped due to fire — No dispatch
- Call disconnected due to moving to safe location — No dispatch

Pager Service -> LIVFD Dispatchers: Page Sent
Pager Service -> LIVFD Responders: Page Sent

- Pager Service non-functional — No dispatch
- All pagers off/discharged/no coverage — No dispatch
- Some pagers off/discharged/no coverage — Increased dispatch time

LIVFD Dispatchers -> Telephone System (BC): Call Emergency Number

- Dispatcher unable to reach telephone — Increased dispatch time
- Dispatcher's phone service out (Telus) — Increased dispatch time
- Dispatcher's phone service overloaded (Telus) — Increased dispatch time

Telephone System (BC) -> Paging Service: Connect to Paging Service

- Paging Service unreachable (Telus) — Increased dispatch time
- Paging Service down — Increased dispatch time
- Paging Service overloaded — Increased dispatch time

LIVFD Dispatchers -> Paging Service: Enter Phone Number + 555

- Wrong phone number/miskeyed — Increased dispatch time

Pager Service -> LIVFD Dispatchers: Page Sent
Pager Service -> LIVFD Responders: Page Sent

- Pager Service non-functional — Increased dispatch time
- All pagers off/discharged/no coverage — Increased dispatch time
- Some pagers off/discharged/no coverage — Increased dispatch time

LIVFD Dispatchers ->Telephone System (BC): Call Number on Page

- Dispatcher unable to reach telephone — Increased dispatch time
- Dispatcher's phone service out (Telus) — Increased dispatch time
- Dispatcher's phone service overloaded (Telus) — Increased dispatch time

Telephone System (BC) -> Caller: Call Answered

- Caller entered wrong number — Increased dispatch time
- Caller no longer has coverage — Increased dispatch time
- Caller no longer at phone — Increased dispatch time

- Caller's phone service unavailable due to fire — Increased dispatch time

Caller -> LIVFD Dispatchers: Obtain Details

- Caller unable to communicate details — Increased dispatch time
- Caller has to leave phone — Increased dispatch time
- Caller no longer has coverage — Increased dispatch time
- Caller's phone service unavailable due to fire — Increased dispatch time

LIVFD Responders -> Telephone System (BC): Call Emergency Number

- Responder unable to reach telephone — Increased dispatch time
- Responder's phone service out (Telus) — Increased dispatch time
- Responder's phone service overloaded (Telus) — Increased dispatch time

Telephone System (BC) -> Paging Service: Connect to Paging Service

- Paging Service unreachable (Telus) — Increased dispatch time
- Paging Service down — Increased dispatch time
- Paging Service overloaded — Increased dispatch time

LIVFD Responders -> Paging Service: Enter Phone Number + 555

- Wrong phone number/miskeyed — Increased dispatch time

Pager Service -> LIVFD Dispatchers: Page Sent
Pager Service -> LIVFD Responders: Page Sent

- Pager Service non-functional — Increased dispatch time
- All pagers off/discharged/no coverage — Increased dispatch time
- Some pagers off/discharged/no coverage — Increased dispatch time

LIVFD Dispatchers -> Telephone System (BC): Call Number on Page

- Dispatcher unable to reach telephone — Increased dispatch time
- Dispatcher's phone service out (Telus) — Increased dispatch time
- Dispatcher's phone service overloaded (Telus) — Increased dispatch time

Telephone System (BC) -> LIVFD Responders: Call Answered

- Responder entered wrong number on page — Increased dispatch time
- Responder unavailable — Increased dispatch time
- Responder no longer has coverage — Increased dispatch time
- Responder's phone service out (Telus) — Increased dispatch time
- Responder's phone service overloaded (Telus) — Increased dispatch time

LIVFD Responders->Caller: Provide Emergency Response

- Responders unable to locate fire — No response
- Responders unable to reach fire — No response
- Responders arrive too late — Limited response

LIVFD Dispatchers -> LIVFD Dispatchers: Document Event

- Forget to document — No documentation

6.2.1.3.2.2 Medical emergencies

This section describes the worst-case consequences of various failures on the success of the dispatch system for medical emergencies. Each relevant interaction from the corresponding diagram is listed, along with a description of the failure and the resulting consequence.

Caller -> Telephone System (BC): Call BC Ambulance Number

- Caller unable to reach telephone — No dispatch
- Caller unable to dial telephone — No dispatch
- Caller does not know number — No dispatch
- Caller's phone service out (Telus) — No dispatch
- Caller's phone service overloaded (Telus) — No dispatch
- Caller has no cell coverage — No dispatch

Telephone System (BC) -> BC Ambulance Dispatch: Connect to BC Ambulance

- BC Ambulance unreachable (Telus) — No dispatch
- BC Ambulance down — No dispatch
- BC Ambulance overloaded — Increased dispatch time

Caller -> BC Ambulance Dispatch: Talk with Medical Dispatcher

- Caller can't provide location — Increased dispatch time
- Call dropped — No dispatch
- Call disconnected due to moving to safe location — No dispatch

BC Ambulance Dispatch -> Telephone System (Lasqueti): Call Emergency Number

- BC Ambulance phone service out (Telus) — No dispatch
- BC Ambulance phone service overloaded (Telus) — No dispatch

Telephone System (BC) -> Paging Service: Connect to Paging Service

- Paging Service unreachable (Telus) — No dispatch
- Paging Service down — No dispatch
- Paging Service overloaded — Increased dispatch time

BC Ambulance Dispatch -> Paging Service: Enter Phone Number + 555

- Caller forgets procedure — No dispatch
- Wrong phone number/miskeyed — Increased dispatch time

Pager Service -> LIVFD Dispatchers: Page Sent
Pager Service -> LIVFD Responders: Page Sent

- Pager Service non-functional — No dispatch

- All pagers off/discharged/no coverage — No dispatch
- Some pagers off/discharged/no coverage — Increased dispatch time

BC Ambulance Dispatch -> Caller: Dispatch Confirms Help on the way, Provides additional assistance

- Call dropped — No Effect
- Call disconnected due to moving to safe location — No Effect

BC Ambulance Dispatch -> BC Ambulance Dispatch: Document Call

- *Forget to document* — *No documentation*

LIVFD Dispatchers -> Telephone System (BC): Call Emergency Number

- Dispatcher unable to reach telephone — Increased dispatch time
- Dispatcher's phone service out (Telus) — Increased dispatch time
- Dispatcher's phone service overloaded (Telus) — Increased dispatch time

Telephone System (BC) -> Paging Service: Connect to Paging Service

- Paging Service unreachable (Telus) — Increased dispatch time
- Paging Service down — Increased dispatch time
- Paging Service overloaded — Increased dispatch time

LIVFD Dispatchers -> Paging Service: Enter Phone Number + 555

- Wrong phone number/miskeyed — Increased dispatch time

Pager Service -> LIVFD Dispatchers: Page Sent
Pager Service -> LIVFD Responders: Page Sent

- Pager Service non-functional — Increased dispatch time
- All pagers off/discharged/no coverage — Increased dispatch time
- Some pagers off/discharged/no coverage — Increased dispatch time

LIVFD Dispatchers ->Telephone System (BC): Call Number on Page

- Dispatcher unable to reach telephone — Increased dispatch time
- Dispatcher's phone service out (Telus) — Increased dispatch time
- Dispatcher's phone service overloaded (Telus) — Increased dispatch time

Telephone System (BC) -> BC Ambulance Dispatch: Call Answered

- BC Ambulance entered wrong number — Increased dispatch time

BC Ambulance Dispatch -> LIVFD Dispatchers: Obtain Details

- BC Ambulance phone connection lost — Increased dispatch time

LIVFD Responders -> Telephone System (BC): Call Emergency Number

- Responder unable to reach telephone — Increased dispatch time

- Responder's phone service out (Telus) Increased dispatch time
- Responder's phone service overloaded (Telus) Increased dispatch time

Telephone System (BC) -> Paging Service: Connect to Paging Service

- Paging Service unreachable (Telus) Increased dispatch time
- Paging Service down Increased dispatch time
- Paging Service overloaded Increased dispatch time

LIVFD Responders -> Paging Service: Enter Phone Number + 555

- Wrong phone number/miskeyed Increased dispatch time

Pager Service -> LIVFD Dispatchers: Page Sent
Pager Service -> LIVFD Responders: Page Sent

- Pager Service non-functional Increased dispatch time
- All pagers off/discharged/no coverage Increased dispatch time
- Some pagers off/discharged/no coverage Increased dispatch time

LIVFD Dispatchers -> Telephone System (BC): Call Number on Page

- Dispatcher unable to reach telephone Increased dispatch time
- Dispatcher's phone service out (Telus) Increased dispatch time
- Dispatcher's phone service overloaded (Telus) Increased dispatch time

Telephone System (BC) -> LIVFD Responders: Call Answered

- Responder entered wrong number on page Increased dispatch time
- Responder unavailable Increased dispatch time
- Responder no longer has coverage Increased dispatch time
- Responder's phone service out (Telus) Increased dispatch time
- Responder's phone service overloaded (Telus) Increased dispatch time

LIVFD Responders->Caller: Provide Emergency Response

- Responders unable to locate fire No response
- Responders unable to reach fire No response
- Responders arrive too late Limited response

LIVFD Dispatchers -> LIVFD Dispatchers: Document Event

- Forget to document No documentation

6.2.3.3.2.3 Conclusions

The critical failure modes are as follows:

1. If phone service (land-line and/or cellular) is down or out of service, initial dispatch will not happen.

This is the most frequent type of failure, and has the most significant impact.

2. Since all calls flow through the paging service, any outages will prevent dispatch and alerting within the LIVFD.

6.2.1.4 Cost analysis

6.2.1.4.1 Setup costs

Setup costs for the existing pager system is, by definition, $0, as the system is already set up.

6.2.1.4.2 Annual operating costs

Pager service:	Approximately $10,000[2] / year
Total annual operating costs:	Approximately $10,000 / year

6.2.1.4.3 In-kind contributions

As this option was only considered as a base-case, no future improvements to this option were considered.

6.2.1.4.4 Projected future capital costs

As this option was only considered as a base-case, no future improvements to this option were considered.

[2] PRRD 2016-2020 Financial plan (Jan 14, 2016 Rural Services Committee agenda), Lasqueti Island Fire Department, includes line item “Services – Communications Systems” of $9,291 (2014 actual), $9,438 (2015 actual), $9,627 (2016 projected), $9,916 (2017 projected), $10,213 (2018 projected), $10,591 (2019 projected) and $10,835 (2020 projected).

6.2.1.5 Community interests

6.2.1.5.1 Firefighter and first responder safety

The degree to which the dispatch system increases firefighter and first responder safety.

The most significant safety risks associated with LIVFD operations are fire-fighting activities, medical response activities, and vehicle operation. Dispatchers do not experience any of these significant safety risks associated with the execution of their dispatching duties as they perform their duties from any operational phone wherever they are at the time the system is activated.

The current pager system notifies dispatchers and first responders with an alert that does not require an immediate response. This gives a driver time to pull over at a safe location before reading or responding to the page, as it does not demand an immediate response that may distract from safely operating a vehicle. Furthermore, as no voice messages is played as part of the page, there is minimal distraction or additional information load placed on a driver.

The current alerting system requires that the dispatcher establish the location of a fire by making a call to the contact number left on the paging system by the person making the initial report. Once this direct communication with the person activating the system is established, critical information regarding location, nature, and scope/scale of the emergency can be gathered, documented and disseminated to the LIVFD members that have indicated that they are immediately available to respond, and where they can be reached by phone. In the event that the callback number left on the pager can not be reached dispatchers make use of a local reverse directory to establish where the call originated and forward this information to the LIVFD members that are ready to go.

As there is no formalized addressing system on Lasqueti dispatchers are required to rely heavily on local knowledge. Currently, a locally maintained reverse directory and local knowledge are the basic tools available to dispatchers if an alert doesn't relay usable information. Delays in determining the location of an emergency can result in a more severe fire or medical emergency, resulting in heightened safety risks to firefighters and medical responders.

The current alerting system requires a dispatcher to call back to talk with the original caller to gather critical information. In some situations, such as where a fire makes it unsafe for the caller to remain at the telephone, this means that detailed information about the nature of the emergency is not available to dispatchers. Without this detailed information, firefighters and first responders may not be able to prepare as well as they could have, and responders may not be as well informed about hazards or access issues that may exist at the site of the emergency.

Since post-dispatch communication is out of scope of the committee, these aspects of LIVFD operations have not been addressed in this analysis.

6.2.1.5.2 Appropriateness of cost/benefit given Lasqueti situation

The relative costs to benefits of the dispatch system given the needs of the community, the remote nature of Lasqueti Island, the size of the population and the ability to pay for the service.

The current pager system provides a limited yet operational dispatch system, at low cost to the community. This provides more opportunity for limited resources and tax dollars to be focused on improving other aspects of firefighting and medical response activities. Given the small population and the relative infrequency of fire or medical alert calls, the current system minimizes costs, which is especially important for taxpayers who have a fixed income, and/or are under other financial pressures resulting from rising property values and other new or increased tax burdens in other areas funded by the Regional District.

Cost details can be found in section 6.2.1.4.

6.2.1.5.3 Ensure dispatch involves appropriate training

The degree to which the dispatch system supports and facilitates appropriate training of dispatchers, first responders and firefighters.

Current dispatching operations requires all training to be locally developed and maintained by the LIVFD. Training includes responding to pages, calling back the initial caller, gathering critical info, identifying the location and scope of an emergency, disseminating this information and coordinating initial firefighter/medical responder deployment, and documenting the initial details gathered about the event. New dispatchers receive a simple dispatching manual that describes the system and how to use it. New dispatchers are teamed with a mentor from the dispatcher team until the individual and the department fell the individual is competent as a dispatcher. Dispatchers meet regularly to debrief, address issues and share information that may add to the LIVFD local knowledge information pool.

6.2.1.5.4 Local knowledge

The ability to use LIVFD's local knowledge to dispatch, locate, and respond to incidents. Use of local knowledge is valuable because it increase the effectiveness and appropriateness of emergency response. However, local knowledge can be unavailable, ad-hoc and informal.

The LIVFD relies heavily on the use of local knowledge to effectively locate, dispatch and otherwise deploy resources to incidents. The LIVFD recognizes the importance of local knowledge within the department's operations given that access to many structures may not be straightforward. Many property access roads are overgrown or not built to support full size heavy trucks and some residences are only accessible by trail or water.

When an initial alert is received, response time is reduced if dispatcher's local knowledge of phone numbers allows for quick identification of the origin of the alert, especially if no direct contact is possible with the phone number showing on the pager.

Examples of local knowledge include:

- General property location

- Driving directions to property
- Driving/access directions to structures
- Restrictions when accessing property/structures
- Hazards
- Nearby firefighting resources
- Property owner

Currently there is no formal, written or other documentation process that identifies if an individual dispatcher is informed with an acceptable level of local knowledge.

6.2.1.5.5 Minimal points of failure

The degree to which the dispatch system has the fewest parts that if they fail, service is disrupted.

The current pager system has several major parts that if they fail, dispatch does not take place. The main parts of concern are:

- Lasqueti land-line telephone system
- Cellular Phone Network
- Telus communication network
- Paging Service Provider

A detailed interactions diagram identifying the various parts of the system can be found in section 6.2.1.3.

6.2.1.5.6 Redundancy

The degree to which the dispatch system continues to operate in the presence of failures and faults, including technological failures, operational failures, and human error.

The current pager system is dependent on the local telephone system, which has numerous single points of failure. If a caller is unable to place a call, no dispatch can take place. This point of failure is common to any system that includes the use of local land-lines.

The current alerting system is dependent on the paging system. The current pager provider has limited system redundancy/ robustness, and pager system failures can result in reduced coverage, and missed pages. If pagers are in areas without coverage, are not charged, not operational or not turned on, pages are not received. However all pagers must simultaneously fail to receive a page delivered in order to result in a dispatch not taking place.

A detailed failure analysis can be found in section 6.2.1.3.2.

6.2.1.5.7 Easy to use and understand

The degree to which the dispatch system can easily be understood by all involved parties, including the public, and the degree to which the system is easy for dispatchers to successfully dispatch firefighters and first responders.

The current alerting system is not easily understood by visitors, as they are used to calling 9-1-1 in the event of a fire or medical emergency. It is also not easy to use for visitors and residents, as there are two ten digit numbers which must be memorized, kept on a reference card, or entered into phone memory. Dialling a longer and unfamiliar number may be challenging, especially during a medical or fire emergency when the caller is likely under intense stress. For example, the power may be out due to a fire, or there may be smoke in the room, or the caller's medical condition may make dialling difficult. And if you make the wrong choice about including a “1” when you dial, you instead receive a message from the phone company indicating that “The number you have called cannot be completed as dialled.”

Currently, when reporting a fire, once the correct number is called, the caller must enter their call-back phone number, plus the digits “555”. If the call-back phone number is not entered, or is entered incorrectly, the dispatcher may not be able to return the call and/or identify the location of the caller. A visitor may not know the call-back number for the residence they are currently in, and the visitor or resident may have difficulty entering the call-back number for a host of reasons. Once the person initiating the alert successfully accesses the paging service they are directed to remain by the phone for a callback, but only if it is safe to do so. These characteristics makes the system more difficult to use and understand.

Once an initial alert has been successfully sent, the process becomes straightforward for the dispatchers, first responders, and firefighters. The initial alert is received by the entire LVFD membership, and only the dispatcher makes contact with number where the initial alert came from. While the dispatcher is gathering information from the initiator of the alert, available firefighters/medical responders are calling into the paging system to leave their ID# and contact # then they preparing to be dispatched.

6.2.1.5.8 Happy first responders and firefighters

The degree to which the first responders and firefighters are happy with the dispatch system, and feel that it meets their needs.

The current pager system is a significant area of concern for fire department members. While not complicated to use for them the system has suffered a degeneration in quality of service and coverage. Further, the local system is custom, and does not match the more standardized procedures commonly found elsewhere in the province, and thus requires custom training, and raises concerns with the Regional District, which would prefer to have standardized procedures for fire department operations, where possible.

6.2.1.5.9 Local dispatch

The degree to which the dispatch system allows for dispatching to be done by dispatchers on Lasqueti.

The current pager system provides a means for local dispatchers to locate an emergency, initiate deployment of resources (personnel/equipment) as prescribed by department procedures, keep records and provide follow up communications as directed by the Incident Commander.

6.2.1.5.10 Retain B.C. Ambulance understanding about Lasqueti situation

The degree to which the dispatch system allows for the relationship between B.C. Ambulance and Lasqueti LIVFD to be retained for medical emergencies.

In the event of a medical emergency the current system has initial callers communicating directly with B.C. Ambulance. B.C. Ambulance is then able to determine the nature of the medical emergency, and initiate an alert of a medical emergency to LIVFD via use of the pager system. Thus, this system requires this relationship with BC Ambulance to be retained and maintained.

6.2.1.5.11 Local control

The degree to which a local group (e.g. LIVFD) are able to make decisions regarding management and operation of the dispatch system.

The current pager system is solely maintained and managed by the LIVFD. All decisions related to procedures, operations, suppliers, and changes are made by the LIVFD, all costs related to the paging system are covered within the LIVFD budget, with oversight provided by the Regional District.

6.2.1.5.12 Accessible to all

The degree to which the dispatch system is accessible to all areas of Lasqueti Island where emergency services are provided.

The current pager system is accessible to all residents and visitors that have a working land-line phone service, or have cellular coverage. This excludes many residences that do not have installed (or operating) phone service, or are outside of cellular coverage. Due to lack of investment in the land-line phone infrastructure on Lasqueti, and infrequent repair service visits, it is common for there to be phone service outages for large numbers of subscribers, and for the duration of these outages to extend in some cases for multiple months.

Dead-zones where pages cannot be reliably received means that some current or prospective LIVFD members are unable to participate in the LIVFD activities as effectively as others.

6.2.1.5.13 Locate people accurately & effectively

The degree to which the dispatch system is able to accurately and effectively locate incidents.

The current fire alerting system does not readily identify the location of an emergency. Instead, the alerting system identifies where to call to gather information regarding the emergency using a caller-specified call-back number. If the dispatcher is unable to get an answer at number showing on the pager from the initial alert and the number is not recognized by the dispatcher the dispatcher will refer to the LVFD reverse directory for the name of the holder of that number. If a caller is calling from a cell phone that is not listed in the reverse directory, the location of the caller cannot be immediately identified. GPS coordinates of a caller cell phone are not made available to the LIVFD pager system.

The accuracy of the location process is highly dependent on the accuracy of the collected reverse directory and identity-to-map-location information collected and maintained by the LIVFD. The effectiveness of the location process is highly dependent on local knowledge, the existence of the caller in the LIVFD reverse directory and identity-to-map-location information, and the degree to which dispatchers have immediate access to this information.

Once a location has been identified, the degree to which the first responders can locate the initial caller is also dependent on local knowledge.

6.2.1.5.14 Not tied to contract we can't get out of

The degree to which the dispatch system can be adjusted and changed as needed. Refers in part to the "No Withdrawal" regulation for regional emergency telephone services.

The current pager system has no long-term contracts. Short-term contracts can be withdrawn from with a small monetary penalty. This permits changes to be made as-needed, with minimal financial or legal penalties.

6.2.1.5.15 Feedback when successful dispatch

The degree to which the dispatch system lets the public calling in know that help is on the way.

The current LIVFD alerting system does not let the public calling in know that help is on the way until the dispatcher is able to call back. This typically occurs well within a ten minute window, (commonly 3 to 5 minutes) unless the initiator of the alert can not be reached at the number entered into the paging system.

6.2.1.5.16 Local repairability

The degree to which the dispatch system can be maintained and modified by a local group (e.g. the LIVFD).

The current pager system is owned and maintained by a non-local paging service provider (Rogers), and pager maintenance expenses incurred by the LVFD include monthly rental fees and monthly battery replacement. Because pagers are rented faulty pagers are replaced at no charge.

6.2.1.5.17 Future-proofing

The degree to which the dispatch system can be future-proofed, upgraded, and be resilient to technological changes and changes in needs.

The current pager system is based on a technology that is being discontinued by service providers, (analog) and has a limited future life. Future planning around the LVFD alerting system will require the LVFD to operate its own paging system (could be analog, comparable to the 9-1-1 paging system) or migrate to more sophisticated systems such as cellular or wi-fi based systems.

6.2.1.5.18 Knowing what we are getting into/committing to

The degree to which the groups responsible for the dispatch system clearly communicate with the community regarding decisions and consequences associated with those decisions.

The current alerting system is the responsibility of the LIVFD, which consists of community volunteers, and is overseen by the Regional District. The LIVFD keeps the community aware of activities, challenges and upcoming changes, and encourages community participation and promotes within the community how to activate the LVFD alerting system. The Regional District is an open government, and has a director elected by Lasqueti Island (Electoral Area “E”), whose responsibility is to represent the community.

6.2.1.5.19 Simplicity

The degree to which the dispatch system is simple, both with respect to its design and use.

The current alerting/dispatching system involves an easy to understand process that has few components, namely:

- Land-line phone system or cellular phone system
- Telecommunication connectivity to Paging Service Provider
- Paging Service Provider
- LIVFD Dispatchers
- LIVFD radio communication system

The use of the system is simple:

- Dial one of two numbers
- Leave your number + “555”(fire), or talk directly with a B.C. Ambulance operator
- Lasqueti Island Dispatchers locate you, and call you back
- LIVFD medical responders and firefighters respond to the emergency

It is important to note that simplicity is separate from usability and ease of use, which is covered in a different interest. You can have a system that is simple and difficult to use, or a system that is complex but easy to use.

6.2.1.5.20 Tax implications & costs

The degree to which the dispatch system requires or avoids high short-term and/or long-term tax costs.

The current pager system has minimal short-term and long-term tax costs, nor does it lock us into costs and taxes associated with different or enhanced services that may not apply to Lasqueti.

6.2.1.5.21 Dispatch recognizes that some people are accessible by trail or water access only

The degree to which the dispatch system recognizes that some residents and locations on Lasqueti Island have no road access.

The current dispatching system allows the use of LIVFD-maintained identity-to-map-location information, which can take into account trails, water-access-only designations, and other unusual restrictions found in remote communities like Lasqueti.

6.2.1.5.22 Equal value and access for everyone

The degree to which all people who pay for the dispatch system receive equal service.

The current alerting/pager system is only accessible to people with phone service. Given the reliance on local knowledge for locating incidents, residents at better known locations may receive more immediate emergency service than people at lesser known locations.

6.2.1.5.23 Not dependent on systems that will be non-functional in a disaster

The degree to which the dispatch system will continue to function in the event of a major disaster, such as an earthquake or major storm.

The current alerting/pager system is dependent on a telephone system, Telus microwave tower, and a third-party paging service. It is likely that in the event of a major disaster that there will be no telephone service, as the local phone system ceases to function if communication to Lasqueti is severed. Furthermore, it is likely that the pager system may also be down.

6.2.1.5.24 Ability to be involved

The degree to which the public can be involved in decisions that affect the local dispatch system.

The current pager system is the responsibility of the LIVFD, which consists of community volunteers, and is overseen by the Regional District. The LIVFD interacts with the community and provides opportunities for the community to be involved. The Regional District is an open government, and has a director elected by Lasqueti Island (Electoral Area “E”), whose responsibility is to represent the community.

6.2.1.5.25 Takes advantage of existing local infrastructure

The degree to which the dispatch system uses local infrastructure, such as communication towers, etc.

The current alerting and dispatching system uses the local land-line phone system.

6.2.1.5.26 Avoid intermediaries who may not understand the situation on Lasqueti

The degree to which the dispatch system avoids external dependencies that may not understand or may not be interested in accommodating the situation on Lasqueti.

The current Rogers pager system is dependent on phone service. Telus provides land-line phone service to Lasqueti, however Telus has clearly demonstrated that they are not currently willing or interested in providing reliable and dependable land-line phone service on Lasqueti[3]. The current system is also dependent on the cellular communication companies, which have not prioritized providing a high degree of coverage for Lasqueti Island. The current system is also dependent on paging service providers, which are in the process of phasing out paging services.

6.2.1.5.27 Being local helps with disaster scenarios

The degree to which the dispatch system assists with local disaster preparedness and response.

The current alerting/pager system is highly dependent on systems external to Lasqueti (the phone system and paging service provider), which are likely to be non-functional in a disaster, and are not locally repairable. Thus, the current pager system does not help with local disaster preparedness and response.

6.2.1.5.28 Get better telephone system

The degree to which the dispatch system can improve reliability of land-lines or cellular coverage.

The current pager system is dependent on the reliability of land-lines and cellular coverage, but does not in any way improve these services.

6.2.1.5.29 Broader questions about how to help LIVFD

The degree to which the dispatch system can assist with other investments needed to help the LIVFD. Does this system fit into/assist with broader strategic planning?

The current pager system is viewed as a deficient area by the underwriters evaluation, but is listed as a lower priority compared to some of the other challenges.

6.2.1.5.30 Minimize follow-on implications and obligations

[3] CRTC correspondence re. Case ID 791891 - http://www.lasqueti.ca/files/correspondence_re-_crtc_case_id_719891.pdf

The degree to which the dispatch system minimizes additional requirements that may occur due to aspects of the system or associated contracts or investments.

The current pager system has no long-term contracts. Short-term contracts can be withdrawn from with a small monetary penalty. This permits changes to be made as-needed, with minimal financial or legal penalties. There are no major financial or procedural investments (sunk costs) that limit the ability to change to other systems.

6.2.1.5.31 Don't want to be dependent on Vancouver/Victoria

The degree to which the dispatch system avoids dependencies on the major metropolitan areas that are likely to be overloaded or down in the event of a major event.

The current alerting/pager system is not dependent on infrastructure located in Vancouver or Victoria, however, a major event may have disruptions that affect the reliability of the phone service and/or paging service.

Medical emergency calls are dependent on B.C. Ambulances ‘s dispatch centres, which are located in the Victoria area.

6.2.1.5.32 Not invest in old analogue system that will need to be replaced

The degree to which the dispatch system avoids use of older technologies that are likely to be retired in the near future.

The current pager system depends on analogue technology which telecommunications providers are moving away from.

6.2.1.5.33 One point of contact

The degree to which the dispatch system uses a single point of contact (phone number) to call for emergency services.

The current LIVFD alerting system relies on two phone numbers one for fire and one for medical emergency services.

6.2.1.5.34 Retaining the character of the community

The degree to which the dispatch system retains the character of the Lasqueti community.

The current pager system does not require community members to make any changes to their property or to reveal any information beyond their name, phone number and location in order to obtain emergency services.

6.2.1.5.35 Retain insurance coverage

The degree to which the dispatch system assists in retaining insurance coverage (e.g. for mortgages) by meeting a sufficient protection grade set by the Fire Underwriters Survey.

The current pager system is not a factor in the current protection grade, as set by Fire Underwriters Survey.

6.2.1.5.36 Need to recognize that Lasqueti is willing to accept a higher level of risk

The degree to which the dispatch system reflects the attitude of many residents that our community accepts a "higher level of risk" associated with emergencies.

Many residents of Lasqueti understand that living on a rural and remote island means that the level of emergency services available will be lower than those in a municipal setting. This is a consequence of:

1. Small tax base limits investments and funding for emergency services
2. Low frequency of emergencies results in reduced perception of need to improve emergency services
3. Spread out population, unpaved roads and large lots increases response time
4. Properties that have no road access (water or trail access only)
5. Distance from other communities and infrequent ferry service prevents mutual aid
6. High cost for installing new phone lines, poor land-line reliability, and limited cellular coverage means that phone service is not always available

However, there are also factors that increase risk that result from decisions made by residents, such as:

1. Installation of gates and other barriers that delay emergency access
2. Dwelling access issues, such as poorly maintained driveways, too steep driveways, driveways with insufficient room to turn around, etc.
3. Lack of signage to assist with finding a dwelling in an emergency
4. Complacency (despair) of long outages and slow repair times for phone service, lack of timely customer-managed repairs when fault on private property

These are all examples of individuals choosing to accept a higher level of risk.

From a community perspective, discussions have indicated that there is a willingness to improve emergency services, but any investments must be made with community input and collaboration.

6.2.1.5.37 Easier than remembering a phone number

The degree to which the means by which the public reaches the dispatch system can be easier than remembering a phone number, for example, having a single button to press.

The current alerting system call-in numbers are typically not memorized by the general public, and are found by referring to an emergency #s card circulated by the LIVFD to be placed by residents near their phone. Emergency phone numbers and call-in procedures are also listed in the local Lasqueti phone book and on the Lasqueti.ca web page.

Phone numbers can be programmed into phones to allow numbers to be dialed with the press of a single button or selected from a directory or contacts list. Specialized stand-alone devices that automatically call pre-programmed emergency numbers are

also supported. Phones and or devices not preprogrammed can often be a cause of a delayed response due to searching for numbers and possible entry errors.

6.2.1.6 LIVFD interests

6.2.1.6.1 When reporting a fire, caller should be able to talk to a person

Whether or not the dispatch system provides 24/7 capability by which a caller can directly talk to a person.

Callers will talk immediately with a BC Ambulance dispatcher for a medical emergency call. For a fire emergency call, a caller must wait for a return call from the local dispatcher. Hence, for a fire emergency, callers will not talk immediately with a person.

The current dispatch system ensures that there is always two (?) or more on-duty dispatchers. Since emergency calls may arrive at any time of the day, on call dispatchers may not be immediately available when a call is made (e.g. they may be asleep or in the shower). However, since on-duty dispatchers will have their pagers nearby, the alerting page will get their attention for response. Since all dispatchers receive all pages if the on call dispatcher doesn't respond within a short timeframe another dispatcher takes over the call

Since the current system sends all pages to all responders, responders will also focus their attention on an emergency as soon as the first alerting page is sent, and will take action to communicate with the dispatcher.

6.2.1.6.2 Easy to use and understand

The degree to which the dispatch system is user friendly and available to all, including kids, adults, infirm, visitors.

This interest is closely related to the community interest "Easy to use and understand" described in section 6.2.1.5.7.

6.2.1.6.3 Equal provision of service

The degree to which the dispatch system serves all residents served equally, subject to local conditions.

This interest is closely related to the community interests "Accessible to all" described in section 6.2.1.5.12, and "Equal value and access for everyone" described in section 6.2.1.5.22.

6.2.1.6.4 Call-outs (e.g. pagers) that work everywhere

The degree to which system provides good geographic coverage to receive incident alert calls.

The current pager system provides minimal coverage for pages to reach dispatchers and responders. There are a number of locations on Lasqueti where pagers will not receive pages.

The current VHF radio system provides coverage from the VHF repeater at the north end of the island and another repeater located in a more central location There are some locations that are not covered by these repeaters however populated areas are well covered.

The telephone system provides land-line and cellular coverage. Land-line coverage is periodically unavailable, sometimes for relatively long durations, until repaired by Telus. Cellular coverage is available on much, but not all, of the island, with variable signal strength.

6.2.1.6.5 Reliable call-outs

The degree to which alerting system provides continuous and resilient coverage.

This interest is similar to the PRRD interest “Effective communications network linking dispatchers and emergency responders” described in section 6.2.1.7.3.

The ability to make call-outs depends on coverage (see previous interest regarding coverage) as well as usability, functionality, training, and reliability.

The current dispatch system uses a commercial paging system and telephones for call-outs. The current pagers are simple to use to send and receive pages. The paging system itself is reliable. The primary concerns relate to coverage (leading to pages not received, or inaccurate pages), and robustness of the physical pagers.

6.2.1.6.6 System should be able to pass reliable messages (numeric or voice)

The degree to which alerting system provides a reliable method to communicate between dispatchers and responders.

This interest is similar to the previous interest as well as the PRRD interest “Effective communications network linking dispatchers and emergency responders” described in section 6.2.1.7.3.

The ability to pass reliable messages depends on coverage (see interest described in section 6.2.1.6.4 regarding coverage) as well as usability, functionality, training, and reliability.

The current dispatch system uses a commercial paging system and telephones for call-outs. The current pagers are simple to use to send and receive pages. The paging system itself is reliable. The primary concerns relate to coverage (leading to pages not received, or inaccurate pages), and robustness of the physical pagers. Further, the pagers are one-way and so messages can be received on pagers, but not sent. Paging messages are limited to numeric codes.

6.2.1.6.7 Effective, easy-to-use home location (with consideration of confidentiality)

The degree to which the dispatch system is able to accurately and effectively locate incidents.

This interest is closely related to the community interest “Local people accurately & effectively” as described in section 6.2.1.5.13.

This interest also adds concerns regarding protection of personal information, as covered by the Freedom of Information and Protection of Privacy Act (FIPPA). Compliance with the provisions of the FIPPA is a requirement (see PRRD interest “Ensure compliance with all relevant statutes and regulations” described in section 6.2.1.7.17).

The current dispatch system relies on local knowledge for home location, with use of a reverse directory when needed. The FIPPA applies to any personal information recorded in the reverse directory. The current system requires LIVFD members to sign a non-disclosure agreement to ensure members are aware of the nature of personal information and to prevent unauthorized disclosure of personal information.

6.2.1.6.8 Streamlined system: no extra steps

The degree to which the dispatch system minimizes steps needed by callers, dispatchers and responders to use the system.

This interest is related to the community interest “Simplicity” as described in section 6.2.1.5.19, but with a focus on steps required during use of the system.

The steps for usage are described in the overview section. In the current system, for a fire incident, the caller makes a phone call to send an alerting page (step 1), the local dispatcher returns the call (step 2), each responding local dispatcher and responder makes a phone call to send a notification page (step 3), and the local dispatcher phones each responder to provide initial response information and instructions (step 4).

In the current system, for a medical incident, the caller makes a phone call to talk directly with a BC Ambulance dispatcher (step 1), the BC Ambulance dispatcher makes a phone call to send an alerting page (step 2), the LIVFD local dispatcher returns the call to BC Ambulance (step 3), each responding dispatcher and responder makes a phone call to send a notification page (step 4), and the local dispatcher phones each responder to provide initial response information and instructions (step 5).

6.2.1.6.9 Secure communication system

The degree to which the emergency communication system protects personal information and privacy.

Protection of personal information is legislated by the Freedom of Information and Protection of Privacy Act (FIPPA). Compliance with the provisions of the FIPPA is a requirement (see PRRD interest “Ensure compliance with all relevant statutes and regulations” described in section 6.2.1.7.17).

In the current system, communication is by telephone and pager. Personal information is not transmitted by the pagers, and telephone communication is relatively secure (but not encrypted).

6.2.1.6.10 No changes to First Responder dispatch

The degree to which the dispatch system support the continued role of local dispatchers.

The current system relies on local dispatchers for both fire and medical emergency incidents. Clearly, by definition, the current system does not require any changes to the role of local dispatchers.

6.2.1.6.11 System that functions over the long term (i.e. avoid changing system again in near future)

The degree to which the dispatch system remains stable, with little or incremental change for improvements over time.

The current system relies on commercial Rogers pagers. While speculative, it is conceivable that Rogers may not continue to provide this service over the long term. Further, other concerns regarding the current system (e.g. incident location) suggest that there would be increasing pressure to make some changes to the current system.

6.2.1.6.12 Eliminate non-emergency calls

The degree to which the dispatch system reduces likelihood of non-emergency calls, and unnecessary response efforts in case of non-emergency calls.

The current system requires the caller to dial either BC Ambulance or the Fire Alering pager number. These numbers could be automated (e.g. on a rapid dial button), and so accidental calls are possible. While it is challenging to eliminate non-emergency calls (calls made inadvertently, or people calling for non-emergency reasons), the current system limits unnecessary response effort. For a medical call, once the BC Ambulance dispatcher realizes that the call is not an emergency no alerting page will be sent by BC Ambulance. Similarly for a fire call, the local dispatcher could direct responders to stand down once they know the incident is not an emergency. If, however, the local dispatcher is unable to reach the caller by call-back, other response actions by LIVFD will have to proceed until the nature of the incident is known (e.g. send someone to the location, or contact a neighbour).

6.2.1.6.13 Maximum local control and ownership (ability to have a voice)

The degree to which local groups (e.g. LIVFD and community) are able to make decisions regarding management and operation of the dispatch system.

This interest is closely related to the community interest “Local control” as described in section 6.2.1.5.11.

6.2.1.6.14 Community is happy with service

The degree to which the dispatch system supports good relations with community, implement a service supported by the community, and not get squeezed between community and regional district.

This interest is the complement to the community interest “Happy first responders and firefighters” as described in section 6.2.1.5.8.

The community interests represent the key issues of concern regarding the dispatch system. The better the dispatch system meets these interests, the more the community will support the system.

The current system has a number of areas in which interests are well met, but also where interests are not well met (e.g. “Feedback when successful dispatch” described in section 6.2.1.5.15). Evaluating the degree to which the current option meets community interests relative to other options is a major aspect of the mandate of the E-DAC.

6.2.1.6.15 The system meets PRRD requirements

The degree to which the dispatch system complies with relevant statutes and regulations.

The PRRD requirements were included in the terms of reference for the E-DAC, and represented in the PRRD interests.

This interest is closely related to the PRRD interest “Ensure compliance with all relevant statutes and regulations” as described in more detail in section 6.2.1.7.17.

6.2.1.6.16 That a community team puts together a reliable system that PRRD will be OK with

The degree to which the dispatch system meets requirements and supports good relations with the regional district.

The PRRD requirements were included in the terms of reference for the E-DAC, and represented in the PRRD interests.

The E-DAC was formed to make a recommendation for a reliable system that meets requirements, as well as meets community, LIVFD and PRRD interests to the degree possible.

This interest is closely related to the PRRD interest “Ensure compliance with all relevant statutes and regulations” as described in more detail in section 6.2.1.7.17.

6.2.1.6.17 To help increase and maintain LIVFD membership

The degree to which the dispatch system protects firefighters / first responders safety and morale, and supports degree to which community is happy with fire service and operations.

Maintaining LIVFD membership is directly linked with morale and safety of department members. In terms of the dispatch system, this is related to the degree to which LIVFD interests are met, as this represents the issues of concern to members regarding dispatch.

Increasing LIVFD membership is directly linked with the degree to which the community supports the LIVFD. In terms of the dispatch system, this is related to the degree to which community interests are met.

The current dispatch system has a number of areas in which community and LIVFD interests are well met, but also where interests are not well met (e.g. community interest "Feedback when successful dispatch" described in section 6.2.1.5.15, and LIVFD interest "Call-outs that work everywhere" described in section 6.2.1.6.4). Evaluating the degree to which the current option meets community and LIVFD interests relative to other options is a major aspect of the mandate of the E-DAC.

6.2.1.6.18 To have adequate resources to implement the service

The degree to which the dispatch system ensures adequate funding and administrative support for the service.

Providing adequate funding to implement the LIVFD operations is a mandate of the PRRD. In principle, the LIVFD operations must be consistent with the related service establishment bylaw. When there are differences, either the bylaw should be changed to reflect operational implementation, or the operations must be changed to comply with the bylaw.

Provided the LIVFD operations are consistent with its service establishment bylaw, the LIVFD needs to ensure that PRRD is informed about the resources required to implement the service. In turn, the PRRD needs to ensure that these resources are included in the annual tax requisition.

This context and process is the same for any dispatch option.

6.2.1.6.19 That funding is not lost

The degree to which the dispatch system ensures that funding levels are maintained, that the LIVFD has input to funding needs.

This interest is essentially synonymous with the previous interest. Provided that the LIVFD protection service is consistent with its service establishment bylaw, funding cannot be lost. Funding via the PRRD for the LIVFD would only be lost if the regional service was withdrawn, at the end of a lengthy regional service withdrawal process.

6.2.1.6.20 To have clear, feasible service policies to implement

The degree to which the fire service bylaw is consistent with implementation of fire protection service.

In principle, the LIVFD operations must be consistent with the related service establishment bylaw. When there are differences, either the bylaw should be changed to reflect operational implementation, or the operations must be changed to comply with the bylaw.

Hence, it is important for the fire service establishment bylaw to set clear and feasible policies for the LIVFD to implement.

The current dispatch system is guided by the current service establishment bylaw (see Appendix E), which clarifies the expectations of the department, the role and authority of the fire chief, etc.

6.2.1.6.21 That dispatch service not influence land-use; limit follow-on implications (e.g. changes to road requirements)

The degree to which the dispatch system minimizes additional requirements that may occur due to aspects of the system or associated contracts or investments.

This interest is closely related to the community interest “Minimize follow-on implications and obligations” as described in section 6.2.1.5.30.

6.2.1.6.22 Educate public about fire safety (e.g. Fire Smart)

The degree to which the dispatch system supports individual efforts to reduce fire risks.

While safety education is not within the mandate of the E-DAC, the discussions and community engagement over the past two years has elevated the profile of fire and medical safety issues in general.

It is not clear how the current dispatch system relates to public safety education.

6.2.1.6.23 Need to consider equipment upgrades

The degree to which there is an appropriate cost/benefit allocation for dispatch to maintain options for funding for other department equipment and training needs (e.g. fire-fighting boat for beach fires and waterfront homes that are water access only; quad).

There are always tradeoffs and opportunity costs when considering how to allocate a limited resource, such as tax dollars. Hence, this interest is closely related to the community interest “Appropriateness of cost/benefit given Lasqueti situation” as described in section 6.2.1.5.2.

6.2.1.6.24 Simplify documentation

The degree to which the dispatch system supports documentation of incident dispatch.

Documentation is an important requirement for emergency response. It is important to help LIVFD in debriefing and operational improvement. Documentation that shows that response was done according to procedures, within the ability of the department given the resources provided and context, is also important to limit liability.

Documentation within the current dispatch system is done by hand, following dispatcher training procedures. Written reports are maintained in the LIVFD record files.

6.2.1.7 PRRD interests

6.2.1.7.1 Effective support for public and emergency responder safety

The degree to which the dispatch system increases public, firefighter and first responder safety.

This interest is closely related to the community interest “Firefighter and first responder safety” described in section 6.2.1.5.1. In relation to dispatch, increased public safety risks are primarily associated any delays to emergency response, and risk of no response. Aspects of the current system related to call-in and locating emergencies regarding public emergency responder safety are described in section 6.2.1.5.1.

6.2.1.7.2 Comprehensive dispatch system description

The recommended dispatch system must be a complete description about usage, operations, infrastructure and costs.

More specifically, the dispatch system description should include (i) public phone number(s) to reach dispatchers; (ii) all costs, for equipment purchasing, training, ongoing maintenance, licences, contracts, professional fees and any other anticipated necessary expenditures for the system’s first ten years; and (iii) any major capital items (i.e. communications towers), including anticipated lifecycle and replacement costs.

The current dispatch system has separate public phone numbers to call for fire and medical emergencies, as described in the Option A overview. Costs are well known, as they have been included in the regional budget, and detailed in the financial analysis section of this report. No new significant capital is required for the current system.

6.2.1.7.3 Effective communications network linking dispatchers and emergency responders

The degree to which the communications network used for emergency response supports communications among LIVFD members.

This interest is similar to the LIVFD interest “Reliable call-outs” described in section 6.2.1.6.5.

The effective communications network depends on coverage (see next interest regarding coverage) as well as usability, functionality, training, and reliability.

The current dispatch system uses a commercial paging system and telephones. VHF radios may be used during response.

The current pagers are simple to use to send and receive pages. The paging system itself is reliable. The primary concerns relate to coverage (leading to pages not received, or inaccurate pages), and robustness of the physical pagers.

VHF radio technology is reliable and robust. The primary concerns relate to coverage.

The telephone land-line network has wide physical coverage. The primary concerns relate to relatively frequent loss of service, and relatively long times before repair.

6.2.1.7.4 Communications system effectiveness/coverage across the service area

The degree of coverage for communications devices used by LIVFD members.

This interest is closely related to the LIVFD interest “Call-outs (e.g. pagers) that work everywhere” described in section 6.2.1.6.4.

6.2.1.7.5 Meets communications equipment standards

The degree to which the equipment used for dispatch communications meets relevant standards.

The current dispatch system primarily relies on pagers, telephone and VHF radios for communications. All of these types of devices currently deployed by the LIVFD meet all relevant standards for legal and safe operation in Canada.

All radio-communication equipment must comply with Industry Canada regulations in order to be legally owned and operated in Canada. Furthermore, any radio transmission equipment must either be licensed or must comply with the restrictions placed on unlicensed spectrum, and must be operated within the constraints of the license or unlicensed spectrum.

The LIVFD has selected radio equipment to ensure compatibility with current communication standards used by NI 9-1-1. This is in compliance with PRRD bylaw #391, which states:

> *Preparation of specifications for new communication systems and additions to existing communication systems which are compatible with NI911 dispatch services.*

This ensure that costly equipment replacements are not required in the event of a transition to 9-1-1 service.

6.2.1.7.6 Communications equipment redundancies in case of main system failure

The degree to which the dispatch system continues to operate in the presence of failures and faults, including technological failures, operational failures, and human error.

This interest is closely related to the community interest “Redundancy” described in section 6.2.1.5.6.

6.2.1.7.7 Surge capacity for times of major emergencies or disasters

The degree to which the dispatch system will continue to function under high call volumes in the event of a major disaster, such as an earthquake or major storm.

This interest is related to the community interest “Not dependent on systems that will be non-functional in a disaster” described in section 6.2.1.5.23, but with a focus on the

capacity of the system to handle large call volumes rather than on dependencies on components that are relatively more likely to fail in a disaster.

The current pager system is dependent on the telephone system, Telus microwave tower, and a third-party paging service. It is likely that in the event of a major disaster that there will be no telephone service, as the local phone system ceases to function if communication to Lasqueti is severed. Furthermore, it is likely that the pager system will also be down. Emergency response would then be reduced to VHF radio communications and physically checking on people, according to the emergency plan.

6.2.1.7.8 Plan for alternative power supply for all necessary components in case of power failure

The degree to which there is backup power supply available for components of the dispatch system.

The current dispatch system relies on local and off-island systems. The system assumes that Telus and Rogers have a backup power system to continue providing telephone and pager services.

Local dispatchers provide their service from their residences (or from the residences or locations at which they may be present when an emergency call is received). In effect, this makes use of a distributed power system since most residences have more than one independent power source (e.g. solar/micro-hydro power via a battery bank, plus one or more backup generators). If the power system at a residence is not functioning, the power system at each neighbouring residence is independent. It is unlikely that large areas of Lasqueti would be entirely without power.

The current system also relies on LIVFD members to ensure pager and radio batteries remain charged.

6.2.1.7.9 Dispatcher training

The degree to which the dispatch system supports and facilitates appropriate training of dispatchers.

This interest is closely related to the community interest “Ensure dispatch involves appropriate training” described in section 6.2.1.5.3.

6.2.1.7.10 Dispatching staffing to ensure 24/7 service

Whether or not the dispatch system provides 24/7 service.

This interest is closely related to the LIVFD interest “When reporting a fire, caller should be able to talk to a person” described in section 6.2.1.6.1.

6.2.1.7.11 Longer term dispatch succession plan

The degree to which the dispatch system supports recruitment and training of new dispatchers to replace retiring dispatchers.

The current system relies on local dispatchers who choose to volunteer to serve their community. To date, dispatchers have stayed in their role for relatively long periods of time (years). As dispatchers approach retirement, a new dispatcher is actively recruited and trained.

6.2.1.7.12 Ensure applicable PRRD obligations to meet Workers Compensation Act Occupational Health and Safety Regulations regarding dispatcher operations

The degree to which the dispatch system supports meeting legal worker safety requirements (statutes and regulations).

The LIVFD is required to meet the provisions of the Workers Compensation Act and Occupational Health and Safety Regulation. There are a range of provisions that must be met in relation to fire protection and emergency First Response services. The LIVFD is obligated to provide working conditions that reduce the risk to personal injury. See Section 5.2 and Appendix C for more details.

In terms of dispatch, the current system relies on local dispatchers who provide their service from their residences (or from the residences or locations at which they may be present when an emergency call is received). Training ensures that the dispatcher work environment is safe for their duties (e.g. from improper posture during communications, or from dangerous placement of electrical cords).

Further, the LIVFD maintains a “joint health and safety committee” at which workplace risks and hazards can be discussed, and solutions identified.

6.2.1.7.13 Ensure PRRD obligations are met per Bill C-45 for effective workplace safety

The degree to which the dispatch system meets the provisions of Bill C-45 regarding criminal liability of an organization such as PRRD

The LIVFD is required to meet the provisions of Bill C-45 regarding potential claims leading to criminal liability of an organization such as PRRD. There are a range of provisions that must be met in relation to fire protection and emergency First Response services. Since the LIVFD fire chief “has complete responsibility and authority over the Fire Department, subject to the direction and control of the Board” (bylaw 391, 2005), he/she should ensure an ongoing workplace health and safety program is implemented for the fire service, which should aim to identify, communicate and reduce workplace hazards. See Section 5.2 and Appendix C for more details.

In terms of dispatch, local dispatchers are included in the fire department workplace health and safety program. In addition, the current dispatch system meets the Occupational Health and Safety Regulation.

Further, it is important for the regional service establishment bylaw to be consistent with the operations of LIVFD, including the dispatch system. After adopting a recommended dispatch option, the regional board should revise the LIVFD fire protection service establishment bylaw to ensure consistency with the dispatch system.

6.2.1.7.14 House numbering or other property/location identifier system

The degree to which the dispatch system is able to accurately and effectively locate incidents.

This interest is closely related to the community interest “Local people accurately & effectively” as described in section 6.2.1.5.13.

6.2.1.7.15 Ability to implement any “next generation” communications

The degree to which the dispatch system is able to implement a text message option for hearing impaired, or other media usage (e.g. pictures).

The current pager system cannot communicate text messages or other media such as pictures.

6.2.1.7.16 Appropriate dispatch recording practices and records management system

The degree to which the dispatch system includes and supports a dispatch documentation practices and records management system, including maintenance of dispatch personnel, training, and operations (with call times) records, appropriate storage and retention of records, and ensuring privacy concerns are addressed.

This interest is related to the LIVFD interest “Simplify documentation” as described in section 6.2.1.6.24.

The current system includes a documentation system in which dispatchers record on paper incident details, including time of call, nature of call, who responded, conclusion of dispatch related to incident.

6.2.1.7.17 Ensure compliance with all relevant statutes and regulations

The degree to which the dispatch system complies with relevant statutes and regulations, including:

- *Industry Canada*
- *Canadian Radio-television and Telecommunications Commission (CRTC)*
- *Freedom of Information and Protection of Privacy Act (FIPPA)*
- *Office of the Fire Commissioner (OFC)*
- *BC Building Code*
- *Workers Compensation Act*

The current system complies with the above statutes and regulations. Radio frequencies are licensed per Industry Canada. Personal information, per FIPPA, is protected by limiting transmission of personal information during dispatch and by all LIVFD members signing a non-disclosure agreement. Workers health and safety issues are addressed in section 6.2.1.7.12.

Under the Office of the Fire Commissioner “Playbook”, LIVFD has been assigned as an “Exterior Operations Service Level” department. This service level defines minimum requirements for fire services personnel and department operational competencies.

These requirements relate to LIVFD firefighter training and operations, and do not refer to dispatch.

6.2.1.7.18 Ensure compliance with any relevant PRRD bylaws and policies

The degree to which the dispatch system is consistent with applicable PRRD bylaws and policies

The primary PRRD bylaw related to dispatch is bylaw 391 enacted “to provide for the operation of the Lasqueti Island Volunteer Fire Department”. It is very important that the LIVFD operations are consistent with this bylaw. Divergence between LIVFD operations and this bylaw can be resolved in two primary ways: (i) the PRRD board can revise the bylaw to match operations (as may be required for changes to the dispatch system); or (ii) the LIVFD can revise operations to match the bylaw.

The current system is broadly consistent with the bylaw. One item of concern that has been raised by PRRD staff relates the following from Schedule D (Fire Department Administrative Responsibilities), in the Communications sub-section:

> *“Preparation of specifications for new communication systems and additions to existing communication systems which are compatible with NI911 dispatch services”*

The VHF radios recently purchased by LIVFD are compatible with the NI 9-1-1 dispatch services. However, as noted by a legal opinion obtained by PRRD staff, concerns regarding this item could be easily resolved for the current system by revising the bylaw to remove this item.

6.2.2 Option B: NI 9-1-1 system

6.2.2.1 System description

6.2.2.1.1 Overview

This section provides an overview of Option B, with a focus on a high-level view of how it meets the core service requirements, as described in section 5.1. Fire and medical emergency response processes are described separately.

6.2.2.1.2 Fire emergencies

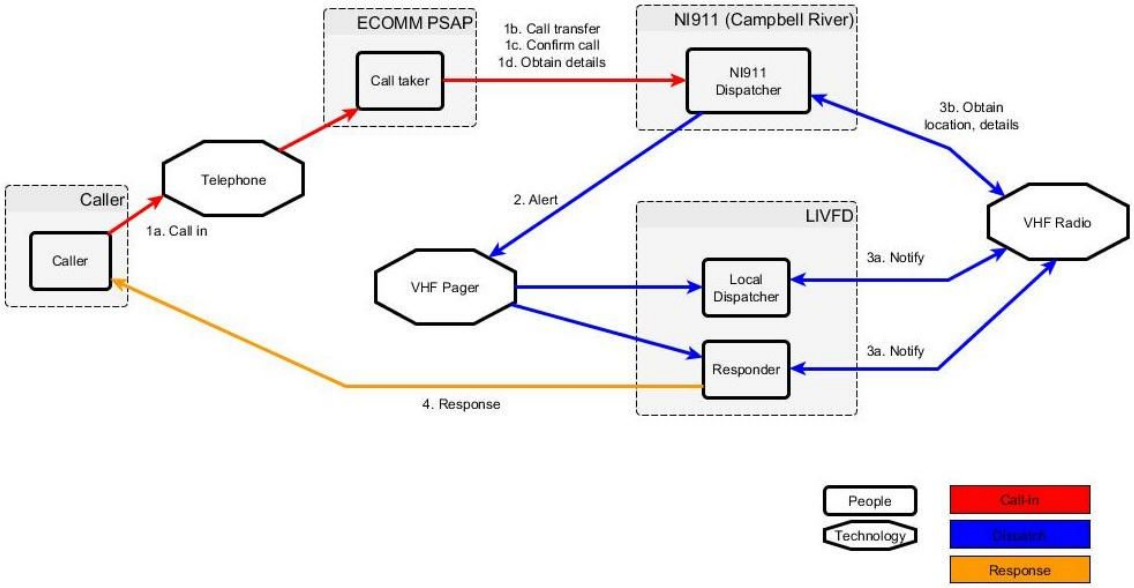


Figure 5 - Fire emergency response process in Option B (NI 9-1-1 service)

Emergency incident call-in

When a fire incident is identified by a person, that person calls in for help by dialing 9-1-1 to talk with a call taker at the E-COMM PSAP (Public Safety Access Point; step 1a in Figure 5). After stating that there is a fire, the call taker will transfer the call to a North Island 9-1-1 (NI 9-1-1) dispatcher in Campbell River (step 1b in Figure 5).

The NI 9-1-1 dispatcher provides confirmation to the caller that their call has been received and that help is on the way (step 1c in Figure 5), and obtains relevant details regarding the nature of the incident including location details and severity (step 1d in Figure 5).

The civic address provided by Telus, or, in the future, the GPS coordinate of the caller's location[4] will be transferred, via E-COMM, to NI 9-1-1. NI 9-1-1's Computer Aided

[4] North Island 9-1-1 currently requires cell phone callers to manually provide their location. See http://www.nisl911.bc.ca/main_dispatch.shtml

Dispatch system will use this location information to identify the corresponding property and access directions on a map for use by the NI 9-1-1 dispatcher.

Emergency Alerting and Response Notification

The NI 9-1-1 dispatcher sends an alerting page over the appropriate channel on the NI 9-1-1 VHF communications network to all on-duty local dispatchers and responders (step 2 in Figure 5). The VHF pager alert indicates that the call is a fire incident.

After receiving the fire alerting page, each available local dispatcher and fire responder accesses a VHF radio to contact the NI 9-1-1 dispatcher, again over the appropriate channel on the NI 9-1-1 VHF communications network, to indicate that they are able to respond to the call (step 3a in Figure 5), and to obtain relevant information and instructions for their initial response actions (step 3b in Figure 5).

Emergency Incident Response

Once fire responders have relevant information about an incident, they can take response actions, such as heading to the appropriate fire hall for appropriate equipment and further instruction (step 4 in Figure 5).

6.2.2.1.3 Medical emergencies

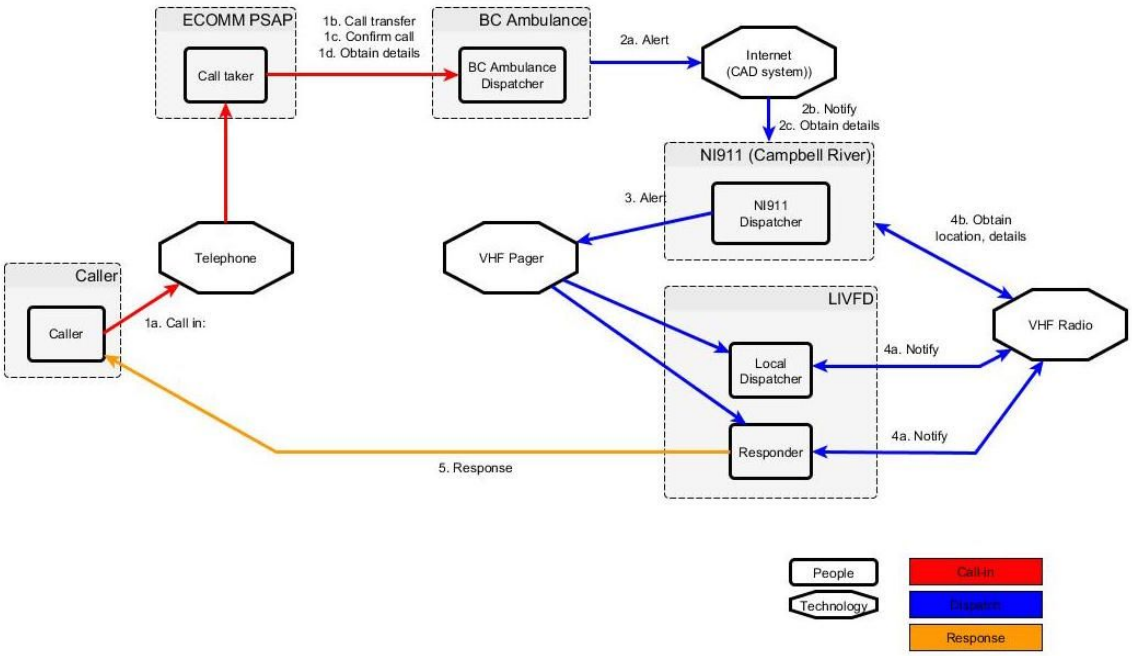


Figure 6 - Medical emergency response process in Option B (NI 9-1-1 service)

Emergency Incident Call-in

When a medical incident is identified by a person, that person calls in for help by dialing 9-1-1 to talk with a call taker at the E-COMM PSAP (step 1a in Figure 6). After stating

that there is a medical emergency, the call taker will transfer the call to a BC Ambulance dispatcher in Victoria (step 1b in Figure 6).

The BC Ambulance dispatcher provides confirmation to the caller that their call has been received and that help is on the way (step 1c in Figure 6), and obtains relevant details regarding the nature of the incident including location details and severity (step 1d in Figure 6).

The civic address at the caller's location will be transferred, via E-COMM, to BC Ambulance.

Emergency Alerting and Response Notification

The BC Ambulance dispatcher uses a Computer-Assisted Dispatch system (CAD) to alert the NI 9-1-1 dispatcher via the internet (step 2a in Figure 6). The receiving NI 9-1-1 dispatcher notifies the BC Ambulance dispatcher that they are responding (step 2b in Figure 6) and obtains relevant information and instructions (step 2c in Figure 6).

The NI 9-1-1 dispatcher sends an alerting page over the appropriate channel on the NI 9-1-1 VHF communications network to all on-duty local dispatchers and responders (step 3 in Figure 6). The VHF pager display indicates that the call is a medical incident.

After receiving the medical alerting page, the on duty local dispatcher accesses a VHF radio to contact the NI 9-1-1 dispatcher, again over the appropriate channel on the NI 9-1-1 VHF communications network, to indicate that they are able to respond to the call (step 4a in Figure 6), and to obtain relevant information and instructions to pass along to each available medical responder for their initial response actions (step 4b in Figure 6).

Emergency Incident Response

Once medical responders have relevant information about an incident, they can take response actions, such as heading to the appropriate fire hall for appropriate equipment and further instruction (step 5 in Figure 6).

6.2.1.1.4 Key components of Option B (NI 9-1-1 service)

The following are key components related to dispatch (equipment, outside and local services, etc.) of Option B:

- Telephone system: common to all options for call-in.
- Use of E-COMM PSAP to receive all 9-1-1 calls (fire and medical).
- Use of NI 9-1-1 service for dispatch and VHF communications network.
- Use of VHF radios and VHF pagers.
- VHF radios: used during the dispatch as well as response step for communications between LIVFD and NI 9-1-1, as well as between LIVFD members.
- Use of civic addresses, associated with call-in numbers, automatically transferred via the E-COMM call centre to NI 9-1-1 or BC Ambulance.

The following are key distinguishing characteristics related to dispatch of Option B:

- Use of a 9-1-1 emergency telephone service for both fire and medical calls (E-COMM Public Safety Answering Point).
- Dispatch from NI 9-1-1 largely replacing current role of local dispatchers.
- Use of, and reliance on, civic addressing to identify incident location.
- Need for new VHF communication tower(s) on Lasqueti or Texada to provide consistent coverage.

6.2.2.2 System narrative

It was a chilly spring morning on Lasqueti Island. Upon hearing the rooster crow, Alex exchanged his cup of tea for a jacket, and walked out over to the garden shed to collect the morning's eggs. This will make for a nice breakfast, he thought.

Throwing the light switch in the shed, he was startled as the LED light exploded in a shower of sparks raining down upon the hay below. In the dark, he could already see strands of straw starting to catch on fire. "$&%#!" he thought frantically — where was the extinguisher? Was there any water in that bucket in the corner? Smoke was starting to fill the room, and he retreated outside, coughing.

Running back to the house, he opened the front door, ran over to the telephone, and dialed 9-1-1.

In Vancouver, the computer console at the E-COMM centre lights up, and the call is answered within seconds. The call centre operator immediately asks the caller for the nature of the emergency, fire, medical or police. Alex, still a little breathless, tells the operator that his chicken coop was on fire, and is immediately transferred over to NI 9-1-1 in Campbell River. Seconds later, the call shows up on the phone console at NI 9-1-1, and when the operator answers the call, the address of Alex's home and it's location on the map automatically pops up. The NI 9-1-1 operator confirms that there is a fire, and lets Alex know that the fire department is being notified, and during a quick hold, sends out an emergency notification over the NI 9-1-1 operated VHF radio network. This notification is received by the Lasqueti Fire first responder radios and radio pagers.

When Marvin, an on-call Lasqueti Fire Fighter, hears the alert go out over the radio, he stops what he's doing and asks the NI 9-1-1 dispatcher over the radio for more information. The dispatcher tells Marvin that it is a fire, and provides the address. Other firefighters start joining Marvin on the radio, and soon, the tanker is on the way, and firefighters are arriving at Alex's front yard. A perimeter is quickly established to prevent fire spread, and after fifteen minutes, the fire is out. Sadly, the shed was a complete loss, but the chickens had smartly let themselves out into the garden, and were happily pecking away.

At the debriefing meeting between the firefighters and dispatchers, details of the incident are received from NI 9-1-1 through a secure computer system, and are attached to the incident report, satisfying the fire department requirement for audit and reporting. That evening, the fire chief sent an e-mail to the mailing list, reminding people not to leave their driveway blocked with their vehicle.

6.2.2.3 Technical analysis

6.2.2.3.1 Interactions diagram

6.2.2.3.1.1 Fire emergencies

The below UML Interaction Diagrams[5] show interactions between the different entities involved in the NI 9-1-1 system for fire calls:

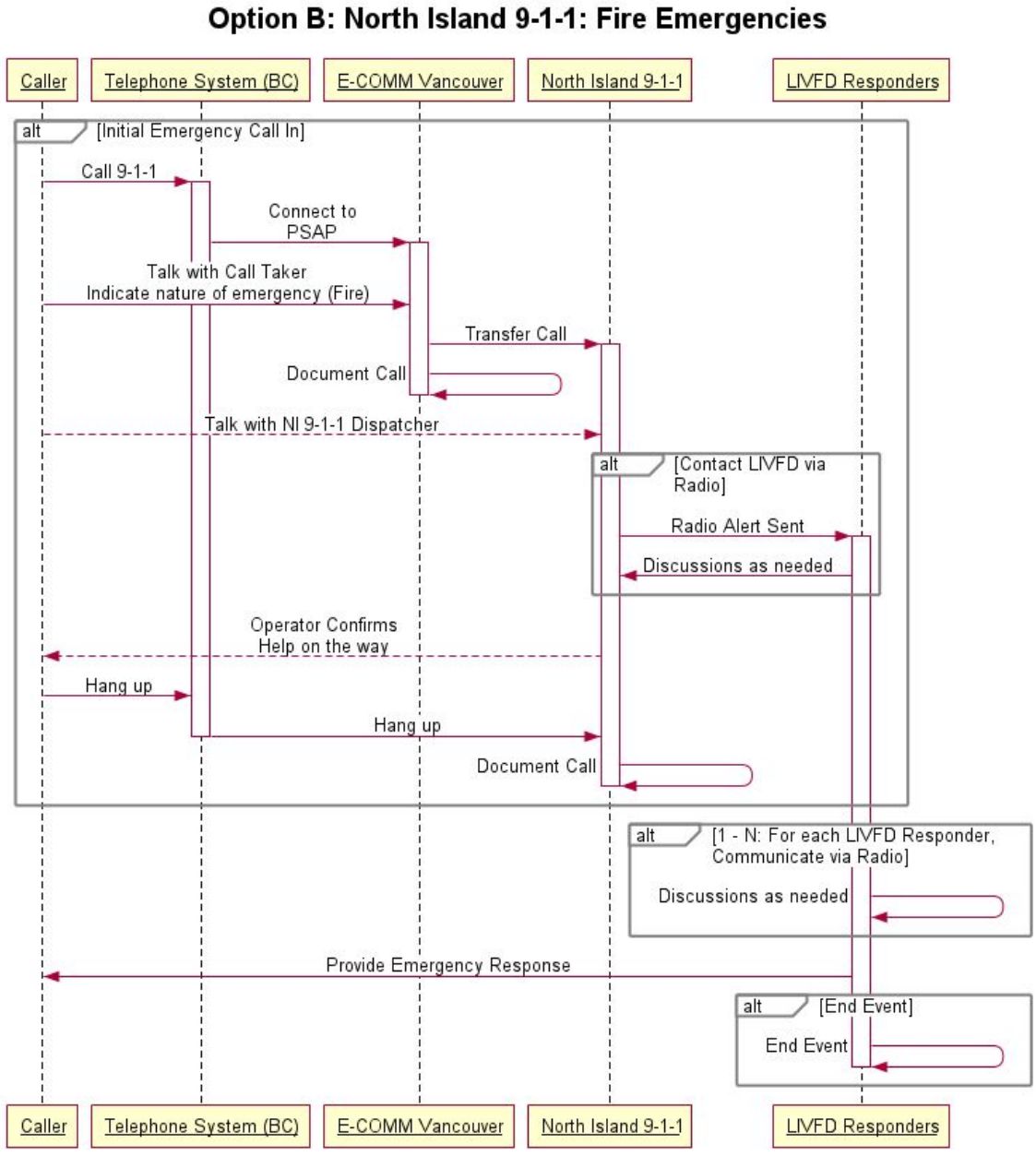


Figure 7 - NI 9-1-1 System Fire Interactions Diagram

[5] More details on how to read a UML Interaction Diagram can be found at https://archive.is/bKD4

6.2.2.3.1.2 Medical emergencies

The below UML Interaction Diagrams show interactions between the different entities involved in the NI 9-1-1 system for medical calls:

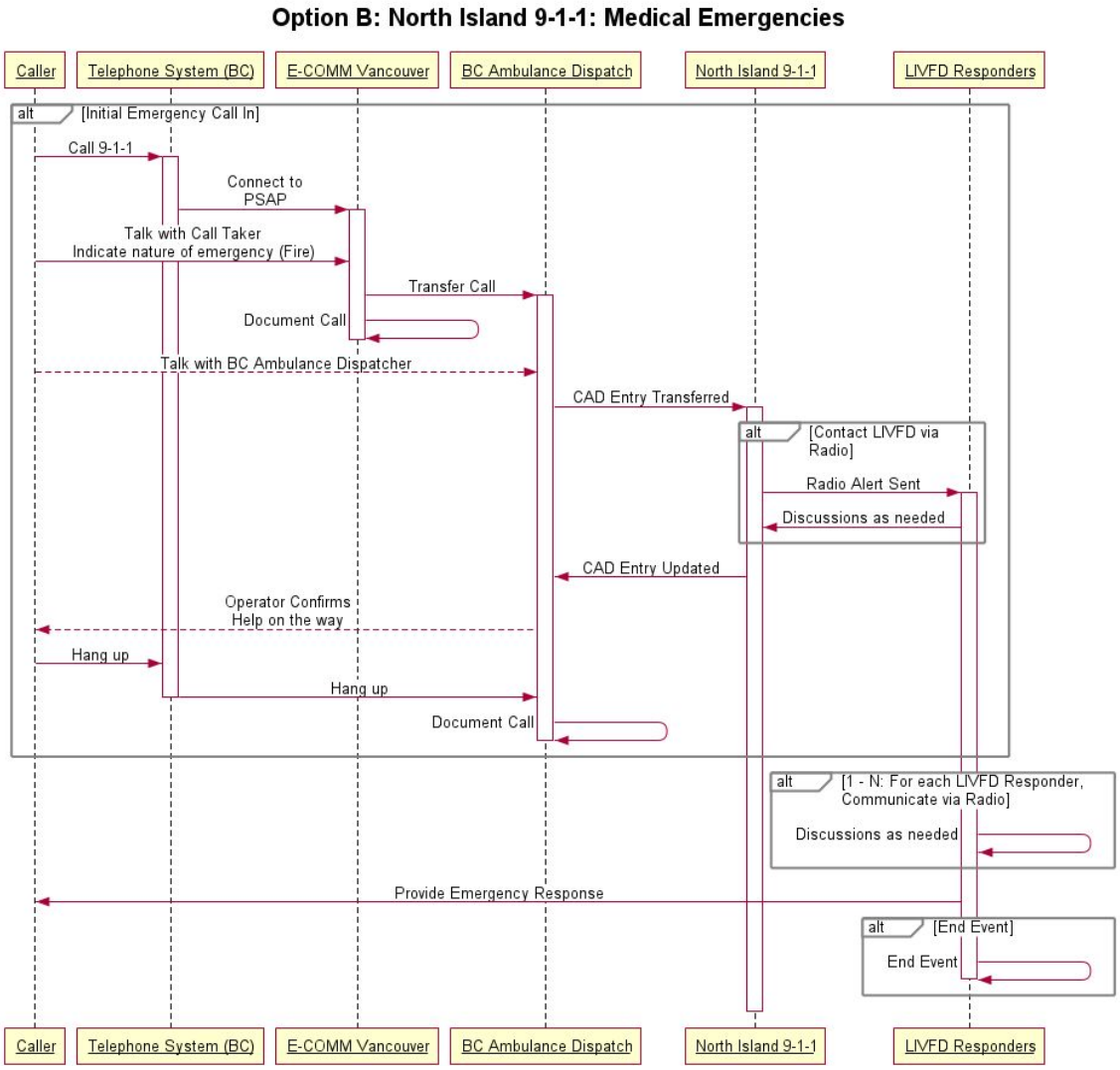


Figure 8 - NI 9-1-1 System Medical Interactions Diagram

6.2.2.3.2 Failure analysis

6.2.2.3.2.1 Fire emergencies

This section describes the worst-case consequences of various failures on the success of the dispatch system for fire emergencies. Each relevant interaction from the corresponding diagram is listed, along with a description of the failure and the resulting consequence.

Caller -> Telephone System (BC): Call 9-1-1

- Caller unable to reach telephone — No dispatch
- Caller unable to dial telephone — No dispatch
- Caller's phone service out (Telus) — No dispatch
- Caller's phone service overloaded (Telus) — No dispatch
- Caller has no cell coverage — No dispatch
- Caller's phone service unavailable due to fire — No dispatch

Telephone System (BC) -> E-COMM Vancouver: Connect to PSAP

- E-COMM unreachable (Telus) — No dispatch
- E-COMM down — No dispatch
- E-COMM overloaded — Increased dispatch time

Caller->E-COMM Vancouver: Talk with Call Taker, Indicate nature of emergency (Fire)

- No Cell location & Caller can't provide location — Increased response time
- Call dropped due to fire — No dispatch, Police sent
- Call disconnected due to moving to safe location — No dispatch, Police sent

E-COMM Vancouver -> North Island 9-1-1: Transfer Call

- E-COMM phone service out (Telus) — No dispatch
- E-COMM phone service overloaded (Telus) — No dispatch
- NI 9-1-1 unreachable (Telus) — No dispatch
- NI 9-1-1 down — No dispatch
- NI 9-1-1 overloaded — Increased dispatch time

E-COMM Vancouver -> E-COMM Vancouver: Document Call

- Forget to document — No documentation

Caller -> North Island 9-1-1: Talk with NI 9-1-1 Dispatcher

- No Cell location & Caller can't provide location — Increased response time
- Call dropped due to fire — No Effect
- Call disconnected due to moving to safe location — No Effect

North Island 9-1-1 -> LIVFD Responders: Radio Alert Sent

- NI 9-1-1 VHF system down — No dispatch
- NI 9-1-1 Lasqueti Repeater(s) down — Increased dispatch time
- All pagers/radios off/discharged/no coverage — No dispatch
- Some pagers/radios off/discharged/no coverage — Increased dispatch time

North Island 9-1-1 -> Caller: Operator Confirms Help on the way

- Call dropped due to fire — No Effect
- Call disconnected due to moving to safe location — No Effect

North Island 9-1-1 -> North Island 9-1-1: Document Call

- Forget to document — No documentation

LIVFD Responders -> LIVFD Responders: Discussions as needed

- Lasqueti Repeater(s) down — Increased dispatch time
- All pagers off/discharged/no coverage — Increased dispatch time
- Some pagers off/discharged/no coverage — Increased dispatch time

LIVFD Responders->Caller: Provide Emergency Response

- Responders unable to locate fire — No response
- Responders unable to reach fire — No response
- Responders arrive too late — Limited response

LIVFD Dispatchers -> LIVFD Dispatchers: Document Event

- Forget to document — No documentation

6.2.2.3.2.2 Medical emergencies

This section describes the worst-case consequences of various failures on the success of the dispatch system for medical emergencies. Each relevant interaction from the corresponding diagram is listed, along with a description of the failure and the resulting consequence.

Caller -> Telephone System (BC): Call 9-1-1

- Caller unable to reach telephone — No dispatch
- Caller unable to dial telephone — No dispatch
- Caller's phone service out (Telus) — No dispatch
- Caller's phone service overloaded (Telus) — No dispatch
- Caller has no cell coverage — No dispatch

Telephone System (BC) -> E-COMM Vancouver: Connect to PSAP

- E-COMM unreachable (Telus) — No dispatch
- E-COMM down — No dispatch
- E-COMM overloaded — Increased dispatch time

Caller->E-COMM Vancouver: Talk with Call Taker, Indicate nature of emergency (Fire)

- No Cell location & Caller can't provide location — Increased response time
- Call disconnected due to moving to safe location — No dispatch, Police sent

E-COMM Vancouver -> BC Ambulance Dispatch: Transfer Call

- E-COMM phone service out (Telus) — No dispatch
- E-COMM phone service overloaded (Telus) — No dispatch
- BC Ambulance Dispatch unreachable (Telus) — No dispatch
- BC Ambulance Dispatch down — No dispatch

- BC Ambulance Dispatch overloaded — Increased dispatch time

E-COMM Vancouver -> E-COMM Vancouver: Document Call

- Forget to document — No documentation

Caller -> BC Ambulance Dispatch: Talk with BC Ambulance Dispatcher

- No Cell location & Caller can't provide location — Increased response time
- Call dropped — Increased response time
- Call disconnected due to moving to safe location — Increased response time

BC Ambulance Dispatch -> North Island 9-1-1: CAD Entry Transferred

- BC Ambulance Dispatch network down (Telus) — No dispatch
- NI 9-1-1 unreachable (Telus) — No dispatch
- NI 9-1-1 down — No dispatch
- NI 9-1-1 overloaded — Increased dispatch time

North Island 9-1-1 -> LIVFD Responders: Radio Alert Sent

- NI 9-1-1 VHF system down — No dispatch
- NI 9-1-1 Lasqueti Repeater(s) down — Increased dispatch time
- All pagers/radios off/discharged/no coverage — No dispatch
- Some pagers/radios off/discharged/no coverage — Increased dispatch time

BC Ambulance Dispatch -> Caller: Operator Confirms Help on the way

- Call dropped — No Effect
- Call disconnected due to moving to safe location — No Effect

North Island 9-1-1 -> North Island 9-1-1: Document Call

- Forget to document — No documentation

LIVFD Responders -> LIVFD Responders: Discussions as needed

- Lasqueti Repeater(s) down — Increased dispatch time
- All pagers off/discharged/no coverage — Increased dispatch time
- Some pagers off/discharged/no coverage — Increased dispatch time

LIVFD Responders->Caller: Provide Emergency Response

- Responders unable to locate caller — No response
- Responders unable to reach caller — No response
- Responders arrive too late — Limited response

LIVFD Dispatchers -> LIVFD Dispatchers: Document Event

- Forget to document — No documentation

6.2.2.3.2.3 Conclusions

The critical failure modes are as follows:

1. If phone service (land-line and/or cellular) is down or out of service, initial dispatch will not happen.

   This is the most frequent type of failure, and has the most significant impact.

   Any attempts to improve dispatch reliability should start here. However, this is largely out of the control of the LIVFD and the PRRD. Given this, investigations should be undertaken around a “made on Lasqueti” emergency notification system that will still work in the absence of a working telephone.

2. Since all calls flow through the E-COMM PSAP and NI 9-1-1 dispatch centre, if these are overloaded due to a major event in a more populated urban area, it is likely that calls will not go through and dispatch will not happen.

3. This system is highly dependent on Telus’ voice and data networks. In the event that communications between Vancouver Island and Vancouver is severed, Telus will redirect 9-1-1 calls to a backup PSAP in Victoria.

In summary, Option B provides a far more resilient and reliable system compared with Option A by providing multiple alternative communication paths for the LIVFD to enable dispatch communication, even in the event of multiple failures.

6.2.2.4 Cost analysis

6.2.2.4.1 Setup costs

VHF radio repeater tower(s):	$60,000[6] to $500,000[7]
Backup paging equipment:	$10,000[8]
Land leasing and clearing:	not included
Civic addresses mapping:	$18,628[9]
Pagers:	$15,000 to $21,000[10]
Identification document changes:	$20,000 to $40,000[11]
Total initial setup costs:	Approximately $123,600 to $589,600

6.2.2.4.2 Annual operating costs

NI 9-1-1 (regional emergency telephone service):	$7,624[12] / year
Civic addresses (regional house numbering service):	$420[13] / year
Radio and pager repair and replacement:	$5,000[14] / year
Total annual operating costs:	Approximately $13,000 / year

[6] PRRD Regional Board meeting agenda, Dec 17, 2014, pg 53-55. Also PRRD Committee of the Whole meeting agenda, Dec 14, 2014, pg 67-74. Note that these tower costs were for placement on Mt. Trematon, which is not feasible. These costs were used as estimates for placement of a communications tower on Mt. Davies, Texada Island, which is effectively on hold due to opposition from the Texada community as indicated in minutes of the NI 9-1-1 Board June 26, 2015 and Oct 2, 2015. The Oct 2, 2015 minutes of the NI 9-1-1 Board report that public consultation on Texada is in progress.

[7] Jan 13, 2015 letter from D. Oakman of NI 9-1-1, re. “Mt. Trematon Nature Reserve on Lasqueti Island – 9-1-1 fire dispatch services”, and email from R. Zaleschuk of NI 9-1-1 to clarify figures in letter from D. Oakman (see Appendix G).

[8] Nov 21, 2014 letter from R. Zaleschuk of NI 9-1-1, re. “Radio Dispatching Coverage – Lasqueti Island”

[9] PRRD Regional Board meeting agenda, Jan 22, 2015.

[10] 30-35 Motorola Minitor VI pagers at a cost of $500 - $600 each (estimates from RadioWorks).

[11] Cost of a passport change: $120. Round trip cost of a trip per person to locations on Vancouver Island: least $40. Average cost per person: $50 to $100 for 400 residents.

[12] PRRD Regional Board meeting agenda, Dec 17, 2014, pg 53-55. Also PRRD Committee of the Whole meeting agenda, Dec 14, 2014, pg 67-74.

[13] PRRD Regional Board meeting agenda, Dec 17, 2014, pg 53-55. Also PRRD Committee of the Whole meeting agenda, Dec 14, 2014, pg 67-74.

[14] PRRD 2016-2020 Financial plan, pg 35-42 (Jan 14, 2016 Rural Services Committee agenda), regional fire department communications operations and maintenance expenditures for 2016 include $5,150 for Savary Island FD, $5,000 for Malaspina FD and $6,000 for Northside FD. Lasqueti Island FD shows communications O & M expenditures were projected to increase from $1,094 in 2015 to $5,000.

6.2.2.4.3 In-kind contributions

VHF radio and pager implementation

VHF radio and pager training

Incident Locator Tool setup

Incident Locator Tool data collection

Incident Locator Tool training

Incident Locator Tool data upkeep

6.2.2.4.4 Projected future capital costs

Capital costs for upkeep of towers and radio repeater equipment are assumed to be paid by NI 9-1-1.

Assuming a future transition from analogue VHF radios to APCO P25 digital radios, there will be a significant capital cost to replace all radio equipment.

6.2.2.5 Community interests

6.2.2.5.1 Firefighter and first responder safety

The degree to which the dispatch system increases firefighter and first responder safety.

The most significant safety risks associated with LIVFD operations are fire-fighting activities, medical response activities, and vehicle operation. Dispatchers do not experience any of these significant safety risks associated with the execution of their dispatching duties as they can perform their duties from any operational phone wherever they are at the time the system is activated.

The North Island 9-1-1 system notifies dispatchers and first responders with a radio-pager alert that does not require an immediate response. This gives a driver time to pull over at a safe location before reading or responding to the page, as it does not demand an immediate response that may distract from safely operating a vehicle. Furthermore, as no voice messages are played as part of the page, there is minimal distraction or additional information load placed on a driver.

Once the initial notification has been sent out, the NI 9-1-1 operator can talk with LIVFD members over the VHF radio system, which is linked into NI 9-1-1's system. As there is a live operator, drivers can pull over and ask for information to be repeated if they did not catch the radio traffic.

As NI 9-1-1 identifies the location of the fire by the civic address associated with the caller's land-line (and in the future, the GPS coordinates of the caller's cell phone), and given that the NI 9-1-1 operator can talk with the caller to obtain additional location information, this information can be quickly and accurately disseminated to the LIVFD members that have indicated that they are immediately available to respond. This minimizes delays in determining the location of an emergency, which can result in a more severe fire or medical emergency, and heightened safety risks to firefighters and medical responders.

As the NI 9-1-1 operator talks directly with the original caller, they can remain on the line to help the caller address the emergency situation and to gather additional information. Since this happens within tens of seconds of making the initial call, in situations, such as where a fire makes it unsafe for the caller to remain at the telephone, the caller is more likely to be able to convey information about the nature of the emergency. The NI 9-1-1 operator can then relay this information to LIVFD firefighters and first responders, which allows them to be better informed and prepared for hazards or access issues that may exist at the site of the emergency.

Since post-dispatch communication is out of scope of the committee, these aspects of LIVFD operations have not been addressed in this analysis. In the NI 9-1-1 option, alerting, dispatch and post-dispatch share a common radio-based communication system.

6.2.2.5.2 Appropriateness of cost/benefit given Lasqueti situation

The relative costs to benefits of the dispatch system given the needs of the community, the remote nature of Lasqueti Island, the size of the population and the ability to pay for the service.

The NI 9-1-1 system provides a higher level of service at a higher capital cost. Once set up, operating costs are slightly higher than the current operating costs for the existing pager-based dispatch system. Costs primarily result from mapping, capital equipment and the need to set up radio communication infrastructure required to allow NI 9-1-1 to notify and contact LIVFD members.

Significant capital and startup costs are required, as dedicated tower(s) would need to be erected to provide sufficient radio coverage. Cost details can be found in section 6.2.2.4.

These tower(s) would be needed, because according to NI 9-1-1:

> *"NI 911 Corp staff have conducted extensive radio testing on Lasqueti and have concluded that the installation of a solar power VHF radio repeater near the peak of Mt. Trematon to be the only reliable, cost effective solution."*[15]

The Trematon site is located in a nature reserve managed by the Islands Trust Fund. When NI 9-1-1 requested permission to use this site, the Trust Funds Board responded with motion TFB-2015-051[16] where they indicated that the following approvals and regulatory changes would be required:

- The Lasqueti Land Use Regulations do not currently permit the erection of any structures on Mt. Trematon, and would need to be changed by the community and Lasqueti Local Trust Committee,
- Approval by the donors of the property (the Gordon family),
- Approval by the covenant holders,
- Approval by Environment Canada, and,
- Approval by the Trust Fund Board

Due to these difficulties, the Trematon option was not considered further, and was replaced with an option to use a tower on Mt. Davies on Texada Island. Costs for the Mt. Davies option have not been provided, and there is significant community opposition from Texada against locating an antenna there[17].

Given the unavailability of the Mt. Trematon option, and NI 9-1-1's professional opinion regarding the lack of other options, the likelihood of high capital costs associated with the service raises significant community concerns about the cost-benefits of the system, especially given the small population and the relative infrequency of fire or medical alert calls. These high initial capital costs would result in a burden on some taxpayers, especially those who have a fixed income, and/or are under other financial pressures

[15] Jan 13, 2015 letter from Debra Oakman of NI 9-1-1, re. "Mt. Trematon Nature Reserve on Lasqueti Island – 9-1-1 fire dispatch services"
[16] Jan 21, 2015 Trust Fund Board Regular Meeting Minutes, Page 4
[17] June 26, 2016 NI 9-1-1 Board minutes, Page 2

resulting from rising property values and other new or increased tax burdens in other areas funded by the Regional District.

6.2.2.5.3 Ensure dispatch involves appropriate training

The degree to which the dispatch system supports and facilitates appropriate training of dispatchers, first responders and firefighters.

NI 9-1-1 provides training documentation, a comprehensive set of operations guidelines [18], and training activities that have been developed in conjunction with other member fire departments. These training materials, guidelines, and activities will complement existing LIVFD training documentation and activities.

6.2.2.5.4 Local knowledge

The ability to use LIVFD's local knowledge to dispatch, locate, and respond to incidents. Use of local knowledge is valuable because it increase the effectiveness and appropriateness of emergency response. However, local knowledge can be unavailable, ad-hoc and informal.

The North Island 9-1-1 dispatch option will provide additional information about emergencies obtained by accessing civic addresses associated with the caller's land-line, and information obtained by the NI 9-1-1 operator talking directly with the caller. This ensures that clear information about the location of the emergency will be provided at the time of dispatch.

Due to the rural nature of Lasqueti Island, local knowledge will remain important to the department's operations, given that access to many structures may not be straightforward, and civic addresses only provide directions to the driveway. Many property access roads are overgrown or not built to support full size heavy trucks, and some residences are only accessible by trail or water.

Examples of local knowledge include:

- General property location (Civic address provided by NI 9-1-1)
- Driving directions to property (Provided by NI 9-1-1 optional services)
- Driving/access directions to structures
- Restrictions when accessing property/structures
- Hazards
- Nearby firefighting resources
- Property owner

Local knowledge about property locations will be captured by PRRD mapping activities, which will locate structures using aerial photography, assign civic address numbers corresponding to road frontage, and confirm information with cooperating property owners. All mapping data will be obtained in accordance with PRRD mapping standards.

6.2.2.5.5 Minimal points of failure

[18] An example can be found here: http://www.ni911.ca/files/RadioProcedureforUserFireDepartments.pdf

The degree to which the dispatch system has the fewest parts that if they fail, service is disrupted.

The NI 9-1-1 system has several major parts that if they fail, dispatch does not take place. The main parts of concern are:

- Lasqueti land-line telephone system
- Cellular phone network
- Telus communication network
- E-COMM PSAP
- NI 9-1-1 dispatch centre
- NI 9-1-1 radio network

This system has a significantly higher number of components required for a successful dispatch when compared to the current system. This is somewhat offset by the degree to which the E-COMM PSAP and NI 9-1-1 fire dispatch centre are hardened against failures and have backup sites.

A detailed interactions diagram identifying the various parts of the system can be found in section 6.2.2.3.

6.2.2.5.6 Redundancy

The degree to which the dispatch system continues to operate in the presence of failures and faults, including technological failures, operational failures, and human error.

The NI 9-1-1 system is dependent on the local telephone system, which has numerous single points of failure. If a caller is unable to place a call, no dispatch can take place. This point of failure is common to any system that includes the use of local land-lines.

The NI 9-1-1 system depends on the availability and operations of both the E-COMM PSAP and NI 9-1-1 fire dispatch centre. While these sites are hardened and have backups, they are susceptible to overloading during storms or other major events.

The NI 9-1-1 system is dependent on a VHF radio system to notify and contact LIVFD members. If repeaters or towers are non-operational, coverage may be degraded or communication may be unavailable.

If radios or radio-pagers are in areas without coverage, are not charged, not operational or not turned on, pages are not received. However all pagers must simultaneously fail to receive a page delivered in order to result in a dispatch not taking place.

A detailed failure analysis can be found in section 6.2.2.3.2.

6.2.2.5.7 Easy to use and understand

The degree to which the dispatch system can easily be understood by all involved parties, including the public, and the degree to which the system is easy for dispatchers to successfully dispatch firefighters and first responders.

The NI 9-1-1 system is easily understood by visitors and residents alike, as calling 9-1-1 in the event of a fire or medical emergency is well-understood and used in most populated parts of Canada and the United States.

No special numbers must be memorized or kept on a reference card, and many phones already have an emergency button or mode that calls 9-1-1[19]. Having a short, standardized and well-known number is especially important during a medical or fire emergency when the caller is likely under intense stress

Once 9-1-1 is called, you are quickly connected with an operator that will connect you to a B.C. Ambulance operator for medical emergencies, or to a North Island 9-1-1 operator for fire emergencies. This means that you are tens of seconds away from being able to talk with someone who can directly help you, collect information about the emergency, and confirm that help is on the way.

Once an initial alert is received from NI 9-1-1, the process is also straightforward for LIVFD dispatchers, first responders, and firefighters. NI 9-1-1 operational guidelines indicate how the alert is made, and LIVFD procedures define how the response is organized and communicated, with NI 9-1-1 being able to monitor local radio traffic, and assist where needed.

6.2.2.5.8 Happy first responders and firefighters

The degree to which the first responders and firefighters are happy with the dispatch system, and feel that it meets their needs.

The NI 9-1-1 system will significantly increase first responder and firefighter happiness by reducing uncertainty when an alert is received, as critical information about the location of the emergency will already have been determined. The radio system improvements will also increase coverage. Finally, the dispatch system will be more standard and will be able to benefit from common training materials and activities.

First responder and firefighter happiness is also co-dependent on community happiness in the service (see section 6.2.2.6.14), which in turn depends on meeting community interests to a reasonable/acceptable degree.

6.2.2.5.9 Local dispatch

The degree to which the dispatch system allows for dispatching to be done by dispatchers on Lasqueti.

The NI 9-1-1 system will transfer the responsibility for directly communicating with the caller, and for locating the emergency, to the NI 9-1-1 dispatchers.

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[19] However accidental dialing of 9-1-1 is a significant concern, and dropped 9-1-1 calls are responded by the police.

Local dispatchers will still be able to assist in initiating deployment of resources (personnel/equipment) as prescribed by department procedures, keep records and provide follow up communications as directed by the Incident Commander, but will no longer be permitted to be called “dispatchers”, in order to avoid confusion on the NI 9-1-1 run radio channel.

6.2.2.5.10 Retain B.C. Ambulance understanding about Lasqueti situation

The degree to which the dispatch system allows for the relationship between B.C. Ambulance and Lasqueti LIVFD to be retained for medical emergencies.

Under the NI 9-1-1 system, B.C. Ambulance will no longer directly communicate with the LIVFD, but rather will coordinate through NI 9-1-1. Having an intermediary will require the LIVFD to clearly communicate and coordinate with NI 9-1-1 and B.C. Ambulance to ensure that the remote nature of Lasqueti is understood (e.g. boat or air evacuation).

6.2.2.5.11 Local control

The degree to which a local group (e.g. LIVFD) are able to make decisions regarding management and operation of the dispatch system.

The NI 9-1-1 system will transfer control of dispatch from the LIVFD to NI 9-1-1.

NI 9-1-1 is a large organization that serves many fire departments across Northern Vancouver Island, and nearby smaller islands and mainland, and the LIVFD will represent a very small fraction of their client base and call volume. Based on previous experience with NI 9-1-1, it is reasonable to expect that exceptions will not be made for Lasqueti, and that the LIVFD will be expected to conform to existing NI 9-1-1 procedures and policies and new policies and procedures enacted in the future.

Due to the “No Withdrawal” nature of emergency telephone services provided by regional districts, there is no ability to leave or leverage to negotiate if problems arise. Our sole recourse would be to pressure the PRRD to pressure NI 9-1-1, since as they are a shareholder, they have a seat on the NI 9-1-1 board.

6.2.2.5.12 Accessible to all

The degree to which the dispatch system is accessible to all areas of Lasqueti Island where emergency services are provided.

The NI 9-1-1 system is accessible to all residents and visitors that have a working land-line phone service, or have cellular coverage. This excludes many residences that do not have installed (or operating) phone service, or are outside of cellular coverage. Due to lack of investment in the land-line phone infrastructure on Lasqueti, and infrequent repair service visits, it is common for there to be phone service outages for large numbers of subscribers, and for the duration of these outages to extend in some cases for multiple months.

Improvements to the LIVFD VHF radio-communication system will reduce the number of dead-zones where LIVFD members cannot be notified by the NI 9-1-1 dispatcher in the event of an emergency.

6.2.2.5.13 Locate people accurately & effectively

The degree to which the dispatch system is able to accurately and effectively locate incidents.

In Canada, basic 9-1-1 service connects a 9-1-1 call to a PSAP, where the caller must identify their location to the operator. Enhanced 9-1-1 service connects a 9-1-1 call to a PSAP, where the operator is automatically provided the phone number and address or location of the caller.[20]

The NI 9-1-1 system will automatically display the civic address of a land-line caller, (and in the future, the GPS coordinates of the caller). This allows NI 9-1-1's InformCAD Computer Assisted Dispatching (CAD) system to automatically show the location of the caller on a map. As the NI 9-1-1 dispatcher is able to immediately talk with the caller, they are able to find out additional details on the caller's location.

Location information associated with civic addresses is only as accurate and precise as the mapping data provided to NI 9-1-1. In order to ensure high-quality mapping data is used, the PRRD will create detailed mapping of all residences visible in aerial photography, along with information provided from residents. This mapping data will be cross-referenced with civic addresses assigned as part of a House Numbering Service provided by the PRRD, which will assign street addresses to all residences. These street addresses will be attached to the residences included in the mapping, and residents with Telus land-line phone service will be required to change their addresses to their official civic address. Once this is done, Telus will update its Master Street Address Guide (MSAG), a database which cross-references a caller's phone number and civic address. This database is used to provide address information automatically when 9-1-1 is dialed (known as automated-number-identifier (ANI) and automated-location-information (ALI) data), and once received, matches up with the civic address data included in PRRD's mapping to allow the caller's location to be displayed by the CAD system at the E-COMM PSAP and at the NI 9-1-1 dispatch centre.

In the future, when cell phone location information is able to be provided to North Island 9-1-1, the presence and accuracy of location information will depend on the type, age, and use of the cell phone. Cell phones without a built-in GPS use a system known as "triangulation" to identify the location of callers with an accuracy of 300 metres, however, this approach only works well when there are multiple cell towers reachable by the phone, and may result in delays before location information becomes visible to the 9-1-1 operator[21]. Consequently, many parts of Lasqueti that have poor service coverage which will likely result in misleading or unavailable location triangulation results.

More recently manufactured cell phones come with built-in GPS receiver(s), which provides more accurate location information, but this capability requires the cell phone to

[20] http://crtc.gc.ca/eng/phone/911/can.htm
[21] https://transition.fcc.gov/pshs/911/Apps%20Wrkshp%202015/911_Help_SMS_WhitePaper0515.pdf

have been turned on for a period of time in order to acquire the GPS signal and compute a location, and GPS locations are less reliable and accurate in dense foliage or inside buildings. If a cell phone does not have a plan, or does not have sufficient minutes, calling 9-1-1 results in “basic 9-1-1”, and no location information is provided automatically[22].

Due to these limitations, even when location information is provided, the ability of the 9-1-1 operator to talk directly with the caller is often the primary means by which the caller’s location is determined.

Once the caller’s location has been communicated by the NI 9-1-1 dispatcher to the LIVFD members responding to the emergency, the degree to which the first responders can locate the caller is also dependent on local knowledge. For example, the caller may use local landmark names that are not known to the out-of-town NI 9-1-1 dispatcher, or may be referring to locations on their property that are not marked on the PRRD mapping.

6.2.2.5.14 Not tied to contract we can’t get out of

The degree to which the dispatch system can be adjusted and changed as needed. Refers in part to the “No Withdrawal" regulation for regional emergency telephone services.

The NI 9-1-1 system requires that the PRRD begin providing an emergency telephone system service for Electoral Area E. Under the Local Government Act Regional District Service Withdrawal Regulation[23], once an emergency telephone system service, including an emergency 911 system is provided by a regional district, it cannot be withdrawn, so Lasqueti would be locked into this service forever (unless the law was changed, which is unlikely).

The PRRD, as the provider of the emergency telephone system service, will have final determination over how the service is provided. However, it should be noted that:

- The PRRD is a shareholder in NI 9-1-1,
- The PRRD uses NI 9-1-1 for all areas except for Lasqueti,
- The PRRD has indicated they wish to standardize emergency services, and,
- The B.C. Provincial government has indicated that 9-1-1 is the preferred emergency dispatch system for the province, including rural and remote areas[24]

Based on this, it is unlikely that if an emergency telephone system service was provided for Lasqueti, a system other than NI 9-1-1 would be used.

6.2.2.5.15 Feedback when successful dispatch

[22] http://crtc.gc.ca/eng/phone/911/can.htm
[23] http://www.bclaws.ca/Recon/document/ID/freeside/72_398_2000
[24] March 2015. Emergency Communications Service Delivery in British Columbia. Police Communications Centres and 911 PSAP. Strategic Vision Discussion Paper. BC Ministry of Justice.

The degree to which the dispatch system lets the public calling in knowing that help is on the way.

The NI 9-1-1 system has a live operator that stays on the line with the caller during the dispatch process. The operator is able to receive updates from responding LIVFD members, and relay information back to the caller. This provides the caller with prompt and accurate indications that help is on the way.

6.2.2.5.16 Local repairability

The degree to which the dispatch system can be maintained and modified by a local group (e.g. the LIVFD).

The NI 9-1-1 system is completely out-sourced, with all components, including the radio communications network, being owned and operated by third parties. No components of the dispatch system will be able to be maintained or modified by local groups, including the LIVFD.

6.2.2.5.17 Future-proofing

The degree to which the dispatch system can be future-proofed, upgraded, and be resilient to technological changes and changes in needs.

The NI 9-1-1 system is based on many different technologies which range in age. The 9-1-1 system in general is working towards a modernization programme, known as NG9-1-1 (Next Generation), which moves to an Internet-based foundation, and allows emergency calls via text message and other platforms. Moving to an NG9-1-1 system will require many years of work, and will require significant additional funding sources which are yet to be determined[25].

While many skilled individuals and organizations worldwide spend significant time and resources on designing, implementing and validating improvements to the 9-1-1 system, improvements are slow to roll out, and public safety organizations are rightfully conservative, given the life-critical nature of the services they provide.

6.2.2.5.18 Knowing what we are getting into/committing to

The degree to which the groups responsible for the dispatch system clearly communicate with the community regarding decisions and consequences associated with those decisions.

The NI 9-1-1 system requires trusting a third party to determine how dispatch should best be done. NI 9-1-1 and PRRD have provided detailed documentation describing the nature of the NI 9-1-1 system and held several public meetings on Lasqueti to present and answer questions about the system and the transition.

However, since the decision to move to 9-1-1 was not widely communicated with the community, and because significant political (no-withdrawal clause) and cost implications

[25] A Report on Matters Related to Emergency 9-1-1 Services, CRTC

(tower costs if Mt. Trematon couldn't be used) were not communicated at all, there is a lack of trust in the community regarding the future consequences of using NI 9-1-1.

Due to the no-withdrawal clause, NI 9-1-1 can effectively make changes or require additional costs in the future with little to no recourse for Lasqueti.

In addition, references to the Fire Underwriters Survey[26] (FUS) in relation to the dispatch changes, by PRRD and community members, has also raised some concerns about implications because some of the FUS recommendations seem to lack community support.

6.2.2.5.19 Simplicity

The degree to which the dispatch system is simple, both with respect to its design and use.

The NI 9-1-1 system involves multiple components, namely:

- Land-line phone system or cellular phone system
- Telecommunication connectivity to Vancouver
- E-COMM 9-1-1 centre in Vancouver
- Telecommunication connectivity from E-COMM to NI 9-1-1 dispatch centre
- Telecommunication connectivity from E-COMM to B.C. Ambulance
- B.C. Ambulance centre in Victoria
- Telecommunication connectivity from B.C. Ambulance to NI 9-1-1 dispatch centre
- NI 9-1-1 radio communication network
- LIVFD radio communication system

Many of these components, especially those designed to be reliable and resilient, are extremely complex.

The use of the system is very simple:

- Dial 9-1-1
- Indicate to the E-COMM operator "Fire", "Medical", or "Police"
- For Fire, talk with the NI 9-1-1 dispatcher to describe the nature of the emergency
- For Medical, talk with B.C. Ambulance operator to describe the nature of the emergency
- Dispatching of LIVFD medical responders and firefighters to respond to the emergency is handed behind the scenes.

It is important to note that simplicity is separate from usability and ease of use, which is covered in a different interest. You can have a system that is simple and difficult to use, or a system that is complex but easy to use.

6.2.2.5.20 Tax implications & costs

[26] 2008. Fire Underwriters Survey. Review of Fire Protective Services for Fire Insurance Grading, Lasqueti Island, BC.

The degree to which the dispatch system requires or avoids high short-term and/or long-term tax costs.

The NI 9-1-1 system requires a significant up-front capital investments in order to conduct the required mapping and VHF radio infrastructure improvements. Once operational, costs are not significantly different from the current LIVFD dispatch operating costs.

NI 9-1-1 offers additional "Optional Value Services", such as access to the Visinet Browser to generate Incident Reports, which are required when completing fire reports for the Fire Commissioner's Office, and Visinet Mobile, a hardware/software solution which provides access to incident information on a mobile device at home, work, fire truck, etc.[27] If the PRRD and/or LIVFD were to elect to adopt any of these services, there would be additional capital and operating costs that would need to be paid by taxpayers or by donations to the LIVFD.

Details for the capital and operating costs are provided in section 6.2.2.4.

In addition to tax increases, residents will have to spend time and pay the costs to update their IDs, passports, accounts and other identity documents to specify their newly assigned civic address. Passport replacement cost $120 per person (i.e. up to $48,000 additional costs to Lasqueti residents, if all residents have a passport). Given the isolation of Lasqueti, this updating to account for civic addresses would also incur transport costs for residents.

Once Electoral Area E begins receiving 9-1-1 service, Telus will add an additional "9-1-1 service fee" of $0.67 to each subscriber's monthly land-line phone bill[28].

6.2.2.5.21 Dispatch recognizes that some people are accessible by trail or water access only

The degree to which the dispatch system recognizes that some residents and locations on Lasqueti Island have no road access.

The NI 9-1-1 system would be limited to the mapping provided by the PRRD, which is not currently scoped to include trails, water-access designations and other unusual access restrictions unless volunteered by the land owner to PRRD's mapping staff.

The ability for a caller to talk with the NI 9-1-1 dispatcher helps facilitate the communication of any special access needs at the time of the emergency.

6.2.2.5.22 Equal value and access for everyone

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[27] See FILE NO: 2320-20 NI911, DISTRICT OF UCLUELET

[28] Based on March 2001, Review of 9-1-1 Services for the Capital Regional District, by Planetworks Consulting, Page 91. Available at https://www.crd.bc.ca/docs/default-source/crd-document-library/committeedocuments/planningtransportationandprotectiveservicescommittee/20110525/agenda-item-6a---pps-ps2011-04---crd-911-call-answer-reviewR.pdf?sfvrsn=0

The degree to which all people who pay for the dispatch system receive equal service.

The NI 9-1-1 system is only accessible to people with phone service, but will provides better location service for Telus land-line subscribers, as cell phone callers must currently provide their location to be manually entered by the North Island 9-1-1 dispatcher[29]. In the future, cell phone GPS coordinates may be able to be used to locate the caller (subject to the accuracy of the GPS).

The improvements in the LIVFD radio system will assist with all LIVFD operations.

6.2.2.5.23 Not dependent on systems that will be non-functional in a disaster

The degree to which the dispatch system will continue to function in the event of a major disaster, such as an earthquake or major storm.

The NI 9-1-1 system is dependent on the telephone system, communication links between Lasqueti, Vancouver, Victoria and Campbell River, the E-COMM facility in Vancouver, the NI 9-1-1 facility in Campbell River, and the NI 9-1-1 radio network.

In the event of a major disaster, it is likely that these systems will be non-functional, degraded, or overloaded. Lasqueti Island will be "on their own" without a functional dispatch system[30].

It is also likely that in the event of a major disaster that there will be no local telephone service, as the local phone system ceases to function if communication to Lasqueti is disrupted. While this will prevent the public from accessing 9-1-1 to initiate dispatch, NI 9-1-1's tower(s), if still operational, can assist with local on-island radio communication.

6.2.2.5.24 Ability to be involved

The degree to which the public can be involved in decisions that affect the local dispatch system.

The NI 9-1-1 system is run by the NI 9-1-1 corporation, employing professional personnel experienced in public safety operations and industry best practices. As such, there is limited willingness and ability for NI 9-1-1 to work with and allow for community participation, as has been evidenced by their refusal to consider any changes to the proposed 9-1-1 deployment.

While the public would still be able to be involved with the LIVFD and with the PRRD, these organizations are subscribers and shareholders in NI 9-1-1, respectively, so the ability to be involved are still limited.

6.2.2.5.25 Takes advantage of existing local infrastructure

[29] See http://www.nisl911.bc.ca/main_dispatch.shtml

[30] http://globalnews.ca/news/2289715/large-number-of-9-1-1-calls-during-b-c-windstorm-never-connected-with-operators-e-comm/

The degree to which the dispatch system uses local infrastructure, such as communication towers, etc.

The NI 9-1-1 installs dedicated infrastructure owned and operated by NI 9-1-1, and would not use any local infrastructure in their operations.

The use of the local land-line phones for callers reaching 9-1-1 would be the same as in option A.

6.2.2.5.26 Avoid intermediaries who may not understand the situation on Lasqueti

The degree to which the dispatch system avoids external dependencies that may not understand or may not be interested in accommodating the situation on Lasqueti.

The NI 9-1-1 system introduces several additional intermediaries, namely E-COMM and NI 9-1-1, which do not (and will not) understand the situation on Lasqueti. Their operational structure and approach requires all areas and organizations serviced to conform to their way of doing things, and they will not make exceptions.

The NI 9-1-1 system is also dependent on phone service. Telus provides land-line phone service to Lasqueti, however Telus has clearly demonstrated that they are not willing/interested in providing reliable and dependable land-line phone service on Lasqueti. The current system is also dependent on the cellular communication companies, which have not prioritized providing a high degree of coverage for Lasqueti Island.

6.2.2.5.27 Being local helps with disaster scenarios

The degree to which the dispatch system assists with local disaster preparedness and response.

The NI 9-1-1 system introduces additional non-local organizations and increases the reliance on long-distance communication networks. In the event of a disaster, these links and organizations are likely to be non-functional, degraded and overloaded, and thus unable to assist Lasqueti due to demands placed on them by local (to them) agencies and populations, and on prioritization of providing service to the larger population centres (triage).

The NI 9-1-1 system is also highly dependent on the phone system, which is likely to be non-functional in a disaster, and not locally repairable. Thus, the NI 9-1-1 based dispatch system does not help with local disaster preparedness and response. If the installed towers remained operational, they could assist with on-island radio communication.

6.2.2.5.28 Get better telephone system

The degree to which the dispatch system can improve reliability of land-lines or cellular coverage.

The NI 9-1-1 system is dependent on the reliability of land-lines and cellular coverage, but does not in any way improve these services.

NI 9-1-1 may be able to assist the community in putting pressure on Telus and the CRTC to improve telephone reliability and time to repair.

6.2.2.5.29 Broader questions about how to help LIVFD

The degree to which the dispatch system can assist with other investments needed to help the LIVFD. Does this system fit into/assist with broader strategic planning?

Adoption of the NI 9-1-1 system will address one of the areas identified as deficient in the Fire Underwriters Survey[31], but is listed as a lower priority compared to some of the other challenges.

6.2.2.5.30 Minimize follow-on implications and obligations

The degree to which the dispatch system minimizes additional requirements that may occur due to aspects of the system or associated contracts or investments.

The NI 9-1-1 system requires contracts with Telus, NI 9-1-1 and E-COMM (all coordinated by NI 9-1-1). Once 9-1-1 service is established, it is unlikely to ever be removed, especially given the no-withdrawal clause.

6.2.2.5.31 Don't want to be dependent on Vancouver/Victoria

The degree to which the dispatch system avoids dependencies on the major metropolitan areas that are likely to be overloaded or down in the event of a major event.

The NI 9-1-1 system is completely dependent on infrastructure located in Vancouver or Victoria. Specifically, E-COMM, through which all calls must flow, is located in Vancouver, and the closest B.C. Ambulance dispatch centre is located in Victoria.

6.2.2.5.32 Not invest in old analogue system that will need to be replaced

The degree to which the dispatch system avoids use of older technologies that are likely to be retired in the near future.

The NI 9-1-1 system uses digital phone links to connect to the Telus network, and Computer-Assisted Dispatch technologies, but many parts of the 9-1-1 system remain analogue. The 9-1-1 industry is currently working on technology upgrades (known as NG 9-1-1), but these are a long way away from deployment, and this transition is projected to be very expensive to deploy[32].

6.2.2.5.33 One point of contact

The degree to which the dispatch system uses a single point of contact (phone number) to call for emergency services.

The NI 9-1-1 system uses a single number for requesting emergency services, “9-1-1”.

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[31] 2008. Fire Underwriters Survey. Review of Fire Protective Services for Fire Insurance Grading, Lasqueti Island, BC.

[32] A Report on Matters Related to Emergency 9-1-1 Services, CRTC

6.2.2.5.34 Retaining the character of the community

The degree to which the dispatch system retains the character of the Lasqueti community.

The NI 9-1-1 system requires community members to make the following changes to their properties:

- Civic addresses must be assigned
- Identification, bills and other documents must be updated with civic addresses
- Telus will include street addresses in directories and sell this information
- PRRD will include street addresses in mapping, available online via iMap[33], and make this information available to other companies
- Street addresses are to be posted on the roadside
- Street addresses are encouraged to be posted at every fork of private driveways

6.2.2.5.35 Retain insurance coverage

The degree to which the dispatch system assists in retaining insurance coverage (e.g. for mortgages) by meeting a sufficient protection grade set by the Fire Underwriters Survey.

Adoption of the NI 9-1-1 system will address one of the areas identified as deficient in the Fire Underwriters Survey[34], however, this will not change the “unprotected” designation that results in issues obtaining insurance coverage.

6.2.2.5.36 Need to recognize that Lasqueti is willing to accept a higher level of risk

The degree to which the dispatch system reflects the attitude of many residents that our community accepts a "higher level of risk" associated with emergencies.

The NI 9-1-1 system will reduce multiple risks associated with calling for help in a fire and medical emergency. However, a majority of the risks that are accepted by residents will not be addressed, and there is community concerns that funds invested to improve the dispatch system could be better invested in other areas related to emergency response.

6.2.2.5.37 Easier than remembering a phone number

The degree to which the means by which the public reaches the dispatch system can be easier than remembering a phone number, for example, having a single button to press.

The NI 9-1-1 system is reached by calling 9-1-1, a well-known phone number that is already remembered by most individuals. Other than using a different number, there is no difference between this and the current pager-based system.

The 9-1-1 number can be programmed into phones to allow numbers to be dialled with the press of a single button or selected from a directory or contacts list. Specialized

[33] PRRD iMap service: http://www.powellriverrd.bc.ca/online-mapping/

[34] 2008. Fire Underwriters Survey. Review of Fire Protective Services for Fire Insurance Grading, Lasqueti Island, BC.

stand-alone devices that automatically call pre-programmed emergency numbers are also supported. Phones and or devices not preprogrammed can often be a cause of a delayed response due to searching for numbers and possible entry errors.

6.2.2.6 LIVFD interests

6.2.2.6.1 When reporting a fire, caller should be able to talk to a person

Whether or not the dispatch system provides 24/7 capability by which a caller can directly talk to a person.

In the NI 9-1-1 system, a caller connected directly to a person at E-COMM PSAP after dialing 9-1-1. For a medical call, the E-COMM call taker would transfer the call to a BC Ambulance dispatcher. For a fire call, the E-COMM call taker would transfer the call to an NI 9-1-1 dispatcher.

6.2.2.6.2 Easy to use and understand

The degree to which the dispatch system is user friendly and available to all, including kids, adults, infirm, visitors.

This interest is closely related to the community interest “Easy to use and understand” described in section 6.2.2.5.7.

6.2.2.6.3 Equal provision of service

The degree to which the dispatch system serves all residents served equally, subject to local conditions.

This interest is closely related to the community interests “Accessible to all” described in section 6.2.2.5.12, and “Equal value and access for everyone” described in section 6.2.2.5.22.

6.2.2.6.4 Call-outs (e.g. pagers) that work everywhere

The degree to which system provides good geographic coverage to receive incident alert calls.

The NI 9-1-1 system would provide good coverage for VHF pages and radio communications to reach local dispatchers and responders, and for communications between LIVFD and NI 9-1-1. While there may still be areas without good coverage, the NI 9-1-1 system would achieve good coverage either by installing a tower on Mt. Davies on Texada or, if the Texada site was not accepted by the Texada community, two towers on Lasqueti.

The telephone system provides land-line and cellular coverage. Land-line coverage is periodically unavailable, sometimes for relatively long durations, until repaired by Telus. Cellular coverage is available on much, but not all, of the island, with variable signal strength.

6.2.2.6.5 Reliable call-outs

The degree to which alerting system provides continuous and resilient coverage.

This interest is similar to the PRRD interest “Effective communications network linking dispatchers and emergency responders” described in section 6.2.2.7.3.

The ability to make call-outs depends on coverage (see previous interest regarding coverage) as well as usability, functionality, training, and reliability.

The NI 9-1-1 system uses a VHF paging and radio system owned and managed by NI 9-1-1 for call-outs. The VHF pagers are simple to use to send and receive pages, and are reliable. The NI 9-1-1 system addresses concerns of the current system regarding coverage (improving page reception and accuracy), and robustness of the physical pagers (the VHF pagers are much more robust than the Rogers pagers).

6.2.2.6.6 System should be able to pass reliable messages (numeric or voice)

The degree to which alerting system provides a reliable method to communicate between dispatchers and responders.

This interest is similar to the previous interest as well as the PRRD interest “Effective communications network linking dispatchers and emergency responders” described in section 6.2.2.7.3.

The ability to pass reliable messages depends on coverage (see interest described in section 6.2.2.6.4 regarding coverage) as well as usability, functionality, training, and reliability.

The NI 9-1-1 system uses a VHF paging and radio system owned and managed by NI 9-1-1 for call-outs. The VHF pagers are simple to use to send and receive pages, and are reliable. The NI 9-1-1 system addresses concerns of the current system regarding coverage (improving page reception and accuracy), and robustness of the physical pagers (the VHF pagers are much more robust than the Rogers pagers). Further, the pagers are one-way and so messages can be received on pagers, but not sent. Paging messages are limited to numeric codes. However, the radios support two-way communication among LIVFD and with NI 9-1-1.

6.2.2.6.7 Effective, easy-to-use home location (with consideration of confidentiality)

The degree to which the dispatch system is able to accurately and effectively locate incidents.

This interest is closely related to the community interest “Local people accurately & effectively” as described in section 6.2.2.5.13.

This interest also adds concerns regarding protection of personal information, as covered by the Freedom of Information and Protection of Privacy Act (FIPPA). Compliance with the provisions of the FIPPA is a requirement (see PRRD interest

"Ensure compliance with all relevant statutes and regulations" described in section 6.2.2.7.17).

The NI 9-1-1 system relies on civic addressing, which would be associated with the callers' call-in number via the Automatic Locator Identifier. This would be used with the Computer Aided Dispatch system to locate the civic address on a map. Other details could be obtained from the caller. Civic addressing can help to locate where the private driveway to the incident meet the public road, but may provide limited information on reaching the residence on the driveway. Given the rural, dispersed nature of Lasqueti residences, as well as many properties with multiple shared owner-residents, civic addresses alone may not be sufficient to locate an incident (see Section 6.1). Due to the reduced role of local dispatchers, the NI 9-1-1 system would have limited capacity to use local knowledge for locating incidents.

The FIPPA applies to any personal information recorded in the civic addressing database available for use by E-COMM, NI 9-1-1 and BC Ambulance. The agencies would be responsible for ensuring that the provisions of FIPPA are met.

6.2.2.6.8 Streamlined system: no extra steps

The degree to which the dispatch system minimizes steps needed by callers, dispatchers and responders to use the system.

This interest is related to the community interest "Simplicity" as described in section 6.2.2.5.19, but with a focus on steps required during use of the system.

The steps for usage are described in the overview section. In the NI 9-1-1 system, for a fire incident, the caller telephones 9-1-1 to reach a NI 9-1-1 dispatcher via a transfer from the E-COMM operator (step 1), the NI 9-1-1 dispatcher sends an alerting page to LIVFD (step 2), each responding LIVFD member notifies the NI 9-1-1 dispatcher that they are responding via VHF radio (step 3a), and the NI 9-1-1 dispatcher provides initial response information and instructions by radio (step 3b).

For a medical incident, the caller telephones 9-1-1 to reach a BC Ambulance dispatcher via a transfer from the E-COMM operator (step 1), the BC Ambulance dispatcher alerts NI 9-1-1 via the Computer Aided Dispatch system (step 2), the NI 9-1-1 dispatcher sends an alerting page to LIVFD (step 3), each responding LIVFD member notifies the NI 9-1-1 dispatcher that they are responding via VHF radio (step 4a), and the NI 9-1-1 dispatcher provides initial response information and instructions from BC Ambulance by radio (step 4b).

6.2.2.6.9 Secure communication system

The degree to which the emergency communication system protects personal information and privacy.

Protection of personal information is legislated by the Freedom of Information and Protection of Privacy Act (FIPPA). Compliance with the provisions of the FIPPA is a requirement (see PRRD interest "Ensure compliance with all relevant statutes and regulations" described in section 6.2.2.7.17).

In the NI 9-1-1 system, communication is by telephone, VHF pagers and VHF radios. VHF frequencies are not secure, but personal information is not transmitted over the VHF frequency. Telephone communication is relatively secure (but not encrypted).

Future direction for 9-1-1 and other public safety organization radio systems involves transitioning to radios that support the APCO project 25 standard[35], which support encrypted digital transmissions. This radio equipment is significantly more expensive than the current analogue radios in use today[36].

Unfortunately for those who have made significant investments in P25 radio equipment, numerous security flaws have been discovered[37,38].

6.2.2.6.10 No changes to First Responder dispatch

The degree to which the dispatch system support the continued role of local dispatchers.

The NI 9-1-1 system does not utility local dispatchers. Fire incidents are dispatched from the NI 9-1-1 centre in Campbell River. Medical incidents are dispatched by BC Ambulance via the NI 9-1-1 centre. The role the current local dispatchers would be significantly reduced or eliminated.

6.2.2.6.11 System that functions over the long term (i.e. avoid changing system again in near future)

The degree to which the dispatch system remains stable, with little or incremental change for improvements over time.

Responsibility for management and changes to the NI 9-1-1 system would be the authority of the NI 9-1-1 Corporation, under the guidance of the NI 9-1-1 board (on which there is one PRRD representative). The NI 9-1-1 system is likely to function over the long term, and changes are likely to be incremental. Functionality is likely to remain stable.

6.2.2.6.12 Eliminate non-emergency calls

The degree to which the dispatch system reduces likelihood of non-emergency calls, and unnecessary response efforts in case of non-emergency calls.

The NI 9-1-1 system requires the caller to dial 9-1-1. This number could be automated (e.g. on a rapid dial button), and so accidental calls are possible. It is challenging to eliminate non-emergency calls (calls made inadvertently, or people calling for non-emergency reasons), and the NI 9-1-1 system may result some unnecessary response effort. For a medical call, once the BC Ambulance dispatcher realizes that the call is not an emergency, appropriate action can be taken without the need for responders to be dispatched to the location. Similarly for a fire call, the NI 9-1-1

[35] http://www.project25.org/
[36] Comment by Burch Falkner, http://www.rrmediagroup.com/Features/FeaturesDetails/FID/674
[37] Insecurity in Public-Safety Communications: APCO Project 25: http://www.nicta.com.au/pub?doc=5076
[38] Security Flaws in Encrypted Police Radios:
https://www.schneier.com/blog/archives/2011/08/security_flaws.html

dispatcher could direct responders to stand down once they know the incident is not an emergency. If, however, a call is dropped before identifying the nature of the call, the normal procedure is for a police response to the incident.

6.2.2.6.13 Maximum local control and ownership (ability to have a voice)

The degree to which local groups (e.g. LIVFD and community) are able to make decisions regarding management and operation of the dispatch system.

This interest is closely related to the community interest “Local control” as described in section 6.2.2.5.11.

6.2.2.6.14 Community is happy with service

The degree to which the dispatch system supports good relations with community, implement a service supported by the community, and not get squeezed between community and regional district.

This interest is the complement to the community interest “Happy first responders and firefighters” as described in section 6.2.2.5.8.

The community interests represent the key issues of concern regarding the dispatch system. The better the dispatch system meets these interests, the more the community will support the system.

The NI 9-1-1 system has a number of areas in which community interests are well met (e.g. improvements to communications capabilities, and 24/7 answering of emergency calls by a person), but also where interests are not well met (e.g. “Local control”). Evaluating the degree to which the NI 9-1-1 option meets community interests relative to other options is a major aspect of the mandate of the E-DAC.

6.2.2.6.15 The system meets PRRD requirements

The degree to which the dispatch system complies with relevant statutes and regulations.

The PRRD requirements were included in the terms of reference for the E-DAC, and represented in the PRRD interests.

This interest is closely related to the PRRD interest “Ensure compliance with all relevant statutes and regulations” as described in more detail in section 6.2.2.7.17.

6.2.2.6.16 That a community team puts together a reliable system that PRRD will be OK with

The degree to which the dispatch system meets requirements and supports good relations with the regional district.

The PRRD requirements were included in the terms of reference for the E-DAC, and represented in the PRRD interests.

The E-DAC was formed to make a recommendation for a reliable system that meets requirements, as well as meets community, LIVFD and PRRD interests to the degree possible.

This interest is closely related to the PRRD interest “Ensure compliance with all relevant statutes and regulations” as described in more detail in section 6.2.2.7.17.

6.2.2.6.17 To help increase and maintain LIVFD membership

The degree to which the dispatch system protects firefighters / first responders safety and morale, and supports degree to which community is happy with fire service and operations.

Maintaining LIVFD membership is directly linked with morale and safety of department members. In terms of the dispatch system, this is related to the degree to which LIVFD interests are met, as this represents the issues of concern to members regarding dispatch.

Increasing LIVFD membership is directly linked with the degree to which the community supports the LIVFD. In terms of the dispatch system, this is related to the degree to which community interests are met.

The NI 9-1-1 dispatch system has a number of areas in which community and LIVFD interests are well met (e.g. community interest “Feedback when successful dispatch”, and LIVFD interest “Call-outs that work everywhere”), but also where interests are not well met (e.g. community interest “Local control” and LIVFD interest “Maximum local control and ownership”). One of the reasons E-DAC was formed was due to underlying the community concerns regarding NI 9-1-1. Evaluating the degree to which the NI 9-1-1 option meets community and LIVFD interests relative to other options is a major aspect of the mandate of the E-DAC.

6.2.2.6.18 To have adequate resources to implement the service

The degree to which the dispatch system ensures adequate funding and administrative support for the service.

Providing adequate funding to implement the LIVFD operations is a mandate of the PRRD. In principle, the LIVFD operations must be consistent with the related service establishment bylaw. When there are differences, either the bylaw should be changed to reflect operational implementation, or the operations must be changed to comply with the bylaw.

Provided the LIVFD operations are consistent with its service establishment bylaw, the LIVFD needs to ensure that PRRD is informed about the resources required to implement the service. In turn, the PRRD needs to ensure that these resources are included in the annual tax requisition for the service.

This context and process is the same for any dispatch option.

6.2.2.6.19 That funding is not lost

The degree to which the dispatch system ensures that funding levels are maintained, that the LIVFD has input to funding needs.

This interest is essentially synonymous with the previous interest. Provided that the LIVFD protection service is consistent with its service establishment bylaw, funding cannot be lost. Funding via the PRRD for the LIVFD would only be lost if the regional service was withdrawn, at the end of a lengthy regional service withdrawal process.

6.2.2.6.20 To have clear, feasible service policies to implement

The degree to which the fire service bylaw is consistent with implementation of fire protection service.

In principle, the LIVFD operations must be consistent with the related service establishment bylaw. When there are differences, either the bylaw should be changed to reflect operational implementation, or the operations must be changed to comply with the bylaw.

Hence, it is important for the fire service establishment bylaw to set clear and feasible policies for the LIVFD to implement.

Implementing the NI 9-1-1 system may require modest changes to the current service establishment bylaw (see Appendix E), which clarifies the expectations of the department, the role and authority of the fire chief, etc.

6.2.2.6.21 That dispatch service not influence land-use; limit follow-on implications (e.g. changes to road requirements)

The degree to which the dispatch system minimizes additional requirements that may occur due to aspects of the system or associated contracts or investments.

This interest is closely related to the community interest “Minimize follow-on implications and obligations” as described in section 6.2.2.5.30.

6.2.2.6.22 Educate public about fire safety (e.g. Fire Smart)

The degree to which the dispatch system supports individual efforts to reduce fire risks.

While safety education is not within the mandate of the E-DAC, the discussions and community engagement over the past two years has elevated the profile of fire and medical safety issues in general.

It is not clear how the NI 9-1-1 system relates to public safety education.

6.2.2.6.23 Need to consider equipment upgrades

The degree to which there is an appropriate cost/benefit allocation for dispatch to maintain options for funding for other department equipment and training needs (e.g. fire-fighting boat for beach fires and waterfront homes that are water access only; quad).

There are always tradeoffs and opportunity costs when considering how to allocate a limited resource, such as tax dollars. Hence, this interest is closely related to the community interest “Appropriateness of cost/benefit given Lasqueti situation” as described in section 6.2.2.5.2.

6.2.2.6.24 Simplify documentation

The degree to which the dispatch system supports documentation of incident dispatch.

Documentation is an important requirement for emergency response. It is important to help LIVFD in debriefing and operational improvement. Documentation that shows that response was done according to procedures, within the ability of the department given the resources provided and context, is also important to limit liability.

The NI 9-1-1 system provides substantial documentation via the use of the Computer Aided Dispatch system. Reports are likely maintained in the NI 9-1-1 record files.

6.2.2.7 PRRD interests

6.2.2.7.1 Effective support for public and emergency responder safety

The degree to which the dispatch system increases public, firefighter and first responder safety.

This interest is closely related to the community interest “Firefighter and first responder safety”. In relation to dispatch, increased public safety risks are primarily associated any delays to emergency response, and risk of no response. Aspects of the NI 9-1-1 system related to call-in and locating emergencies regarding public emergency responder safety are described in section 6.2.2.5.1.

6.2.2.7.2 Comprehensive dispatch system description

The recommended dispatch system must be a complete description about usage, operations, infrastructure and costs.

More specifically, the dispatch system description should include (i) public phone number(s) to reach dispatchers; (ii) all costs, for equipment purchasing, training, ongoing maintenance, licences, contracts, professional fees and any other anticipated necessary expenditures for the system’s first ten years; and (iii) any major capital items (i.e. communications towers), including anticipated lifecycle and replacement costs.

The NI 9-1-1 system provides a system used by 51 over fire departments with general satisfaction. While costs of the NI 9-1-1 service are well known, there is substantial uncertainty regarding the capital costs of tower infrastructure. Costs for towers range from about $60,000 for a single small tower on Mt. Davies on Texada Island, to over $500,000 for two large towers on Lasqueti Island, as detailed in the financial analysis section of this report. While the Texada site clearly has a much lower cost, it also has a much higher uncertainty regarding feasibility due to opposition by the Texada community which has led to the PRRD representative on the NI 9-1-1 board to effectively table further exploration of this site by NI 9-1-1 Corporation.

6.2.2.7.3 Effective communications network linking dispatchers and emergency responders

The degree to which the communications network used for emergency response supports communications among LIVFD members.

This interest is similar to the LIVFD interest “Reliable call-outs” described in section 6.2.2.6.5.

The effective communications network depends on coverage (see next interest regarding coverage) as well as usability, functionality, training, and reliability.

The NI 9-1-1 system uses a VHF paging and radio system owned and maintained by NI 9-1-1.

VHF pagers are simple to use to send and receive pages. The paging system itself would be reliable. VHF radio technology is reliable and robust. The NI 9-1-1 system would improve coverage.

The telephone land-line network has wide physical coverage. The primary concerns relate to relatively frequent loss of service, and relatively long times before repair.

6.2.2.7.4 Communications system effectiveness/coverage across the service area

The degree of coverage for communications devices used by LIVFD members.

This interest is closely related to the LIVFD interest “Call-outs (e.g. pagers) that work everywhere” described in section 6.2.2.6.4.

6.2.2.7.5 Meets communications equipment standards

The degree to which the equipment used for dispatch communications meets relevant standards.

The NI 9-1-1 system primarily relies on VHF pagers and VHF radios for communications, with limited use of telephones as a backup. All of these types of devices proposed for use with NI 9-1-1 meet all relevant standards for legal and safe operation in Canada.

All radio-communication equipment must comply with Industry Canada regulations in order to be legally owned and operated in Canada. Furthermore, any radio transmission equipment must either be licensed or must comply with the restrictions placed on unlicensed spectrum, and must be operated within the constraints of the license or unlicensed spectrum.

The LIVFD has selected radio equipment to ensure compatibility with current communication standards used by NI 9-1-1. This is in compliance with PRRD bylaw #391, which states:

> *Preparation of specifications for new communication systems and additions to existing communication systems which are compatible with NI911 dispatch services.*

This ensure that costly equipment replacements are not required in the event of a transition to 9-1-1 service.

6.2.2.7.6 Communications equipment redundancies in case of main system failure

The degree to which the dispatch system continues to operate in the presence of failures and faults, including technological failures, operational failures, and human error.

This interest is closely related to the community interest “Redundancy” described in section 6.2.2.5.6.

6.2.2.7.7 Surge capacity for times of major emergencies or disasters

The degree to which the dispatch system will continue to function under high call volumes in the event of a major disaster, such as an earthquake or major storm.

This interest is related to the community interest “Not dependent on systems that will be non-functional in a disaster” described in section 6.2.2.5.23, but with a focus on the capacity of the system to handle large call volumes rather than on dependencies on components that are relatively more likely to fail in a disaster.

Call-in is dependent on the telephone system and Telus microwave tower. It is likely that in the event of a major disaster that there will be no telephone service, as the local phone system ceases to function if communication to Lasqueti is severed. If the telephone service continues to function, the E-COMM PSAP is designed for large call volumes, but may still be overwhelmed by call volumes from more densely populated areas (e.g. Vancouver). The fire dispatch centre in Campbell River has 10 dispatchers. Given the large area covered (about 56,000 sq. km.), call volume could overwhelm these 10 dispatchers during a disaster. The NI 9-1-1 long-distance VHF pager and radio network is dependent on tower infrastructure that may fail in a disaster. Emergency response would then be reduced to VHF radio communications, with no contact with the NI 9-1-1 dispatch centre, and physically checking on people, according to the emergency plan.

6.2.2.7.8 Plan for alternative power supply for all necessary components in case of power failure

The degree to which there is backup power supply available for components of the dispatch system.

The NI 9-1-1 system relies on off-island systems, and to a lesser degree to local systems. The system assumes that Telus, E-COMM, and NI 9-1-1 have a backup power system to continue providing telephone and dispatch services. As centralized systems, these agencies need to have robust backup plans and systems.

Any towers located on Lasqueti or Texada will need to have backup power systems, which may add to total system cost.

The NI 9-1-1 system also relies on LIVFD members to ensure pager and radio batteries remain charged.

6.2.2.7.9 Dispatcher training

The degree to which the dispatch system supports and facilitates appropriate training of dispatchers.

This interest is closely related to the community interest “Ensure dispatch involves appropriate training” described in section 6.2.2.5.3.

6.2.2.7.10 Dispatching staffing to ensure 24/7 service

Whether or not the dispatch system provides 24/7 service.

This interest is closely related to the LIVFD interest “When reporting a fire, caller should be able to talk to a person” described in section 6.2.2.6.1.

6.2.2.7.11 Longer term dispatch succession plan

The degree to which the dispatch system supports recruitment and training of new dispatchers to replace retiring dispatchers.

The NI 9-1-1 does not need local dispatchers, and relies on paid dispatchers in Campbell River. Only 1 fire department out of 51 covered by NI 9-1-1 (Quadra Island) retains the services of local dispatchers assisting with local resource coordination during larger incidents. While local dispatchers in LIVFD may have a role with the NI 9-1-1 system, it would have significantly diminished responsibilities (e.g. to provide some incident location assistance). It seems likely that recruiting new local dispatchers over time would be hindered by this diminished role, which could lead to a phasing out of the local dispatchers.

6.2.2.7.12 Ensure applicable PRRD obligations to meet Workers Compensation Act Occupational Health and Safety Regulations regarding dispatcher operations

The degree to which the dispatch system supports meeting legal worker safety requirements (statutes and regulations).

The LIVFD is required to meet the provisions of the Workers Compensation Act and Occupational Health and Safety Regulation. There are a range of provisions that must be met in relation to fire protection and emergency First Response services. The LIVFD is obligated to provide working conditions that reduce the risk to personal injury. See Section 5.2 and Appendix C for more details.

In terms of dispatch, the NI 9-1-1 system involves on off-island dispatchers who provide their service from the NI 9-1-1 fire dispatch centre, which would have to meet worker safety requirements.

Further, the LIVFD maintains a “joint health and safety committee” at which workplace risks and hazards can be discussed, and solutions identified.

6.2.2.7.13 Ensure PRRD obligations are met per Bill C-45 for effective workplace safety

The degree to which the dispatch system meets the provisions of Bill C-45 regarding criminal liability of an organization such as PRRD

The LIVFD is required to meet the provisions of Bill C-45 regarding potential claims leading to criminal liability of an organization such as PRRD. There are a range of provisions that must be met in relation to fire protection and emergency First Response services. Since the LIVFD fire chief “has complete responsibility and authority over the Fire Department, subject to the direction and control of the Board” (bylaw 391, 2005), he/she should ensure an ongoing workplace health and safety program is implemented

for the fire service, which should aim to identify, communicate and reduce workplace hazards. See Section 5.2 and Appendix C for more details.

In terms of dispatch, the NI 9-1-1 system involves on off-island dispatchers who provide their service from the NI 9-1-1 fire dispatch centre, which would have to meet the Occupational Health and Safety Regulation. Local dispatchers, to the extent that they have a continued role, are included in the fire department workplace health and safety program.

Further, it is important for the regional service establishment bylaw to be consistent with the operations of LIVFD, including the dispatch system. After adopting a recommended dispatch option, the regional board should revise the LIVFD fire protection service establishment bylaw to ensure consistency with the dispatch system.

6.2.2.7.14 House numbering or other property/location identifier system

The degree to which the dispatch system is able to accurately and effectively locate incidents.

This interest is closely related to the community interest "Local people accurately & effectively" as described in section 6.2.2.5.13.

6.2.2.7.15 Ability to implement any "next generation" communications

The degree to which the dispatch system is able to implement a text message option for hearing impaired, or other media usage (e.g. pictures).

The NI 9-1-1 cannot currently communicate text messages or other media such as pictures. Efforts are underway regarding next generation communications (NG911), but the timeframe to provide this service is uncertain. That said, if and when NG911 service is available, it would be available for use on Lasqueti with the NI 9-1-1 option.

Future direction for 9-1-1 and other public safety organization radio systems involves transitioning to radios that support the APCO project 25 standard[39], which support encrypted digital transmissions. This radio equipment is significantly more expensive than the current analogue radios in use today[40].

6.2.2.7.16 Appropriate dispatch recording practices and records management system

The degree to which the dispatch system includes and supports a dispatch documentation practices and records management system, including maintenance of dispatch personnel, training, and operations (with call times) records, appropriate storage and retention of records, and ensuring privacy concerns are addressed.

This interest is related to the LIVFD interest "Simplify documentation" as described in section 6.2.2.6.24.

[39] http://www.project25.org/

[40] Comment by Burch Falkner, http://www.rrmediagroup.com/Features/FeaturesDetails/FID/674

The NI 9-1-1 system makes use of a Computer Aided Dispatch (CAD) system, which would automatically record relevant incident documentation details regarding timing, personnel responding, etc.

NI 9-1-1 also records all calls and radio communication traffic, which becomes part of the event record.

6.2.2.7.17 Ensure compliance with all relevant statutes and regulations

The degree to which the dispatch system complies with relevant statutes and regulations, including:

- *Industry Canada*
- *Canadian Radio-television and Telecommunications Commission (CRTC)*
- *Freedom of Information and Protection of Privacy Act (FIPPA)*
- *Office of the Fire Commissioner (OFC)*
- *BC Building Code*
- *Workers Compensation Act*

The NI 9-1-1 system would comply with the above statutes and regulations. Radio frequencies are licensed per Industry Canada. While personal information related to addressing would be available at external agencies (i.e. E-COMM and NI 9-1-1), the Lasqueti community would have to rely on these agencies to ensure that the provisions of FIPPA would be met. Personal information, per FIPPA, would be protected by limiting transmission of personal information during dispatch and by all LIVFD members signing a non-disclosure agreement. Workers health and safety issues are addressed in section 6.2.2.7.12.

Under the Office of the Fire Commissioner “Playbook”, LIVFD has been assigned as an “Exterior Operations Service Level” department. This service level defines minimum requirements for fire services personnel and department operational competencies. These requirements relate to LIVFD firefighter training and operations, and do no refer to dispatch.

6.2.2.7.18 Ensure compliance with any relevant PRRD bylaws and policies

The degree to which the dispatch system is consistent with applicable PRRD bylaws and policies

The primary PRRD bylaw related to dispatch is bylaw 391 enacted “to provide for the operation of the Lasqueti Island Volunteer Fire Department”. It is very important that the LIVFD operations are consistent with this bylaw. Divergence between LIVFD operations and this bylaw can be resolved in two primary ways: (i) the PRRD board can revise the bylaw to match operations (as may be required for changes to the dispatch system); or (ii) the LIVFD can revise operations to match the bylaw.

The NI 9-1-1 system may require some changes to bylaw 391 to ensure consistency.

6.2.3 Option C: call centre + VHF system

6.2.3.1 System description

6.2.3.1.1 Overview

This section provides an overview of Option C, with a focus on high-level view of how it meets the core service requirements (described in section 5.1). Fire and medical emergency response processes are described separately.

6.2.3.1.2 Fire emergencies

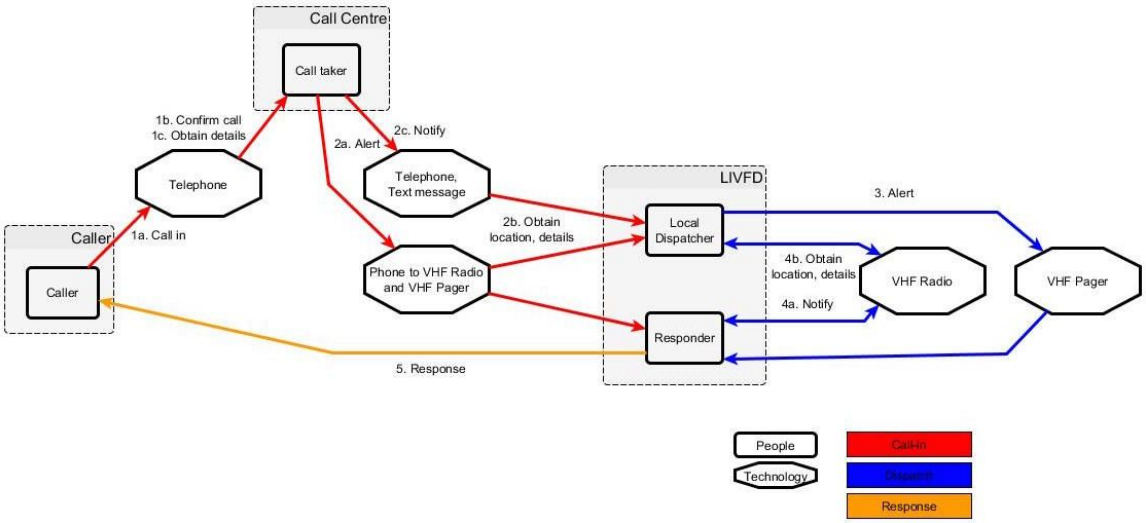


Figure 9 - Fire emergency response process in Option C (call centre + VHF)

Emergency incident call-in

When a fire incident is identified by a person, that person calls in for help by dialing the 10-digit number for the LIVFD call centre (e.g. Four Star Communications) to talk with a call taker (step 1a in Figure 9).The call taker will provide confirmation to the caller that their call has been received and that help is on the way (step 1b in Figure 9), and obtains relevant details regarding the nature of the incident including location details and severity (step 1c in Figure 9), according to LIVFD operating procedures.

The call taker will then send an alerting message to the LIVFD by telephone to a phone patch that transmits the alerting message to all on-duty VHF radios as well as by telephone and text message to the local dispatchers (step 2a in Figure 9).

The local dispatcher will obtain details about the incident (e.g. type, name, telephone number, residential structure id) from the alerting call from the communications from the call centre (step 2b in Figure 9) if available. Otherwise, the local dispatcher will contact the call centre (by text and/or telephone) to receive this information. In either case, they will notify the call centre that that they have received the call (step 2c in Figure 9).

Emergency alerting and response notification

The local dispatcher sends an alerting page over the appropriate channel on the local VHF communications network to all on-duty local dispatchers and responders (step 3 in Figure 9). The VHF pagers display indicates that the call is a fire incident. Note that any LIVFD members with active VHF radios will already have received the initial alerting call from the call centre.

The local dispatcher uses the Incident Locator and Resource Tool (locally developed mapping tool) to identify incident location, as well as nearby resources (e.g. water sources) and hazards (e.g. propane tanks). If needed, this is used in conjunction with a reverse directory to obtain a structure identifier given caller name, phone number or other identifying information.

After receiving the fire alerting page, each available fire responder (and possible other available local dispatchers) accesses a VHF radio to contact the local dispatcher, again over the appropriate channel on the local VHF communications network, to indicate that they are able to respond to the call (step 4a in Figure 9), and to obtain relevant information and instructions for their initial response actions (step 4b in Figure 9).

Emergency incident response

Once fire responders have relevant information about an incident, they can take response actions, such as heading to the appropriate fire hall for appropriate equipment and further instruction (step 5 in Figure 9).

6.2.3.1.3 Medical emergencies

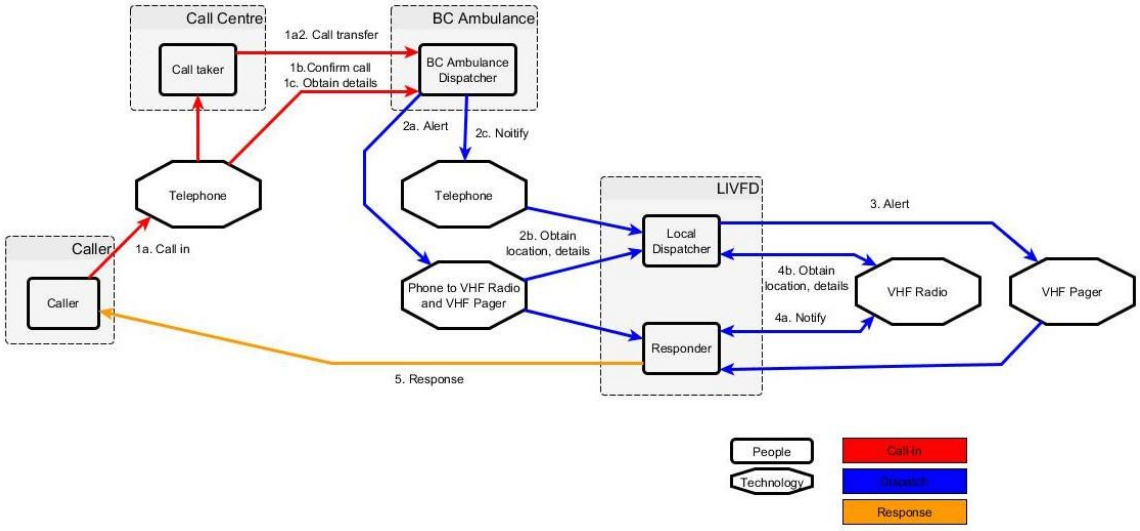


Figure 10 - Medical emergency response process in Option C (call centre + VHF)

Emergency incident call-in

When a medical incident is identified by a person, that person has two options for calling for help (step 1a in Figure 10), both of which lead to a BC Ambulance dispatcher:

by dialing the 10-digit number for the LIVFD call centre (e.g. Four Star Communications) to talk with a call taker. After stating that there is a medical emergency, the call taker will transfer the call to a BC Ambulance dispatcher in Victoria (step 1a2 in Figure 10); or

by dialing the 10-digit number for the BC Ambulance in Victoria directly (same as current system).

The BC Ambulance dispatcher provides confirmation to the caller that their call has been received and that help is on the way (step 1b in Figure 10), and obtains relevant details regarding the nature of the incident including location details and severity (step 1c in Figure 10).

Emergency Alerting and Response Notification

The BC Ambulance dispatcher will then send an alerting message to the LIVFD by telephone to a phone that transmits the alerting message to all on-duty VHF radios/ pagers, as well as by telephone (and possibly text message) to the local dispatchers (step 2a in Figure 10).

The local dispatcher will obtain details about the incident (e.g. type, name, telephone number, residential structure id) from the alerting call from BC Ambulance (step 2b in 10) if available. Otherwise, the local dispatcher will contact BC Ambulance by telephone to receive this information. In either case, they will notify BC Ambulance that that they have received the call (step 2c in 10).

The local dispatcher uses the Incident Locator and Resource Tool (locally developed mapping tool) to identify incident location, as well as nearby resources (e.g. water sources) and hazards (e.g. propane tanks). If needed, this is used in conjunction with a reverse directory to obtain a structure identifier given caller name, phone number or other identifying information.

The local dispatcher sends an alerting page over the appropriate channel on the local VHF communications network to all on-duty local dispatchers and responders (step 3 in Figure 10). The VHF pagers display indicates that the call is a medical incident. Note that any LIVFD members with active VHF radios will already have received the initial alerting call from BC Ambulance.

After receiving an alerting page, each available medical responder (and possible other available local dispatchers) accesses a VHF radio to contact the local dispatcher, again over the appropriate channel on the local VHF communications network, to indicate that they are able to respond to the call (step 4a in Figure 10), and to obtain relevant information and instructions for their initial response actions (step 4b in Figure 10).

Emergency Incident Response

Once medical responders have relevant information about an incident, they can take response actions, such as heading to the appropriate fire hall for appropriate equipment and further instruction (step 5 in Figure 10).

6.2.3.1.4 Key components of Option C (call centre + VHF radios)

The following are key components related to dispatch (equipment, outside and local services, etc.) of Option C:

- Telephone system: common to all options for call-in, as well as for one alternative for communications with BC Ambulance and the call centre.
- Use of a call centre to receive all emergency calls (fire and medical).
- Optional use of directly calling BC Ambulance for medical emergency calls.
- Use of local dispatch and VHF communications network.
- Use of VHF radios and VHF pagers.
- VHF radios: used during the dispatch as well as response steps for communications connected to a phone call from the call centre or BC Ambulance to LIVFD, as well as between LIVFD members.
- Use of local mapping tool (Incident Locator and Resource Tool) to identify incident location, nearby resources (e.g. water sources) and nearby hazards.

The following are key distinguishing characteristics related to dispatch of Option C:

- Use of a call centre to provide a live operator 24/7 answering service for emergency calls.
- Continued role of local dispatchers, with adaptations to role for communications with call centre and use of VHF radios and pagers.
- Use of local mapping tool, created and maintained locally, which encodes both objective mapping and local knowledge, to identify incident location, as well as nearby resources and risks.
- Use of existing and enhanced VHF communication infrastructure on Lasqueti to provide appropriate fire department communication coverage at low cost (see section 6.2.3.3.3).

In addition, to reduce implementation and maintenance burden on the LIVFD, this option would be supported by an ongoing volunteer support group that would help with tasks such as:

- Completion, maintenance and training for the Incident and Resource Locator Tool.
- Implementation and training for use of VHF radio pagers.
- Establishing the terms for a call centre service.
- Liaison with the community.

Volunteers to populate the above have come forward and are on standby.

6.2.3.2 System narrative

It was a chilly spring morning on Lasqueti Island. Upon hearing the rooster crow, Alex exchanged his cup of tea for a jacket, and walked out over to the garden shed to collect the morning's eggs. This will make for a nice breakfast, he thought.

Throwing the light switch in the shed, he was startled as the LED light exploded in a shower of sparks raining down upon the hay below. In the dark, he could already see strands of straw starting to catch on fire. "$&%#!" he thought frantically — where was the extinguisher? Was there any water in that bucket in the corner? Smoke was starting to fill the room, and he retreated outside, coughing.

Running back to the house, he opened the front door and ran over to the telephone. Beside the telephone was a small card with emergency numbers, ready for just such an event. Alex dialled the nine digit number listed for fire emergencies, and listened to the phone ring.

In Kelowna, the incoming call indicator at the 24 hour call centre lit up, with the computer screen indicating an incoming call for Lasqueti Island Emergency Fire Dispatch. The call centre operator put down his coffee, and answers the phone, saying, "Lasqueti Island Fire Department, please state the nature of the emergency". Alex, still a little breathless, tells the operator that his chicken coop was on fire, and after being asked for his location, the call centre operator responds with, "I'm alerting the fire department now, please wait". The call centre operator puts Alex on hold, sends out a radio page, text messages, and presses the button for the Lasqueti Fire Radio Emergency Number, and once connected, announces over the radio, "Emergency, confirmed fire at Alex's at the corner of Weldon road — Please confirm reception". This is broadcast over all of the Lasqueti Fire first responder and dispatcher radios.

Megan, the on-call Lasqueti dispatcher, hears the broadcast on her radio, and immediately picks up the radio, responding with, "Message received, confirmed fire at Alex's, corner of Weldon road". Upon hearing this, the call centre operator switches back over to the other line and tells Alex, "The Fire Department has been notified and is on their way". Do you want to stay on the line?". Alex responds no, and hangs up, knowing that help is on the way, and goes out to try to find hoses.

Meanwhile, Megan has continued to communicate and coordinate with the other Lasqueti dispatchers and first responders, using the in-house mapping tool to direct resources. Soon, the tanker is on the way, and first responders are arriving at Alex's front yard. A perimeter is quickly established to prevent fire spread, and after fifteen minutes, the fire is out. Sadly, the shed was a complete loss, but the chickens had smartly let themselves out into the garden, and were happily pecking away.

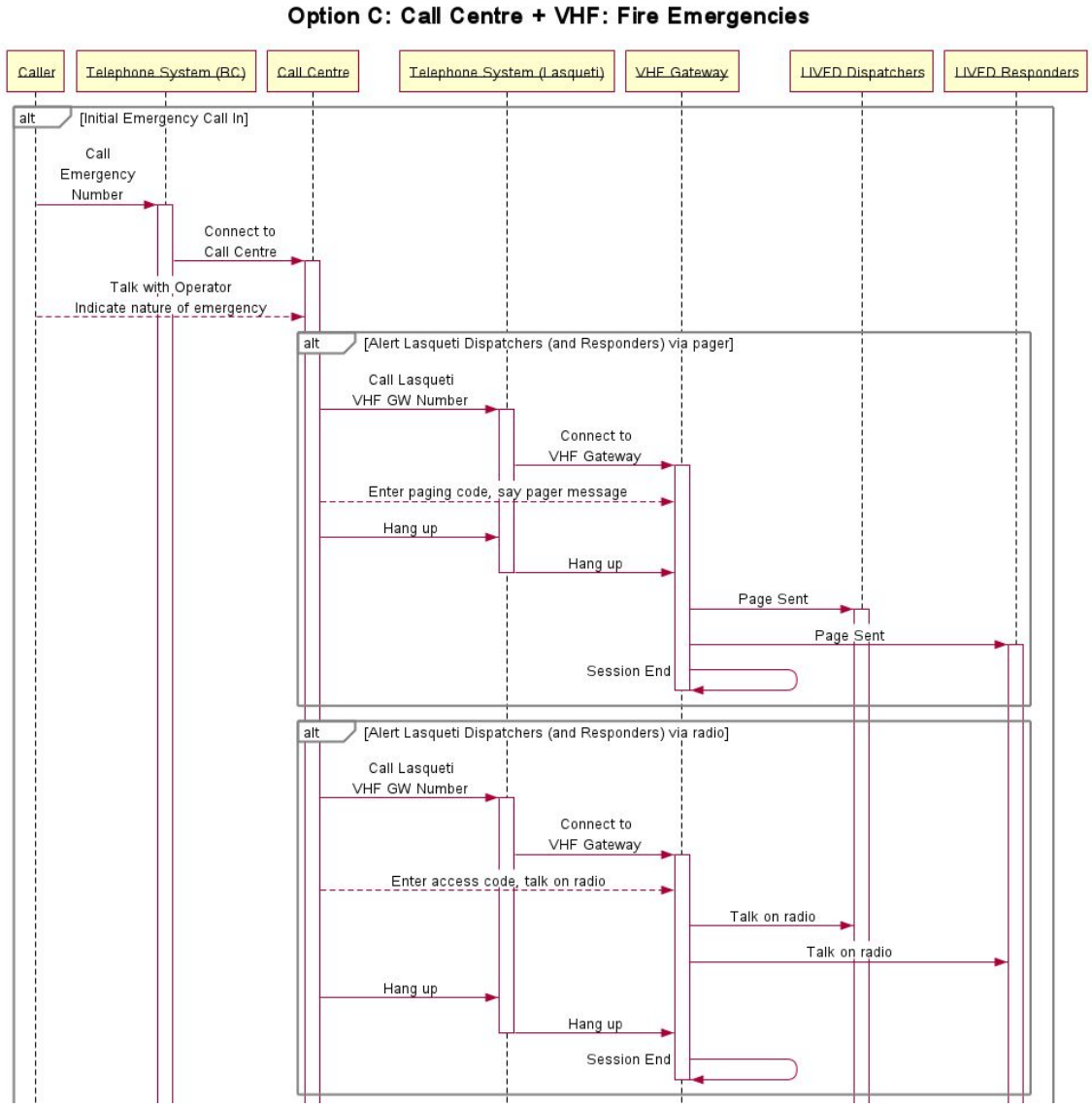
At the debriefing meeting between the firefighters and dispatchers, the timestamps and recording of the conversation was attached to the incident report, satisfying the fire department requirement for audit and reporting. That evening, the fire chief sent an e-mail to the mailing list, reminding people not to leave their driveway blocked with their vehicle.

6.2.3.3 Technical analysis

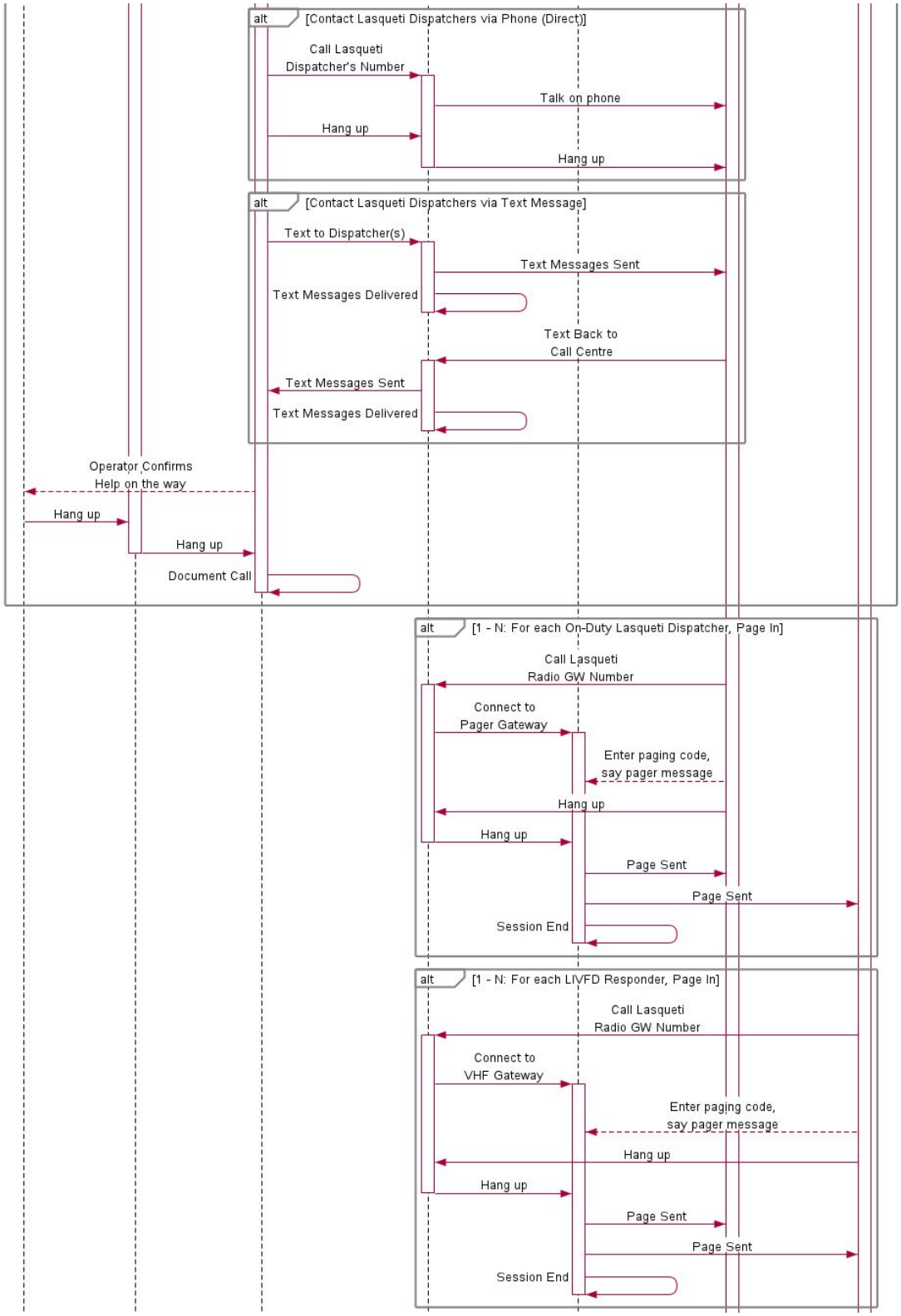
6.2.3.3.1 Interactions diagram

6.2.3.3.1.1 Fire emergencies

The below UML Interaction Diagrams[41] show interactions between the different entities involved in the call centre + VHF system for fire calls:



[41] More details on how to read a UML Interaction Diagram can be found at https://archive.is/bKD4


alt
[Contact Lasqueti Dispatchers via Phone (Direct)]
Call Lasqueti Dispatcher's Number
Talk on phone
Hang up
Hang up
alt
[Contact Lasqueti Dispatchers via Text Message]
Text to Dispatcher(s)
Text Messages Sent
Text Messages Delivered
Text Back to Call Centre
Text Messages Sent
Text Messages Delivered
Operator Confirms Help on the way
Hang up
Hang up
Document Call
alt
[1 - N: For each On-Duty Lasqueti Dispatcher, Page In]
Call Lasqueti Radio GW Number
Connect to Pager Gateway
Enter paging code, say pager message
Hang up
Hang up
Page Sent
Page Sent
Session End
alt
[1 - N: For each LIVFD Responder, Page In]
Call Lasqueti Radio GW Number
Connect to VHF Gateway
Enter paging code, say pager message
Hang up
Hang up
Page Sent
Page Sent
Session End

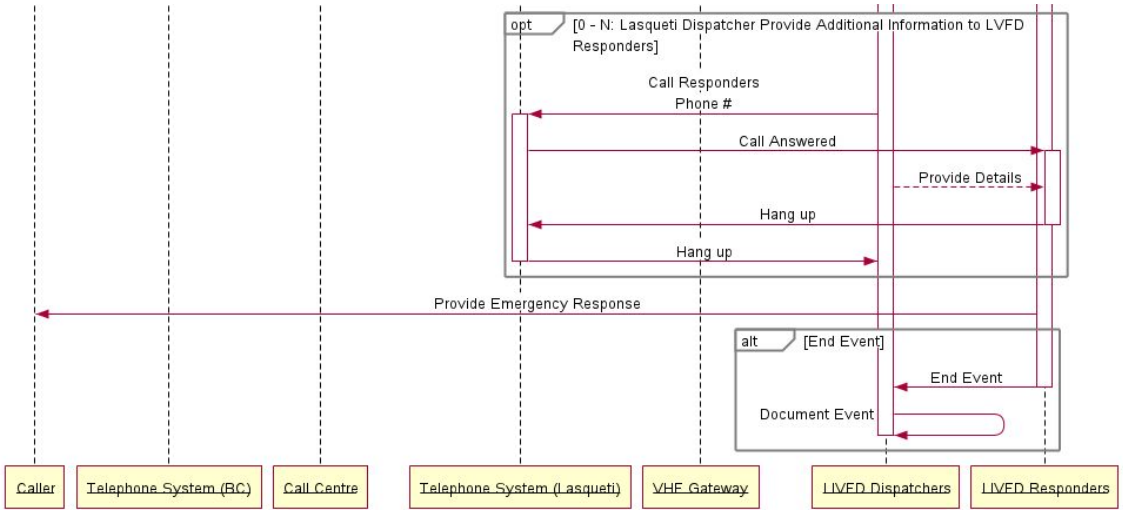
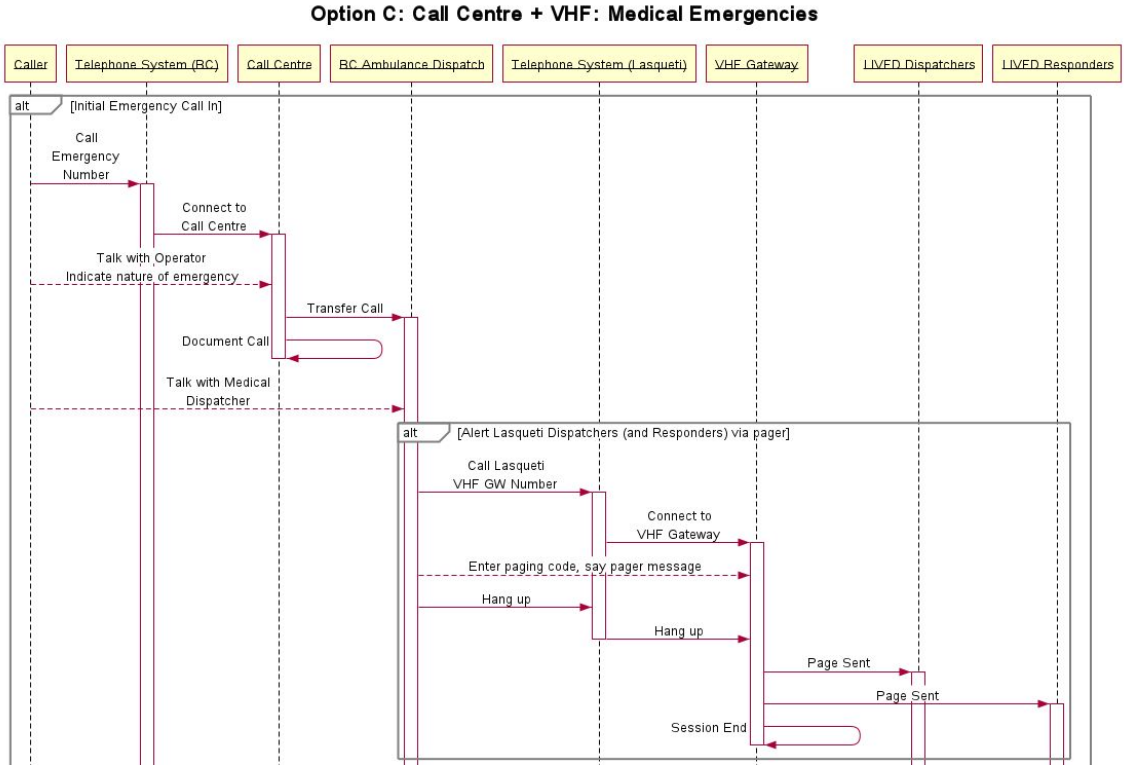
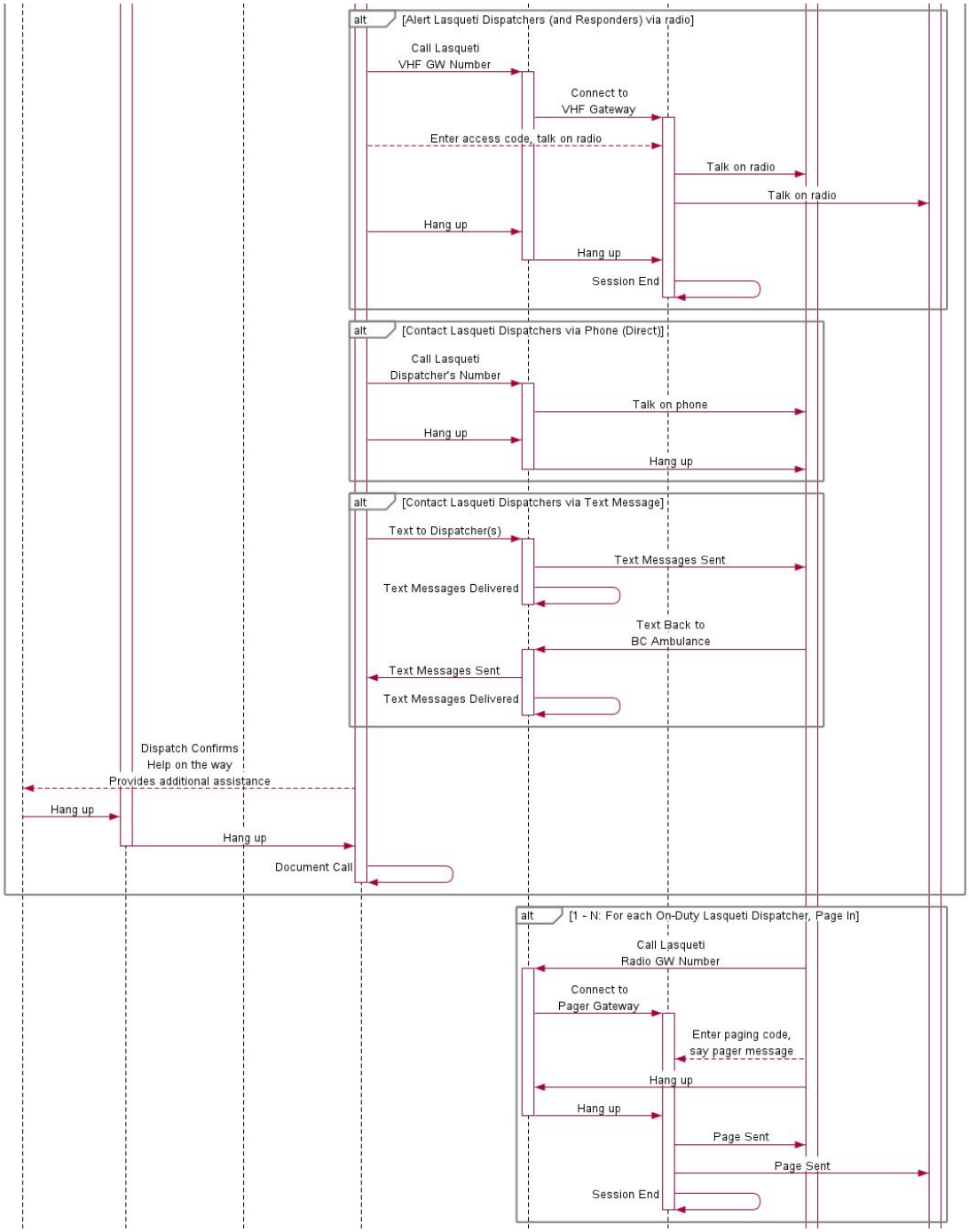


Figure 11 - Call Centre + VHF System Fire Interactions Diagram

6.2.3.3.1.2 Medical emergencies

The below UML Interaction Diagrams show interactions between the different entities involved in the call centre + VHF system for medical calls:




alt
[Alert Lasqueti Dispatchers (and Responders) via radio]
Call Lasqueti
VHF GW Number
Connect to
VHF Gateway
Enter access code, talk on radio
Talk on radio
Talk on radio
Hang up
Hang up
Session End
alt
[Contact Lasqueti Dispatchers via Phone (Direct)]
Call Lasqueti
Dispatcher's Number
Talk on phone
Hang up
Hang up
alt
[Contact Lasqueti Dispatchers via Text Message]
Text to Dispatcher(s)
Text Messages Sent
Text Messages Delivered
Text Back to
BC Ambulance
Text Messages Sent
Text Messages Delivered
Dispatch Confirms
Help on the way
Provides additional assistance
Hang up
Hang up
Document Call
alt
[1 - N: For each On-Duty Lasqueti Dispatcher, Page In]
Call Lasqueti
Radio GW Number
Connect to
Pager Gateway
Enter paging code,
say pager message
Hang up
Hang up
Page Sent
Page Sent
Session End

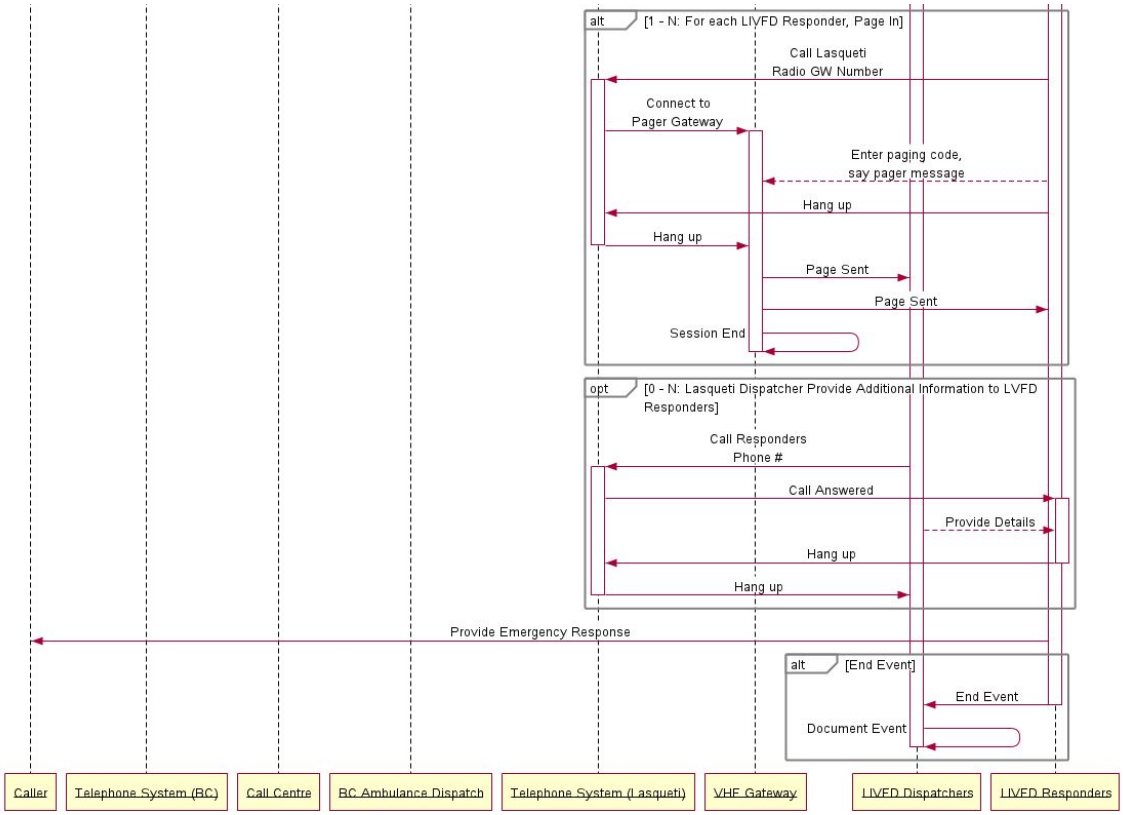


Figure 12 - Call Centre + VHF System Medical Interactions Diagram

6.2.3.3.2 Failure analysis

6.2.3.3.2.1 Fire emergencies

This section describes the worst-case consequences of various failures on the success of the dispatch system for fire emergencies. Each relevant interaction from the corresponding diagram is listed, along with a description of the failure and the resulting consequence.

Caller -> Telephone System (BC): Call Emergency Number

- Caller unable to reach telephone — No dispatch
- Caller unable to dial telephone — No dispatch
- Caller does not know number — No dispatch
- Caller's phone service out (Telus) — No dispatch
- Caller's phone service overloaded (Telus) — No dispatch
- Caller has no cell coverage — No dispatch
- Caller's phone service unavailable due to fire — No dispatch

Telephone System (BC) -> Call Centre: Connect to Call Centre

- Call Centre unreachable (Telus) — No dispatch
- Call Centre down — No dispatch

- Call Centre overloaded — Increased dispatch time

Caller -> Call Centre: Talk with Operator to Indicate nature of emergency

- Caller ID Blocked & Caller can't provide location — Increased response time
- Call dropped due to fire — No dispatch
- Call disconnected due to moving to safe location — No dispatch

Call Centre -> Telephone System (Lasqueti): Call Lasqueti VHF GW Number

- Call Centre phone service out (Telus) — No dispatch
- Call Centre phone service overloaded (Telus) — No dispatch

Telephone System (Lasqueti) -> VHF Gateway: Connect to VHF Gateway

- VHF Gateway unreachable (Telus) — Increased dispatch time
- VHF Gateway down — Increased dispatch time
- VHF Gateway in use — Increased dispatch time

VHF Gateway -> LIVFD Dispatchers: Page Sent
VHF Gateway -> LIVFD Responders: Page Sent

- VHF Gateway paging non-functional — Increased dispatch time
- All pagers off/discharged/no coverage — Increased dispatch time
- Some pagers off/discharged/no coverage — Increased dispatch time

VHF Gateway -> LIVFD Dispatchers: Talk on radio
VHF Gateway -> LIVFD Responders: Talk on radio

- VHF Gateway call patch non-functional — Increased dispatch time
- All radios off/discharged/no coverage — Increased dispatch time
- Some radios off/discharged/no coverage — Increased dispatch time

Call Centre -> Telephone System (Lasqueti): Call Lasqueti Dispatcher's Number

- Call Centre phone service out (Telus) — Increased dispatch time
- Call Centre phone service overloaded (Telus) — Increased dispatch time

Telephone System (Lasqueti) -> LIVFD Dispatchers: Talk on phone

- No dispatchers available — Increased dispatch time
- Dispatcher unable to reach telephone — Increased dispatch time
- Dispatcher's phone service out (Telus) — Increased dispatch time
- Dispatcher has no cell coverage — Increased dispatch time

Call Centre -> Telephone System (Lasqueti): Text Call Centre

- Call Centre text service out (Telus) — Increased dispatch time
- Call Centre text service overloaded (Telus) — Increased dispatch time

Telephone System (Lasqueti) -> LIVFD Dispatchers: Text Messages Sent

- No dispatchers available — Increased dispatch time

- Dispatcher unable to reach smartphone — Increased dispatch time
- Dispatcher has no cell coverage — Increased dispatch time

Call Centre -> Caller: Operator Confirms Help on the way

- Call dropped due to fire — No Effect
- Call disconnected due to moving to safe location — No Effect

Call Centre -> Call Centre: Document Call

- Forget to document — No documentation

LIVFD Dispatchers -> Telephone System (Lasqueti): Call Lasqueti Radio GW Number

- Dispatcher unable to reach telephone — Increased response time
- Dispatcher's phone service out (Telus) — Increased response time
- Dispatcher's phone service overloaded (Telus) — Increased response time

Telephone System (Lasqueti) -> VHF Gateway: Connect to Pager Gateway

- VHF Gateway unreachable (Telus) — Increased dispatch time
- VHF Gateway down — Increased dispatch time
- VHF Gateway in use — Increased dispatch time

VHF Gateway -> LIVFD Dispatchers: Page Sent
VHF Gateway -> LIVFD Responders: Page Sent

- VHF Gateway paging non-functional — Increased dispatch time
- All pagers off/discharged/no coverage — Increased dispatch time
- Some pagers off/discharged/no coverage — Increased dispatch time

LIVFD Responders -> Telephone System (Lasqueti): Call Lasqueti Radio GW Number

- Responder unable to reach telephone — Increased response time
- Responder's phone service out (Telus) — Increased response time
- Responder's phone service overloaded (Telus) — Increased response time

Telephone System (Lasqueti) -> VHF Gateway: Connect to Pager Gateway

- VHF Gateway unreachable (Telus) — Increased dispatch time
- VHF Gateway down — Increased dispatch time
- VHF Gateway in use — Increased dispatch time

VHF Gateway -> LIVFD Dispatchers: Page Sent
VHF Gateway -> LIVFD Responders: Page Sent

- VHF Gateway paging non-functional — Increased dispatch time
- All pagers off/discharged/no coverage — Increased dispatch time
- Some pagers off/discharged/no coverage — Increased dispatch time

LIVFD Dispatchers -> Telephone System (Lasqueti): Call Responders Phone #

- Dispatcher unable to reach telephone — Increased response time

- Dispatcher's phone service out (Telus) — Increased response time
- Dispatcher's phone service overloaded (Telus) — Increased response time

Telephone System (Lasqueti) -> LIVFD Responders: Call Answered

- Responder not available — Increased dispatch time
- Responder unable to reach telephone — Increased dispatch time
- Responder's phone service out (Telus) — Increased dispatch time
- Responder has no cell coverage — Increased dispatch time

LIVFD Responders->Caller: Provide Emergency Response

- Responders unable to locate fire — No response
- Responders unable to reach fire — No response
- Responders arrive too late — Limited response

LIVFD Dispatchers -> LIVFD Dispatchers: Document Event

- Forget to document — No documentation

6.2.3.3.2.2 Medical emergencies

This section describes the worst-case consequences of various failures on the success of the dispatch system for medical emergencies. Each relevant interaction from the corresponding diagram is listed, along with a description of the failure and the resulting consequence.

Caller -> Telephone System (BC): Call Emergency Number

- Caller unable to reach telephone — No dispatch
- Caller unable to dial telephone — No dispatch
- Caller does not know number — No dispatch
- Caller's phone service out (Telus) — No dispatch
- Caller's phone service overloaded (Telus) — No dispatch
- Caller has no cell coverage — No dispatch

Telephone System (BC) -> Call Centre: Connect to Call Centre

- Call Centre unreachable (Telus) — No dispatch
- Call Centre down — No dispatch
- Call Centre overloaded — Increased dispatch time

Caller -> Call Centre: Talk with Operator to Indicate nature of emergency

- Caller ID Blocked & Caller can't provide location — Increased response time
- Call disconnected due to moving to safe location — No dispatch

Call Centre -> BC Ambulance Dispatch: Transfer Call

- Call Centre phone service out (Telus) — No dispatch
- Call Centre phone service overloaded (Telus) — No dispatch
- BC Ambulance unreachable (Telus) — No dispatch

- BC Ambulance down — No dispatch
- BC Ambulance overloaded — Increased dispatch time

Call Centre -> Call Centre: Document Call

- Forget to document — No documentation

Caller -> BC Ambulance Dispatch: Talk with Medical Dispatcher

- Caller can't provide location — Increased response time
- Call dropped — No dispatch
- Call disconnected due to moving to safe location — No dispatch

BC Ambulance Dispatch -> Telephone System (Lasqueti): Call Lasqueti VHF GW Number

- BC Ambulance phone service out (Telus) — No dispatch
- BC Ambulance phone service overloaded (Telus) — No dispatch

Telephone System (Lasqueti) -> VHF Gateway: Connect to VHF Gateway

- VHF Gateway unreachable (Telus) — Increased dispatch time
- VHF Gateway down — Increased dispatch time
- VHF Gateway in use — Increased dispatch time

VHF Gateway -> LIVFD Dispatchers: Page Sent
VHF Gateway -> LIVFD Responders: Page Sent

- VHF Gateway paging non-functional — Increased dispatch time
- All pagers off/discharged/no coverage — Increased dispatch time
- Some pagers off/discharged/no coverage — Increased dispatch time

VHF Gateway -> LIVFD Dispatchers: Talk on radio
VHF Gateway -> LIVFD Responders: Talk on radio

- VHF Gateway call patch non-functional — Increased dispatch time
- All radios off/discharged/no coverage — Increased dispatch time
- Some radios off/discharged/no coverage — Increased dispatch time

BC Ambulance Dispatch -> Telephone System (Lasqueti): Call Lasqueti Dispatcher's Number

- BC Ambulance phone service out (Telus) — Increased dispatch time
- BC Ambulance phone service overloaded (Telus) — Increased dispatch time

Telephone System (Lasqueti) -> LIVFD Dispatchers: Talk on phone

- No dispatchers available — Increased dispatch time
- Dispatcher unable to reach telephone — Increased dispatch time
- Dispatcher's phone service out (Telus) — Increased dispatch time
- Dispatcher has no cell coverage — Increased dispatch time

BC Ambulance Dispatch -> Telephone System (Lasqueti): Text Call Centre

- BC Ambulance text service out (Telus) Increased dispatch time
- BC Ambulance text service overloaded (Telus) Increased dispatch time

Telephone System (Lasqueti) -> LIVFD Dispatchers: Text Messages Sent

- No dispatchers available Increased dispatch time
- Dispatcher unable to reach smartphone Increased dispatch time
- Dispatcher has no cell coverage Increased dispatch time

BC Ambulance Dispatch -> Caller: Dispatch Confirms Help on the way, Provides additional assistance

- Call dropped No Effect
- Call disconnected due to moving to safe location No Effect

BC Ambulance Dispatch -> BC Ambulance Dispatch: Document Call

- Forget to document No documentation

LIVFD Dispatchers -> Telephone System (Lasqueti): Call Lasqueti Radio GW Number

- Dispatcher unable to reach telephone Increased response time
- Dispatcher's phone service out (Telus) Increased response time
- Dispatcher's phone service overloaded (Telus) Increased response time

Telephone System (Lasqueti) -> VHF Gateway: Connect to Pager Gateway

- VHF Gateway unreachable (Telus) Increased dispatch time
- VHF Gateway down Increased dispatch time
- VHF Gateway in use Increased dispatch time

VHF Gateway -> LIVFD Dispatchers: Page Sent
VHF Gateway -> LIVFD Responders: Page Sent

- VHF Gateway paging non-functional Increased dispatch time
- All pagers off/discharged/no coverage Increased dispatch time
- Some pagers off/discharged/no coverage Increased dispatch time

LIVFD Responders -> Telephone System (Lasqueti): Call Lasqueti Radio GW Number

- Responder unable to reach telephone Increased response time
- Responder's phone service out (Telus) Increased response time
- Responder's phone service overloaded (Telus) Increased response time

Telephone System (Lasqueti) -> VHF Gateway: Connect to Pager Gateway

- VHF Gateway unreachable (Telus) Increased dispatch time
- VHF Gateway down Increased dispatch time
- VHF Gateway in use Increased dispatch time

VHF Gateway -> LIVFD Dispatchers: Page Sent
VHF Gateway -> LIVFD Responders: Page Sent

- VHF Gateway paging non-functional — Increased dispatch time
- All pagers off/discharged/no coverage — Increased dispatch time
- Some pagers off/discharged/no coverage — Increased dispatch time

LIVFD Dispatchers -> Telephone System (Lasqueti): Call Responders Phone #

- Dispatcher unable to reach telephone — Increased response time
- Dispatcher's phone service out (Telus) — Increased response time
- Dispatcher's phone service overloaded (Telus) — Increased response time

Telephone System (Lasqueti) -> LIVFD Responders: Call Answered

- Responder not available — Increased dispatch time
- Responder unable to reach telephone — Increased dispatch time
- Responder's phone service out (Telus) — Increased dispatch time
- Responder has no cell coverage — Increased dispatch time

LIVFD Responders->Caller: Provide Emergency Response

- Responders unable to locate caller — No response
- Responders unable to reach caller — No response
- Responders arrive too late — Limited response

LIVFD Dispatchers -> LIVFD Dispatchers: Document Event

- Forget to document — No documentation

6.2.3.3.2.3 Conclusions

The critical failure modes are as follows:

1. If phone service (land-line and/or cellular) is down or out of service, initial dispatch will not happen.

   This is the most frequent type of failure, and has the most significant impact.

   Any attempts to improve dispatch reliability should start here. However, this is largely out of the control of the LIVFD and the PRRD. Given this, investigations should be undertaken around a "made on Lasqueti" emergency notification system that will still work in the absence of a working telephone.

2. Since all calls flow through the call centre, if they are unreachable or down, initial dispatch will not happen.

   This is largely mitigated by having a call centre with multiple simultaneously active locations (active-active redundancy) that are separated geographically.

3. The VHF gateway provides the means for the call centre to broadcast notifications to the LIVFD dispatchers and responders via pages and radio phone to voice communication. If this gateway is down, the call centre must instead directly telephone or text dispatchers, which slows down the dispatch process.

   Due to the non-critical nature of this failure, VHF gateway redundancy is not required initially, but should be considered as a future upgrade when additional repeaters are installed.

In summary, Option C provides a far more resilient and reliable system compared with Option A.

6.2.3.3.3 VHF radio system

6.2.3.3.3.1 Proposed VHF enhancements

The call centre + VHF paging/radio system requires improvements to be made to the existing LIVFD VHF radio system. The improved system must meet the following requirements:

1. Comply with regulatory standards
2. Provide good coverage to all areas of Lasqueti Island
3. Have redundant power systems
4. Tolerate single failures while retaining system operation

Regulatory Standards

All radio equipment proposed for use comply with all Canadian regulatory standards. Radios are licensed for use in Canada by Industry Canada, and all transmitters operate within the constraints of the existing radio licenses.

All proposed handheld radios proposed to be used to equip LIVFD members are also compatible with the current radio communication equipment used by NI 9-1-1, as per PRRD Bylaw No. 391.

Coverage

Three classes of radio devices are proposed as part of the Call Centre + VHF system: handheld VHF radios, truck/base station radios and radio-pagers. Each of these technologies have different coverage characteristics. Looking at the most restrictive devices, handheld VHF radios are typically able to clearly receive a signal that is higher than 0.5 μV, where VHF radio-pagers are typically able to consistently receive pages when a signal is higher than 160 μV[42]. This means that the VHF radio-pagers require a signal that is over a hundred times stronger than what is required to talk via a handheld VHF radio[43]. It is this characteristic that led North Island 9-1-1 to propose two large towers to ensure full coverage.

An online radio propagation analysis and mapping tool was used to compute a worst-case model of which areas of Lasqueti would have strong and marginal coverage for both VHF handheld radios and VHF radio-pagers. Truck/base station radios were not modelled, as they will perform better than VHF handheld radios, and will be deployed in select LIVFD vehicles and at dispatcher's residences, as needed.

The following technical parameters were used to compute coverage maps:

- Frequency: 146 MHz
- Tower height: 15 Meters above ground
- Antenna gain: 6 dBi omni-direction antenna
- Transmission line loss: 3 dB

[42] http://www.hpl.hp.com/hpjournal/98feb/feb98a7.pdf

[43] This is understandable, as the radio-pagers are very small, and thus do not have a very large antenna. Radio-pagers are also typically worn directly against the body, which also attenuates the received signal.

- Transmit power: 18 Watts
- Receiver height: 1 Meter above ground

For VHF Handheld maps:

Green shading corresponds to signal strength > -63 dBm (160 µV), an S9+10 signal.
Yellow shading corresponds to a signal strength > -73 dBm (50.15 µV), an S9 signal.

For VHF Pager maps:

Green shading corresponds to signal strength > -63 dBm (160 µV), an S9+10 signal.
Yellow shading corresponds to a signal strength > -73 dBm (50.15 µV), an S9 signal.

This coverage mapping highlighted the deficiencies of the current radio system for paging, and demonstrates that good coverage can be achieved inexpensively by having LIVFD members use a combination of radio-pagers and VHF handheld radios.

Two phases are proposed to implement improvements to the radio infrastructure to provide sufficient coverage.

Redundant Power

LIVFD radio infrastructure operates on battery power. Battery charging is accomplished via very reliable and locally well understood solar charging technologies. Backup to solar battery charging is provided by on site generator which can also provide direct 12 volt power to the radio system should there be a battery failure. There are no known cases of complete battery failure within any of our local alternative energy systems.

Tolerate Single Failures

This design permits full LIVFD operations during any single full site failure. During a radio site failure, pager coverage would be degraded, but use of VHF radios would remain fully operational. LIVFD procedures would notify members of the required operational changes while the cause of the failure is being addressed.

6.2.3.3.3.2 Current system

The current system includes an existing base station installed in the North Fire Hall and an existing repeater installed at Heemis Rock east of the centre of the island.

VHF Radio Coverage (North End)

Figure 13 - VHF Handheld Coverage From Existing North End Site

VHF Pager Coverage (North End)

Figure 14 - VHF Pager Coverage From Existing North End Site

VHF Radio Coverage (South End)

Figure 15 - VHF Handheld Coverage From Existing South End Site

VHF Pager Coverage (South End)

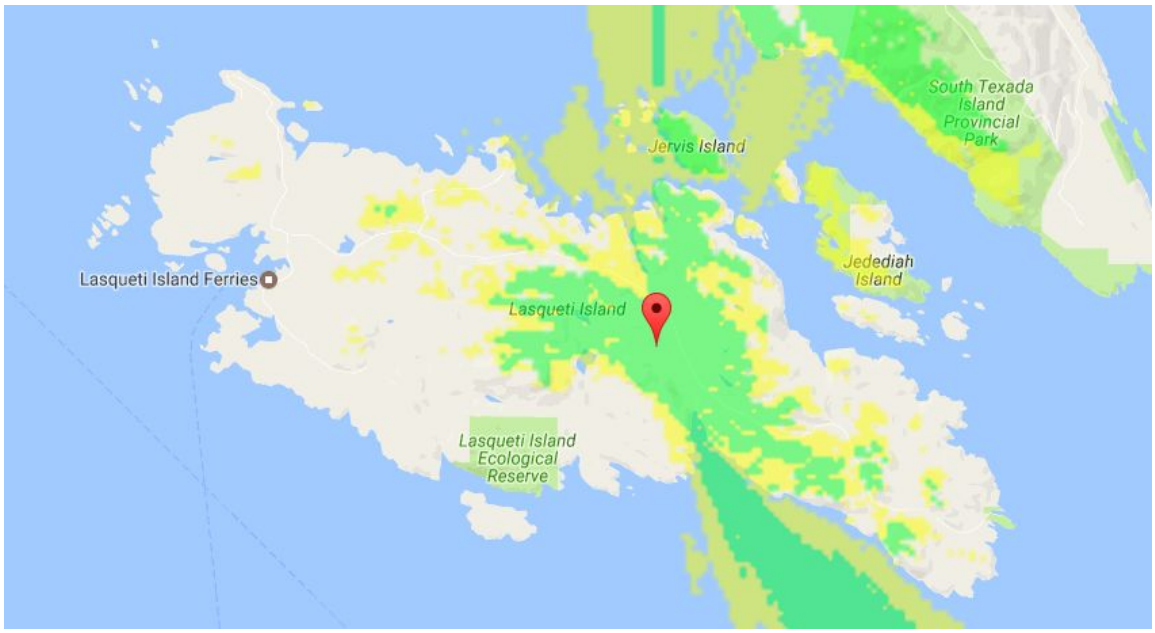


Figure 16 - VHF Pager Coverage From Existing South End Site

Combined Coverage

North and South system coverage are combined, VHF pager coverage is as follows:

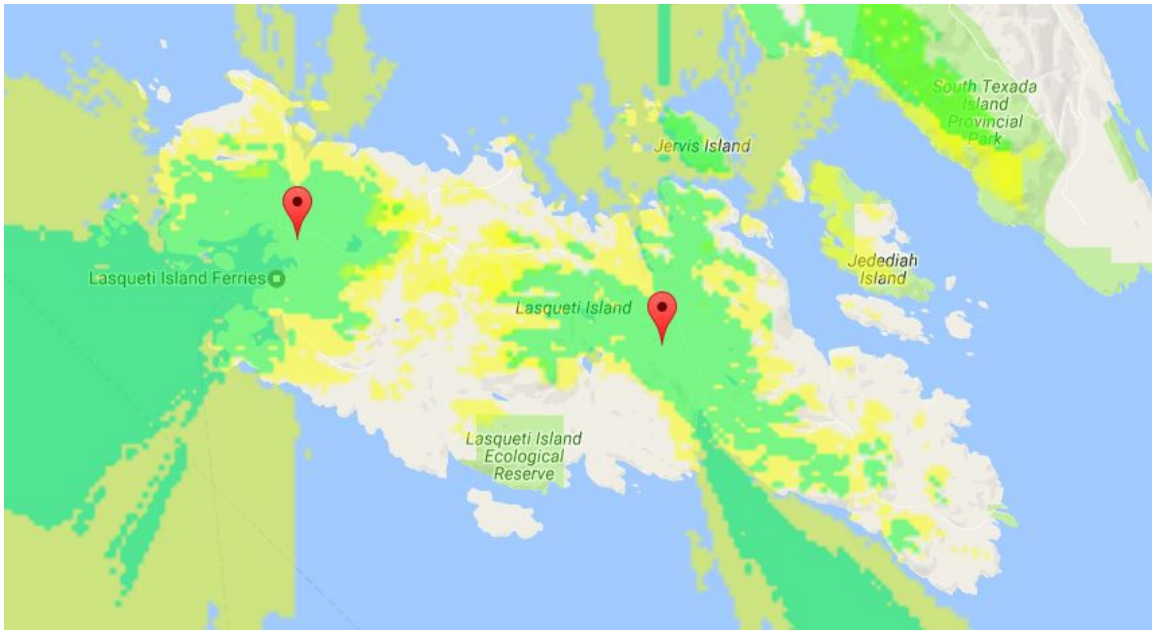


Figure 17 - VHF Pager Combined Coverage From Existing Sites

Note that there are still quite a few areas of the island that are not covered, which is why adding additional repeater(s) is important.

6.2.3.3.3.3 Phase 1 VHF enhancements

Phase 1 involves adding a new low-cost, low-impact repeater on crown land near the centre of Lasqueti Island. This repeater will fill in coverage gaps, and provide redundancy should the repeater at the LIVFD North Hall fail.

This repeater will consist of the following components:

- VHF repeater
- Weatherproof enclosure
- VHF omnidirectional antenna
- Tree-mounting brackets for antenna
- Feedline for connecting antenna to repeater
- Backup batteries (Flooded Lead Acid)
- Solar panels
- Mount and anchors for solar panels
- Solar charge controller
- Backup Generator
- Power cables

The power system proposed is a duplication of the existing LIVFD Heemis Rock repeater site and is similar in design to what is used for the Lasqueti Internet Access Society (LIAS) access points, which have demonstrated a high degree of reliability and resiliency through harsh winter storms and extended periods of low light. The LIVFD repeater at Heemis Rock has been in operation for approximately 7 years with no outages.

The repeater power system will be primarily powered by 12 volt DC batteries, these batteries will be maintained charged by means of solar electric charging technologies with a generator backup system. Batteries will be sized to provide multiple days of autonomy. In the unlikely event where the batteries reach exhaustion, a generator located on-site will be used to recharge the batteries. Daily power draw is estimated to be 192 watts per day, which represents less than one hour of sunlight using a 250 watt solar panel.

Cost estimates have been provided for constructing such a repeater system, including all components as listed above. Each repeater can be assembled from components costing $5,000, including the generator. Costs to set up, test and install the repeaters has been volunteered as an “in-kind” contribution.

Phase 1 improvements can proceed immediately upon approval by the PPRD. This will involve the following steps:

- Purchasing of equipment and materials not provided by in-kind donations.
- Assembly of the repeater enclosure and power system
- Obtaining a licence of occupation[44] from the B.C. Government
- Deployment of the repeater, power system and antenna

The LIVFD falls under the “Non-commercial radio communication provider or user” licence of occupation use category, which has no cost. If permission to use crown land is denied, permission to use private land, with a registered covenant, has been volunteered by a private landowner.

VHF Radio Coverage

Phase 1 enhancements adds coverage for the following areas of Lasqueti for VHF radios:

[44] See section 6.1 of Crown Land Use Operational Policy: Communication Sites http://www2.gov.bc.ca/assets/gov/farming-natural-resources-and-industry/natural-resource-use/land-water-use/crown-land/communication_sites.pdf

Figure 18 - VHF Handheld Coverage From Proposed New Site

As can be seen, the new repeater covers virtually all of the island. The only areas with marginal reception are a few spots at the far South end of the island.

A temporary repeater was installed at the candidate location for testing purposes, and on-the-ground coverage testing matched the predicted coverage, with degraded reception only found at the Squitty Bay parking lot.

VHF Pager Coverage

Phase 1 enhancements adds coverage for the following areas of Lasqueti for VHF pagers:

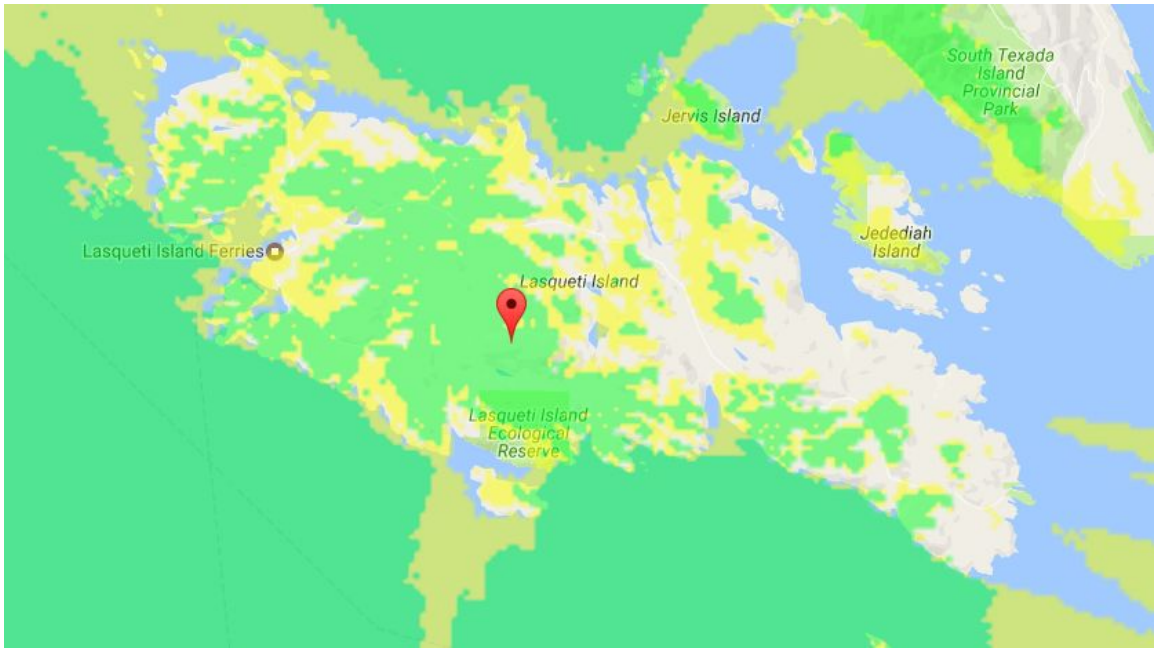


Figure 19 - VHF Pager Coverage From Proposed Site

Combined Coverage

When the current system and Phase 1 enhancements are combined, VHF pager coverage is as follows:

Figure 20 - VHF Pager Coverage From Existing and Proposed Sites

Note that there are significant areas of the island, especially in valleys and on the south end, where there is marginal or no coverage. This highlights the need for a third repeater to improve pager coverage.

6.2.3.3.3.4 Phase 2 VHF enhancements

Phase 2, as needed, involves adding a third low-cost, low-impact repeater towards the south end of Lasqueti Island to address the lack of pager coverage in this area. This repeater will further improve redundancy and system reliability.

Several potential sites have been identified and will be finalized based on on-the-ground testing after Phase 1 is complete and operational.

6.2.3.4 Cost analysis

6.2.3.4.1 Setup costs

Pagers:	$15,000 to $21,000[45]
Pager transmitter:	$1,500 to $2,000[46]
VHF repeaters:	$5,000 to $10,000[47]
Mapping:	up to $2,000[48]
Total set-up (initial capital investment) costs:	Approximately $23,500 to $35,000

6.2.3.4.2 Annual operating costs

Call centre:	$1,600 / year[49]
Repeater maintenance:	$1,000 / year
Radio and pager repair and replacement:	$5,000 / year[50]
Total annual operating costs:	Approximately $7,600 / year

6.2.3.4.3 In-kind contributions

VHF radio and pager implementation

VHF radio and pager training

Incident Locator Tool setup

Incident Locator Tool data collection

Incident Locator Tool training

Incident Locator Tool data upkeep

Volunteer support group

Repeater design

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[45] 30-35 Motorola Minitor VI pagers at a cost of $500 - $600 each (estimates from RadioWorks).
[46] Cost estimate from RadioWorks.
[47] Cost estimate for one or two repeaters. See section 6.2.3.3.3.3 for more details.
[48] Costs are included for purchase of devices for dispatchers to operate the mapping tool, if needed. Five ruggedized tablets have been provided in-kind for initial assessment for this use. This line item is included in case these tablets do not meet LIVFD needs.
[49] Cost estimate from FourStar Communications.
[50] PRRD 2016-2020 Financial plan, pg 35-42 (Jan 14, 2016 Rural Services Committee agenda), regional fire department communications operations and maintenance expenditures for 2016 include $5,150 for Savary Island FD, $5,000 for Malaspina FD and $6,000 for Northside FD. Lasqueti Island FD shows communications O & M expenditures were projected to increase from $1,094 in 2015 to $5,000.

Repeater installation

6.2.3.4.4 Projected future capital costs

Assuming a future NI 9-1-1 transition from analogue VHF radios to APCO P25 digital radios, there will be a significant capital cost to replace all radio equipment in order to maintain compatibility with NI 9-1-1.

6.2.3.5 Community interests

6.2.3.5.1 Firefighter and first responder safety

The degree to which the dispatch system increases firefighter and first responder safety.

The most significant safety risks associated with LIVFD operations are fire-fighting activities, medical response activities, and vehicle operation. Dispatchers do not experience any of these significant safety risks associated with the execution of their dispatching duties as they can perform their duties from any operational phone wherever they are at the time the system is activated.

The call centre + VHF system notifies dispatchers and first responders with a radio call or a radio-pager alert that does not require an immediate response. This gives a driver time to pull over at a safe location before reading or responding to the call or page, as it does not demand an immediate response that may distract from safely operating a vehicle. Furthermore, as no voice messages are played as part of the page, there is minimal distraction or additional information load placed on a driver. Voice messages communicated via VHF radio may cause some level of distraction.

Once the initial notification has been sent out, the call centre operator can talk with LIVFD dispatchers via telephone. Responders can talk with local dispatchers over the VHF radio system. Drivers can pull over and ask for information to be repeated if they did not catch the radio traffic.

The call centre + VHF system uses the locally-developed Incident and Resource Locator Tool, as well as local knowledge, to identify the location of the incident (see Section 6.1). The call centre operator can talk with the caller to obtain additional location information, and the local dispatcher could also attempt to phone the call back to obtain additional information if needed. This information can be quickly and accurately disseminated to the LIVFD members that have indicated that they are immediately available to respond via VHF radio. This minimizes delays in determining the location of an emergency, which can result in a more severe fire or medical emergency, heightened safety risks to firefighters and medical responders.

Since post-dispatch communication is out of scope of the committee, these aspects of LIVFD operations have not been addressed in this analysis. In the call centre + VHF system, alerting, dispatch and post-dispatch share a common radio-based communication system.

6.2.3.5.2 Appropriateness of cost/benefit given Lasqueti situation

The relative costs to benefits of the dispatch system given the needs of the community, the remote nature of Lasqueti Island, the size of the population and the ability to pay for the service.

The call centre + VHF system provides a relatively high level of service at a modest capital cost. Once set up, operating costs are lower than the current operating costs for the existing pager-based dispatch system. Costs primarily result from purchase of VHF pagers and the need to complete radio coverage testing.

Cost details can be found in section 6.2.3.4.

These costs, while more expensive than the current system, are not significantly so, and will result in a lower negative impact on current taxpayers.

6.2.3.5.3 Ensure dispatch involves appropriate training

The degree to which the dispatch system supports and facilitates appropriate training of dispatchers, first responders and firefighters.

Training needs include VHF radio and pager use, and mapping tool use. Procedures and documentation will be developed as part of the implementation process, and designed to complement existing LIVFD training documentation and activities.

6.2.3.5.4 Local knowledge

The ability to use LIVFD's local knowledge to dispatch, locate, and respond to incidents. Use of local knowledge is valuable because it increase the effectiveness and appropriateness of emergency response. However, local knowledge can be unavailable, ad-hoc and informal.

Local knowledge regarding potential incident locations, firefighting resources and risks will be incorporated into the Incident and Resource Locator Tool (see Section 6.1). In addition, use of local dispatchers in direct communication with responders will facilitate use of local knowledge when available.

6.2.3.5.5 Minimal points of failure

The degree to which the dispatch system has the fewest parts that if they fail, service is disrupted.

The call centre + VHF system has several major parts that if they fail, dispatch does not take place. The main parts of concern are:

- Lasqueti land-line telephone system
- Cellular phone network
- Telus communication network
- Call centre
- VHF radio network

This system has a significantly higher number of components required for a successful dispatch when compared to the current system but slightly less than the NI 9-1-1 system. This is somewhat offset by the degree to which the call centre has an active backup site, and the local nature of the VHF radio network.

A detailed interactions diagram identifying the various parts of the system can be found in section 6.2.3.3.

6.2.3.5.6 Redundancy

The degree to which the dispatch system continues to operate in the presence of failures and faults, including technological failures, operational failures, and human error.

The call centre + VHF system is dependent on the local telephone system, which has numerous single points of failure. If a caller is unable to place a call, no dispatch can take place. This point of failure is common to any system that includes the use of local land-lines.

The call centre + VHF system depends on the availability and operations of the call centre. While these sites have backups, they are susceptible to overloading during storms or other major events.

The call centre + VHF system is dependent on a VHF radio system to notify and contact LIVFD members. If repeaters or towers are non-operational, coverage may be degraded or communication may be unavailable.

If radios or radio-pagers are in areas without coverage, are not charged, not operational or not turned on, radio calls and pages are not received. However all active radios and pagers carried with LIVFD members must simultaneously fail to receive a radio and page call in order to result in a dispatch not taking place.

A detailed failure analysis can be found in section 6.2.3.3.2.

6.2.3.5.7 Easy to use and understand

The degree to which the dispatch system can easily be understood by all involved parties, including the public, and the degree to which the system is easy for dispatchers to successfully dispatch firefighters and first responders.

The call centre + VHF system is relatively easily understood by visitors and residents alike. While not quite as easy a calling 9-1-1, the call centre + VHF system provides a single-number for all emergency calls. Further, as visitors with cell phones pay for the 9-1-1 service, 9-1-1 calls on their cell phones will be routed to the appropriate emergency response handler. As an alternative for medical calls, people may also call BC Ambulance directly as in areas with 911 service.

The emergency number(s) would be provided to residents on a reference card, as is done currently. If residents desire, they can use phones that have an emergency button or mode that will autodial the emergency number[51]. This would help simplify use by children, visitors, and others in a medical or fire emergency when the caller is likely under intense stress

[51] As with 9-1-1, accidental dialing of emergency services is still a concern, as an accidental call that is immediately hung up cannot be distinguished from a real emergency call where phone connectivity was lost. In Option C, the LIVFD has the option to handle emergency calls where the caller hangs up, as opposed to the call being handled by the police with NI 9-1-1. In this event, the call centre can pass the caller ID of the caller to the LIVFD. When the caller indicates to the call centre that the call as indeed an accident, the call centre can document the call without having to pass it on, or as defined by the LIVFD standard operating procedures.

Once the call centre is called, you are quickly connected with an operator that will connect you directly to a B.C. Ambulance operator for medical emergencies, or would take information and alert local LIVFD dispatch of a fire emergency. This means that the caller will talk with a professional call-taker immediately who will collect information about the emergency, and confirm that the LIVFD has been alerted and help is on the way. In the case of a medical emergency, the caller will talk directly with a BC Ambulance dispatcher, who use the same process as described above and may also be able to provide immediate emergency intervention advice .

Once an initial alert is received from the call centre or BC Ambulance, the process is also straightforward for LIVFD dispatchers, first responders, and firefighters. LIVFD procedure would indicate how the alert is made, and define how the response is organized and communicated within the LIVFD

6.2.3.5.8 Happy first responders and firefighters

The degree to which the first responders and firefighters are happy with the dispatch system, and feel that it meets their needs.

The call centre + VHF system will significantly increase first responder and firefighter happiness by reducing uncertainty when an alert is received, as critical information about the location of the emergency will already have been determined. The radio system improvements will also increase coverage. Finally, a local dispatch system allows for local control and use of local knowledge.

First responder and firefighter happiness is also co-dependent on community happiness in the service (see section 6.2.3.6.14), which in turn depends on meeting community interests to the highest degree possible.

6.2.3.5.9 Local dispatch

The degree to which the dispatch system allows for dispatching to be done by dispatchers on Lasqueti.

The call centre + VHF system allows the retention of a local dispatch team as a division of the LVFD which serves the LIVFD and the community/public alike.

6.2.3.5.10 Retain B.C. Ambulance understanding about Lasqueti situation

The degree to which the dispatch system allows for the relationship between B.C. Ambulance and Lasqueti LIVFD to be retained for medical emergencies.

The call centre + VHF system will retain the existing relationship with B.C. Ambulance, which supports the interest - BC Ambulance understanding about the Lasqueti situation.

6.2.3.5.11 Local control

The degree to which a local group (e.g. LIVFD) are able to make decisions regarding management and operation of the dispatch system.

The call centre + VHF system - the public will directly connect to a call centre (to provide 24/7 call answering by a person), but otherwise maintains a large degree of local control (e.g. local mapping tool, local dispatchers, local VHF network). As all changes and Standard Operational Guidelines would be within the LIVFD fire protection service, the call centre + VHF system would not be subject to the regional service “no withdrawal” regulation, providing flexibility for future changes as needed.

6.2.3.5.12 Accessible to all

The degree to which the dispatch system is accessible to all areas of Lasqueti Island where emergency services are provided.

The call centre + VHF system is accessible to all residents and visitors that have a working land-line phone service, or have cellular coverage. This excludes many residences that do not have installed (or operating) phone service, or are outside of cellular coverage. Due to lack of investment in the land-line phone infrastructure on Lasqueti, and infrequent repair service visits by the service provider (Telus) it is common for there to be phone service outages for large numbers of subscribers, and for the duration of these outages to extend in some cases for multiple months.

Improvements to the LIVFD VHF radio-communication system will reduce the number of dead-zones where LIVFD members cannot be notified by the local dispatcher in the event of an emergency when land-line connections are not available.

6.2.3.5.13 Locate people accurately & effectively

The degree to which the dispatch system is able to accurately and effectively locate incidents.

In the call centre + VHF system, call centre call takers gather what info they can from the caller and this info is relayed to local dispatchers. Local dispatchers will make use of the locally developed Incident and Resource Locator Tool to fulfill their role. If the caller does not know the structure identity number(address) as established within the Incident and Resource Tool local dispatchers will make use of a reverse directory and or other tools available to them such as local knowledge (see Section 6.1) to establish the location.

- The structure identifier of an incident
- The routing to the incident, including waypoints and other directional information
- Closest structure
- Nearby resources (e.g. water sources)
- Nearby hazards and characteristics (e.g. propane tanks, tight turnarounds)

This allows the local dispatchers and responders to obtain detailed information on how to reach an incident, and what to expect upon arrival.

6.2.3.5.14 Not tied to contract we can’t get out of

The degree to which the dispatch system can be adjusted and changed as needed. Refers in part to the “No Withdrawal" regulation for regional emergency telephone services.

The call centre + VHF system requires the LIVFD to set up an arrangement with a call centre, but no long-term contract is required.

As all changes would be within the regional fire protection service, the call centre + VHF system would not be subject to the regional service “no withdrawal” regulation, providing flexibility for future changes if needed or desired.

6.2.3.5.15 Feedback when successful dispatch

The degree to which the dispatch system lets the public calling in know that help is on the way.

The call centre + VHF system has a live operator that stays on the line with the caller at least until the dispatch process has been initiated. This provides the caller with prompt and accurate indications that help is on the way. In the case of medical calls, the BC Ambulance dispatcher confirms to the caller that help is on the way after receiving the call transfer from the call centre. In the case of fire calls, the call taker obtains relevant information, and confirms to the caller that firefighters are being dispatched.

6.2.3.5.16 Local repairability

The degree to which the dispatch system can be maintained and modified by a local group (e.g. the LIVFD).

The call centre + VHF system out-sources some components (e.g. call centre), but retains local ownership of several components, including the radio communications network and mapping tool. These locally-owned components of the dispatch system will be able to be maintained or modified by local groups, including the LIVFD.

6.2.3.5.17 Future-proofing

The degree to which the dispatch system can be future-proofed, upgraded, and be resilient to technological changes and changes in needs.

The call centre + VHF system would provide substantial flexibility to adapt to changing future technologies. For example, communication via text messaging would be an incremental extension (see Option E, section 6.2.5).

6.2.3.5.18 Knowing what we are getting into/committing to

The degree to which the groups responsible for the dispatch system clearly communicate with the community regarding decisions and consequences associated with those decisions.

The call centre + VHF system requires a few, relatively straight-forward changes to the current system (use of the mapping tool, call centre, and VHF radios and VHF pagers).

Transition to option C does not introduce confusion or implementation difficulties for the community or LIVFD.

6.2.3.5.19 Simplicity

The degree to which the dispatch system is simple, both with respect to its design and use.

The call centre + VHF system involves multiple components, namely:

- Land-line phone system or cellular phone system
- Telecommunication connectivity to Vancouver
- Call centre centre (e.g. in Prince George)
- Telecommunication connectivity from call centre to LIVFD dispatchers and responders
- Telecommunication connectivity from call centre to B.C. Ambulance
- B.C. Ambulance centre in Victoria
- Telecommunication connectivity from B.C. Ambulance to LIVFD dispatchers and responders
- LIVFD radio communication system

Many of these components, especially those designed to be reliable and resilient, are extremely complex.

The use of the system is simple:

1. Dial ten digit number to call centre
2. Indicate to the call centre operator “Fire” or “Medical”
3. For Fire, provide relevant information about incident to call taker
4. For Medical, talk with B.C. Ambulance operator to describe the nature of the emergency

Dispatching of LIVFD medical responders and firefighters to respond to the emergency is handled locally.

It is important to note that simplicity is separate from usability and ease of use, which is covered in a different interest. You can have a system that is simple and difficult to use, or a system that is complex but easy to use.

6.2.3.5.20 Tax implications & costs

The degree to which the dispatch system requires or avoids high short-term and/or long-term tax costs.

The call centre + VHF system would eliminate the current cost of the Rogers pagers, but incur costs associated with purchase of VHF pagers and monthly fees for call centre service.

Details for the capital and operating costs are provided in section 6.2.3.4.

6.2.3.5.21 Dispatch recognizes that some people are accessible by trail or water access only

The degree to which the dispatch system recognizes that some residents and locations on Lasqueti Island have no road access.

The call centre + VHF system would make use of the locally-developed Incidence and Resource Locator Tool, which would provide clear identification of access to properties, including properties with access only by trail, with access only by water, or with other access challenges.

6.2.3.5.22 Equal value and access for everyone

The degree to which all people who pay for the dispatch system receive equal service.

The call centre + VHF system would only be accessible to people with phone service. All people would receive equal service, subject to the resources of the LIVFD and access to the incident. The LIVFD does not discriminate against any people within the LIVFD fire protection area.

6.2.3.5.23 Not dependent on systems that will be non-functional in a disaster

The degree to which the dispatch system will continue to function in the event of a major disaster, such as an earthquake or major storm.

The call centre + VHF system is dependent on a telephone system, Telus microwave tower, call centre, and a local VHF network. It is likely that in the event of a major disaster that there will be no telephone service, as the local phone system ceases to function if communication to Lasqueti is severed.

The location of the call centre outside southwest coastal BC (in the central interior, such as Prince George) means that it is unlikely that a disaster would disrupt both Lasqueti and the call centre.

Use of a local VHF radio system provides for interdepartmental communications via VHF radios, and VHF pagers. In a disaster our radio system is expected to remain operational (with potentially reduced coverage/range if local repeaters fail).

6.2.3.5.24 Ability to be involved

The degree to which the public can be involved in decisions that affect the local dispatch system.

The call centre + VHF system would be the responsibility of the LIVFD with assistance from a local volunteer advisory group (to be determined) The LIVFD consists of community volunteers, and is overseen by the Regional District. The advisory group would assist the LIVFD by, for example, developing and maintaining the mapping tool. The LIVFD and the advisory group would interact with the community and provide

opportunities for the community to be involved. The Regional District is an open government, and has a director elected by Lasqueti Island (Electoral Area “E”), whose responsibility is to represent the community.

6.2.3.5.25 Takes advantage of existing local infrastructure

The degree to which the dispatch system uses local infrastructure, such as communication towers, etc.

The call centre + VHF alerting and dispatching system would use the local land-line phone system and local VHF network.

6.2.3.5.26 Avoid intermediaries who may not understand the situation on Lasqueti

The degree to which the dispatch system avoids external dependencies that may not understand or may not be interested in accommodating the situation on Lasqueti.

The call centre + VHF system would be dependent on phone service. Telus provides land-line phone service to Lasqueti, however Telus has clearly demonstrated that they are not willing/interested in providing reliable and dependable land-line phone service on Lasqueti. The call centre + VHF system would also be dependent on the cellular communication companies, which have not prioritized providing widespread coverage. Option C would require clear guidelines for the call centre on how they would handle calls from Lasqueti. LIVFD relationship with BC Ambulance regarding dispatch is long standing and proven effective. Option C makes no changes that affect BC Ambulance alerts to the LIVFD.

6.2.3.5.27 Being local helps with disaster scenarios

The degree to which the dispatch system assists with local disaster preparedness and response.

The call centre + VHF system would be dependent on some systems external to Lasqueti (the phone system and call centre service provider). The phone system is likely to be non-functional in a disaster, and not locally repairable. As the call centre would be in the BC central interior, it is unlikely that a disaster would affect both the call centre and Lasqueti.

Conversely, call centre + VHF would also be dependent on many elements local to Lasqueti (the mapping tool, VHF radios and pagers, VHF network, local dispatchers). This would provide significant capacity for the dispatch system to support local disaster response.

6.2.3.5.28 Get better telephone system

The degree to which the dispatch system can improve reliability of land-lines or cellular coverage.

The call centre + VHF system is dependent on the reliability of land-lines and cellular coverage, but does not in any way improve these services.

6.2.3.5.29 Broader questions about how to help LIVFD

The degree to which the dispatch system can assist with other investments needed to help the LIVFD. Does this system fit into/assist with broader strategic planning?

Adoption of the call centre + VHF system will address one of the areas identified as deficient in the Fire Underwriters Survey (although the Fire Underwriters Survey recommends a 9-1-1 system it is our belief the inclusion of a live call-taker is the primary reason for this), however is listed as a lower priority compared to some of the other challenges.

6.2.3.5.30 Minimize follow-on implications and obligations

The degree to which the dispatch system minimizes additional requirements that may occur due to aspects of the system or associated contracts or investments.

The call centre + VHF system would have no long-term contracts. Short-term contracts can be withdrawn from with a small monetary penalty. This permits changes to be made as-needed, with minimal financial or legal penalties. There are no major financial or procedural investments (sunk costs) that limit the ability to change to other systems.

6.2.3.5.31 Don't want to be dependent on Vancouver/Victoria

The degree to which the dispatch system avoids dependencies on the major metropolitan areas that are likely to be overloaded or down in the event of a major event.

The call centre + VHF system is not dependent on infrastructure located in Vancouver or Victoria, however, a major event may have disruptions that affect the reliability of the phone service.

6.2.3.5.32 Not invest in old analogue system that will need to be replaced

The degree to which the dispatch system avoids use of older technologies that are likely to be retired in the near future.

The call centre + VHF system depends on analogue technology for telecommunications, and VHF radios and pagers. Digital phone links may be used for cellular phone links. The call centre + VHF system supports extension to Option E, which would make more extensive use of digital communications technology for texting. Analogue voice radio communications are the fall-back standard for local emergency communications as it doesn’t rely on outside infrastructure and as such should not be eliminated.

6.2.3.5.33 One point of contact

The degree to which the dispatch system uses a single point of contact (phone number) to call for emergency services.

The call centre + VHF alerting system would support a single phone number for both fire and medical emergency services to contact the call centre. Alternatively, people could still call BC Ambulance directly for medical emergencies and would have no effect on how BC Ambulance would mobilize LIVFD medical responders.

6.2.3.5.34 Retaining the character of the community

The degree to which the dispatch system retains the character of the Lasqueti community.

The call centre + VHF system does not require community members to make any changes to their property or to reveal any information beyond the location of their driveway. People may agree, at their discretion, to allow more detailed mapping information, such as house location, water sources, etc., in the mapping tool. People may also agree, at their discretion, to have their name and phone number included in the reverse directory to improve their receipt of emergency services.

6.2.3.5.35 Retain insurance coverage

The degree to which the dispatch system assists in retaining insurance coverage (e.g. for mortgages) by meeting a sufficient protection grade set by the Fire Underwriters Survey.

The current dispatch system is not a factor in the current protection grade, as set by Fire Underwriters Survey. Since the call centre + VHF system addresses a number of issues regarding the current system, it would likely improve the dispatch aspect of the fire protection service as viewed by the Fire Underwriters Survey.

6.2.3.5.36 Need to recognize that Lasqueti is willing to accept a higher level of risk

The degree to which the dispatch system reflects the attitude of many residents that our community accepts a "higher level of risk" associated with emergencies.

This subject refers to response time which in most cases is determined by ease of access.

The call centre + VHF system requires individuals to have reliable phone service, which many residents don't prioritize.

6.2.3.5.37 Easier than remembering a phone number

The degree to which the means by which the public reaches the dispatch system can be easier than remembering a phone number, for example, having a single button to press.

The call centre + VHF system call-in number may be memorized, and could also be found by referring to an emergency card placed by residents near their phone. Emergency phone numbers and call-in procedures are also listed in the local Lasqueti phone book.

Phone numbers can be programmed into phones to allow numbers to be dialled with the press of a single button or selected from a directory or contacts list. Specialized stand-alone devices that automatically call pre-programmed emergency numbers are

also supported. Phones and or devices not preprogrammed can often be a cause of a delayed response due to searching for numbers and possible entry errors.

6.2.3.6 LIVFD interests

6.2.3.6.1 When reporting a fire, caller should be able to talk to a person

Whether or not the dispatch system provides 24/7 capability by which a caller can directly talk to a person.

In the Option C system, a caller connected directly to a person at the call centre after dialing the emergency number. For a medical call, the call taker would transfer the call to a BC Ambulance dispatcher. For a fire call, the call taker would contact the local dispatcher by phone, VHF pager or phone-to-VHF radio.

6.2.3.6.2 Easy to use and understand

The degree to which the dispatch system is user friendly and available to all, including kids, adults, infirm, visitors.

This interest is closely related to the community interest “Easy to use and understand” described in section 6.2.3.5.7. And in our opinion meets this LIVFD interest

6.2.3.6.3 Equal provision of service

The degree to which the dispatch system serves all residents served equally, subject to local conditions.

This interest is closely related to the community interests “Accessible to all” described in section 6.2.3.5.12, and “Equal value and access for everyone” described in section 6.2.3.5.22.

6.2.3.6.4 Call-outs (e.g. pagers) that work everywhere

The degree to which system provides good geographic coverage to receive incident alert calls.

The Option C system would provide reasonable coverage for VHF pages and radio communications to reach local dispatchers and responders, and for communications within LIVFD. While there may still be areas without good coverage, the Option C system would provide a significant improvement over the current call-in and alerting system used for fire reporting. The repeater at the north end of the island has been re-located to allow for a more appropriate installation and improved radio coverage.

The telephone system provides land-line and cellular coverage. Land-line coverage is periodically unavailable, sometimes for relatively long durations, until repaired by Telus. Cellular coverage is available on much, but not all, of the island, with variable signal strength.

6.2.3.6.5 Reliable call-outs

The degree to which alerting system provides continuous and resilient coverage.

This interest is similar to the PRRD interest “Effective communications network linking dispatchers and emergency responders” described in section 6.2.3.7.3.

The ability to make call-outs depends on coverage (see previous interest regarding coverage) as well as usability, functionality, training, and reliability.

The Option C system uses a VHF paging and radio system owned and managed locally for call-outs. The VHF pagers are simple to use, tough, and reliable. The Option C system addresses concerns of the current system regarding coverage (improving page reception and accuracy), and robustness of the physical pagers (the VHF pagers are much more robust than the Rogers pagers).

6.2.3.6.6 System should be able to pass reliable messages (numeric or voice)

The degree to which alerting system provides a reliable method to communicate between dispatchers and responders.

This interest is similar to the previous interest as well as the PRRD interest “Effective communications network linking dispatchers and emergency responders” described in section 6.2.3.7.3.

The ability to pass reliable messages depends on coverage (see interest described in section 6.2.3.6.4 regarding coverage) as well as usability, functionality, training, and reliability.

The Option C system uses a VHF paging and radio system owned and managed locally for call-outs. The VHF pagers are simple to use to send and receive pages, and are reliable. The Option C system addresses concerns of the current system regarding coverage (improving page reception and accuracy), and robustness of the physical pagers (the VHF pagers are much more robust than the Rogers pagers). Further, the pagers are one-way and so messages can be received on pagers, but not sent. Paging messages are limited to numeric codes. However, the radios support two-way communication within the LIVFD.

6.2.3.6.7 Effective, easy-to-use home location (with consideration of confidentiality)

The degree to which the dispatch system is able to accurately and effectively locate incidents.

This interest is closely related to the community interest “Local people accurately & effectively” as described in section 6.2.3.5.13.

This interest also adds concerns regarding protection of personal information, as covered by the Freedom of Information and Protection of Privacy Act (FIPPA). Compliance with the provisions of the FIPPA is a requirement (see PRRD interest

"Ensure compliance with all relevant statutes and regulations" described in section 6.2.3.7.17).

In the Option C system, local dispatchers will make use of the locally developed Incident and Resource Locator Tool and reverse directory (see Section 6.1) to identify:

- The structure identifier of an incident
- The routing to the incident, including waypoints and other directional information
- Closest structure
- Nearby resources (e.g. water sources)
- Nearby hazards and characteristics (e.g. propane tanks, tight turnarounds)

This allows the local dispatchers and responders to obtain detailed information on how to reach and incident, and what to expect upon arrival.

The Incident and Resource Locator Tool encapsulates relevant local knowledge, but does not contain any personal information as defined by FIPPA. It is designed to be used with a reverse directory when needed to identify structure identifiers given a resident's name or phone number. The FIPPA applies to this personal information. To provide as much protection of this personal information as possible, the reverse directory would only be available for use by the local dispatchers in a read-only format. At present, LIVFD members sign a non-disclosure agreement to ensure members are aware of the nature of personal information and to prevent unauthorized disclosure of personal information. This non-disclosure agreement would be modified to include the personal information in the reverse directory.

6.2.3.6.8 Streamlined system: no extra steps

The degree to which the dispatch system minimizes steps needed by callers, dispatchers and responders to use the system.

This interest is related to the community interest "Simplicity" as described in section 6.2.3.5.19, but with a focus on steps required during use of the system.

The steps for usage are described in the overview section. In the Option C system, for a fire incident, the caller telephones the emergency number to reach a call centre operator (step 1), the call centre operator contacts a LIVFD dispatcher via telephone, text messaging, VHF pager and/or phone to VHF radio (step 2), the local dispatcher sends an alerting page to LIVFD if needed (step 3), each responding LIVFD member notifies the local dispatcher that they are responding via VHF radio/pager (step 4a), and the local dispatcher provides initial response information and instructions by radio/phone line (step 4b).

For a medical incident, the caller telephones the emergency number to reach a BC Ambulance dispatcher via a transfer from the call centre (step 1), the BC Ambulance dispatcher contacts a LIVFD dispatcher via telephone VHF pager and/or phone to VHF radio (step 2), the local dispatcher sends an alerting page to LIVFD if needed (step 3), each responding LIVFD member notifies the local dispatcher that they are responding

via VHF radio/pager (step 4a), and the local dispatcher provides initial response information and instructions from BC Ambulance. (step 4b).

6.2.3.6.9 Secure communication system

The degree to which the emergency communication system protects personal information and privacy.

Protection of personal information is legislated by the Freedom of Information and Protection of Privacy Act (FIPPA). Compliance with the provisions of the FIPPA is a requirement (see PRRD interest "Ensure compliance with all relevant statutes and regulations" described in section 6.2.3.7.17).

In the Option C system, communication is by telephone, VHF pagers and VHF radios. VHF frequencies are not secure, but person information is not transmitted over the VHF frequency. Telephone communication is relatively secure (but not encrypted).

Due to significant increased cost of radios and pagers, APCO P25 radios are not proposed at this time. When NI 9-1-1 upgrades to P25 (or a future alternative system), as part of the goal of maintaining compatible equipment, LIVFD can re-assess the cost/benefits of also upgrading.

6.2.3.6.10 No changes to First Responder dispatch

The degree to which the dispatch system support the continued role of local dispatchers.

The Option C system relies on local dispatchers for both fire and medical emergency incidents. This system would require some changes to the role of local dispatchers to incorporate use of the call centre, use of the Incident and Resource Locator Tool, and the use of VHF pagers and radios. However, the general purpose and function of local dispatch would remain the same.

6.2.3.6.11 System that functions over the long term (i.e. avoid changing system again in near future)

The degree to which the dispatch system remains stable, with little or incremental change for improvements over time.

Responsibility for management and changes to the Option C system would be the authority of the LIVFD and PRRD, with assistance from the proposed community advisory group. Unless legislation changes, there is no reason that this system cannot function over the long term. Future changes can be implemented incrementally, and would be done to make improvements (e.g. to transition towards Option E with text-message capability). Functionality is likely to remain stable.

6.2.3.6.12 Eliminate non-emergency calls

The degree to which the dispatch system reduces likelihood of non-emergency calls, and unnecessary response efforts in case of non-emergency calls.

The Option C system requires the caller to dial the emergency number to reach the call centre. This number could be automated (e.g. on a rapid dial button), and so accidental calls are possible. While it is challenging to eliminate non-emergency calls (calls made inadvertently, or people calling for non-emergency reasons), the Option C system limits unnecessary response effort. For a medical call, once the BC Ambulance dispatcher realizes that the call is not an emergency, appropriate action can be taken without the need for responders to be dispatched to the location. Similarly for a fire call, the local dispatcher could direct responders to stand down once they know the incident is not an emergency. If a call is dropped before identifying the nature of the call, other response actions by LIVFD would have to proceed until the nature of the incident is known (e.g. send someone to the location, or contact a neighbour).

6.2.3.6.13 Maximum local control and ownership (ability to have a voice)

The degree to which local groups (e.g. LIVFD and community) are able to make decisions regarding management and operation of the dispatch system.

This interest is closely related to the community interest “Local control” as described in section 6.2.3.5.11. And as such we feel this LIVFD is meet.

6.2.3.6.14 Community is happy with service

The degree to which the dispatch system supports good relations with community, implement a service supported by the community, and not get squeezed between community and regional district.

This interest is the complement to the community interest “Happy first responders and firefighters” as described in section 6.2.3.5.8.

The community interests represent the key issues of concern regarding the dispatch system. The better the dispatch system meets these interests, the more the community will support the system.

The Option C system was designed to meet as many of the community and LIVFD interests as possible, while providing a system that meets PRRD requirements and acceptability. Evaluating the degree to which Option C meets community interests relative to other options is a major aspect of the mandate of the E-DAC

The LIVFD feels this interest is meet with Option C

6.2.3.6.15 The system meets PRRD requirements

The degree to which the dispatch system complies with relevant statutes and regulations.

The PRRD requirements were included in the terms of reference for the E-DAC, and represented in the PRRD interests.

This interest is closely related to the PRRD interest “Ensure compliance with all relevant statutes and regulations” as described in more detail in section 6.2.3.7.17.

6.2.3.6.16 That a community team puts together a reliable system that PRRD will be OK with

The degree to which the dispatch system meets requirements and supports good relations with the regional district.

The PRRD requirements were included in the terms of reference for the E-DAC, and represented in the PRRD interests.

The E-DAC was formed to make a recommendation for a reliable system that meets requirements, as well as meets community, LIVFD and PRRD interests to the best degree possible.

This interest is closely related to the PRRD interest “Ensure compliance with all relevant statutes and regulations” as described in more detail in section 6.2.3.7.17.

6.2.3.6.17 To help increase and maintain LIVFD membership

The degree to which the dispatch system protects firefighters / first responders safety and morale, and supports degree to which community is happy with fire service and operations.

Maintaining LIVFD membership is directly linked with morale and safety of department members. In terms of the dispatch system, this is related to the degree to which LIVFD interests are met. Effective dispatch relates directly to response effectiveness which by nature has a high impact on moral.

Increasing LIVFD membership is directly linked with the degree to which the community supports the LIVFD. In terms of the dispatch system, this is related to the degree to which community interests are met.

The Option C system has a number of areas in which community and LIVFD interests are well met (e.g. community interest “Feedback when successful dispatch”, and LIVFD interest “Call-outs that work everywhere”), While there are also some community and LIVFD interests that are not well met, the Option C system was designed to meet as many of the community and LIVFD interests as possible, while providing a system that meets PRRD requirements and acceptability. Evaluating the degree to which Option C meets community and LIVFD interests relative to other options is a major aspect of the mandate of the E-DAC.

6.2.3.6.18 To have adequate resources to implement the service

The degree to which the dispatch system ensures adequate funding and administrative support for the service.

Providing adequate funding to implement the LIVFD operations is a mandate of the PRRD. In principle, the LIVFD operations must be consistent with the related service establishment bylaw. When there are differences, either the bylaw should be changed to reflect operational implementation, or the operations must be changed to comply with the bylaw.

Provided the LIVFD operations are consistent with its service establishment bylaw, the LIVFD needs to ensure that PRRD is informed about the resources required to implement the service. In turn, the PRRD needs to ensure that these resources are included in the annual tax requisition for the service.

This context and process is the same for any dispatch option.

6.2.3.6.19 That funding is not lost

The degree to which the dispatch system ensures that funding levels are maintained, that the LIVFD has input to funding needs.

This interest is essentially synonymous with the previous interest. Provided that the LIVFD protection service is consistent with its service establishment bylaw, funding cannot be lost. Funding via the PRRD for the LIVFD would only be lost if the regional service was withdrawn, at the end of a lengthy regional service withdrawal process.

6.2.3.6.20 To have clear, feasible service policies to implement

The degree to which the fire service bylaw is consistent with implementation of fire protection service.

In principle, the LIVFD operations must be consistent with the related service establishment bylaw. When there are differences, either the bylaw should be changed to reflect operational implementation, or the operations must be changed to comply with the bylaw.

Hence, it is important for the fire service establishment bylaw to set clear and feasible policies for the LIVFD to implement.

Implementing the Option C system may require modest changes to the current service establishment bylaw (see Appendix E), which clarifies the expectations of the department, the role and authority of the fire chief, etc.

6.2.3.6.21 That dispatch service not influence land-use; limit follow-on implications (e.g. changes to road requirements)

The degree to which the dispatch system minimizes additional requirements that may occur due to aspects of the system or associated contracts or investments.

This interest is closely related to the community interest “Minimize follow-on implications and obligations” as described in section 6.2.3.5.30.

6.2.3.6.22 Educate public about fire safety (e.g. Fire Smart)

The degree to which the dispatch system supports individual efforts to reduce fire risks.

While safety education is not within the mandate of the E-DAC, the discussions and community engagement over the past two years has elevated the profile of fire and medical safety issues in general.

It is not clear how the Option C system relates to public safety education other than by increasing liaison between LIVFD and the community.

The process of populating the Incident Locator Tool can be used as an opportunity to engage with community members, and to explore additional firefighting resources (ponds, etc) and hazards associated with dwellings.

6.2.3.6.23 Need to consider equipment upgrades

The degree to which there is an appropriate cost/benefit allocation for dispatch to maintain options for funding for other department equipment and training needs (e.g. fire-fighting boat for beach fires and waterfront homes that are water access only; quad).

There are always tradeoffs and opportunity costs when considering how to allocate a limited resource, such as tax dollars. Hence, this interest is closely related to the community interest “Appropriateness of cost/benefit given Lasqueti situation” as described in section 6.2.3.5.2.

6.2.3.6.24 Simplify documentation

The degree to which the dispatch system supports documentation of incident dispatch.

Documentation is an important requirement for emergency response. It is important to help LIVFD in debriefing and operational improvement. Documentation that shows that response was done according to procedures, within the ability of the department given the resources provided and context, is also important to limit liability.

The call centre used by Option C would provide documentation regarding incident call-in times, times to transfer calls to BC Ambulance, and times to reach a local dispatcher. Some aspects of documentation would be managed by the local dispatcher, as in the current system. Reports would be maintained as outlined in a standard operational guideline as agreed between the LIVFD and PRRD.

6.2.3.7 PRRD interests

6.2.3.7.1 Effective support for public and emergency responder safety

The degree to which the dispatch system increases public, firefighter and first responder safety.

This interest is closely related to the community interest “Firefighter and first responder safety”. In relation to dispatch, increased public safety risks are primarily associated to delays to emergency response, and risk of no response. Aspects of the current system related to call-in and locating emergencies regarding public emergency responder safety are described in section 6.2.3.5.1.

6.2.3.7.2 Comprehensive dispatch system description

The recommended dispatch system must be a complete description about usage, operations, infrastructure and costs.

More specifically, the dispatch system description should include (i) public phone number(s) to reach dispatchers; (ii) all costs, for equipment purchasing, training, ongoing maintenance, licences, contracts, professional fees and any other anticipated necessary expenditures for the system’s first ten years; and (iii) any major capital items (i.e. communications towers), including anticipated lifecycle and replacement costs.

The Option C system provides a single emergency call in number to a 24/7 call centre operator, who would transfer the call to a BC Ambulance dispatcher for a medical incident, or who would contact a local dispatcher for a fire incident. Communications within LIVFD would be via VHF pagers and VHF radios, using local infrastructure that has been improved to increase coverage. The system has been fully costed, and would have very modest cost requirements (less than the cost of the current system after VHF pager costs have been amortized), as detailed in the financial analysis section of this report. The only new significant capital is required for the Option C system would be for VHF pagers.

6.2.3.7.3 Effective communications network linking dispatchers and emergency responders

The degree to which the communications network used for emergency response supports communications among LIVFD members.

This interest is similar to the LIVFD interest “Reliable call-outs” described in section 6.2.3.6.5.

The effective communications network depends on coverage (see next interest regarding coverage) as well as usability, functionality, training, and reliability.

The Option C system uses a VHF paging and radio system owned and maintained locally.

VHF pagers are simple to use to send and receive pages. The paging system itself would be reliable. VHF radio technology is reliable and robust. The Option C system would make use of improved coverage.

The telephone land-line network has wide physical coverage. The primary concerns relate to relatively frequent loss of service, and relatively long times before repair.

6.2.3.7.4 Communications system effectiveness/coverage across the service area

The degree of coverage for communications devices used by LIVFD members.

This interest is closely related to the LIVFD interest "Call-outs (e.g. pagers) that work everywhere" described in section 6.2.3.6.4.

6.2.3.7.5 Meets communications equipment standards

The degree to which the equipment used for dispatch communications meets relevant standards.

The Option C system primarily relies on VHF pagers, VHF radios, and telephones for communications. All of these types of devices currently deployed by the LIVFD meet all relevant standards for legal and safe operation in Canada.

All radio-communication equipment must comply with Industry Canada regulations in order to be legally owned and operated in Canada. Furthermore, any radio transmission equipment must either be licensed or must comply with the restrictions placed on unlicensed spectrum, and must be operated within the constraints of the license or unlicensed spectrum.

All radio equipment proposed for Option C will maintain compatibility with current communication standards used by NI 9-1-1. This is in compliance with PRRD bylaw #391, which states:

> *Preparation of specifications for new communication systems and additions to existing communication systems which are compatible with NI911 dispatch services.*

This ensure that costly equipment replacements are not required in the event of a future transition to 9-1-1 service[52].

6.2.3.7.6 Communications equipment redundancies in case of main system failure

The degree to which the dispatch system continues to operate in the presence of failures and faults, including technological failures, operational failures, and human error.

This interest is closely related to the community interest "Redundancy" described in section 6.2.3.5.6.

[52] This assumes that NI 9-1-1 has not yet transitioned to a fully digital radio systems. In that event, costly equipment replacements will be required.

6.2.3.7.7 Surge capacity for times of major emergencies or disasters

The degree to which the dispatch system will continue to function under high call volumes in the event of a major disaster, such as an earthquake or major storm.

This interest is related to the community interest “Not dependent on systems that will be non-functional in a disaster” described in section 6.2.3.5.23, but with a focus on the capacity of the system to handle large call volumes rather than on dependencies on components that are relatively more likely to fail in a disaster.

Call-in is dependent on the telephone system and Telus microwave tower. It is likely that in the event of a major disaster that there will be no telephone service, as the local phone system ceases to function if communication to Lasqueti is severed. If the telephone service continues to function, the call centre is likely to be functioning due to its location in the interior of the province and fully functioning back up site. However, the call centre may still be overwhelmed by call volumes from other clients for which emergency call answering service is provided. There are 5 local dispatchers, with at least 2 on call at any time. Given the geographic size and population of Lasqueti, the local dispatchers provide a significant advantage relative to the 10 dispatchers at the NI 9-1-1 fire dispatch centre in Campbell River:

Per capita, Option C would approximately provide 1 dispatcher per 200 residents, whereas the NI 9-1-1 system would approximately provide 1 dispatcher per 10,000 residents (assuming the NI 9-1-1 coverage area includes about 100,000 residents).

Per square km, Option C would approximately provide 1 dispatcher per 37 sq. km, whereas the NI 9-1-1 system would approximately provide 1 dispatcher per 5,600 sq. km (the NI 9-1-1 coverage area is about 56,000 sq km).

Per fire department, Option C would provide 2 dispatchers per fire department (just LIVFD), whereas the NI 9-1-1 system would approximately provide 1 dispatcher per 5 fire departments.

It would still be possible for call volume to overwhelm dispatch in a large-scale incident. The Option C VHF pager and radio network is dependent on repeater infrastructure that may fail in a disaster. Emergency response would then be reduced to direct VHF radio communications, and physically checking on people, according to the emergency plan.

6.2.3.7.8 Plan for alternative power supply for all necessary components in case of power failure

The degree to which there is backup power supply available for components of the dispatch system.

The Option C system relies on local systems, and to a less degree off-island systems. The system assumes that Telus has a backup power system to continue providing telephone services. Locally Telus has back-up power.

Local dispatchers provide their service from their residences (or from the residences or locations at which they may be present when an emergency call is received). In effect, this makes use of a distributed power system since most residences have more than one

independent power source (e.g. solar/micro-hydro power via a battery bank, plus one or more backup generators). If the power system at a residence is not functioning, the power system at each neighbouring residence is independent. It is unlikely that large areas of Lasqueti would be entirely without power.

The Option C system also relies on LIVFD members to ensure pager and radio batteries remain charged.

6.2.3.7.9 Dispatcher training

The degree to which the dispatch system supports and facilitates appropriate training of dispatchers.

This interest is closely related to the community interest "Ensure dispatch involves appropriate training" described in section 6.2.3.5.3.

6.2.3.7.10 Dispatching staffing to ensure 24/7 service

Whether or not the dispatch system provides 24/7 service.

This interest is closely related to the LIVFD interest "When reporting a fire, caller should be able to talk to a person" described in section 6.2.3.6.1.

6.2.3.7.11 Longer term dispatch succession plan

The degree to which the dispatch system supports recruitment and training of new dispatchers to replace retiring dispatchers.

The Option C system relies on local dispatchers who choose to volunteer to serve their community. To date, dispatchers have stayed in their role for relatively long periods of time (years). As dispatchers approach retirement, new dispatchers would be actively recruited and trained.

6.2.3.7.12 Ensure applicable PRRD obligations to meet Workers Compensation Act Occupational Health and Safety Regulations regarding dispatcher operations

The degree to which the dispatch system supports meeting legal worker safety requirements (statutes and regulations).

The LIVFD is required to meet the provisions of the Workers Compensation Act and Occupational Health and Safety Regulation. There are a range of provisions that must be met in relation to fire protection and emergency First Response services. The LIVFD is obligated to provide working conditions that reduce the risk to personal injury. See Section 5.2 and Appendix C for more details.

In terms of dispatch, the Option C system relies on local dispatchers who provide their service from their residences (or from the residences or locations at which they may be present when an emergency call is received). Training ensures that the dispatcher work environment is safe for their duties (e.g. from improper posture during communications, or from dangerous placement of electrical cords).

Further, the LIVFD maintains a “joint health and safety committee” at which workplace risks and hazards can be discussed, and solutions identified.

6.2.3.7.13 Ensure PRRD obligations are met per Bill C-45 for effective workplace safety

The degree to which the dispatch system meets the provisions of Bill C-45 regarding criminal liability of an organization such as PRRD

The LIVFD is required to meet the provisions of Bill C-45 regarding potential claims leading to criminal liability of an organization such as PRRD. There are a range of provisions that must be met in relation to fire protection and emergency First Response services. Since the LIVFD fire chief “has complete responsibility and authority over the Fire Department, subject to the direction and control of the Board” (bylaw 391, 2005), he/she should ensure an ongoing workplace health and safety program is implemented for the fire service, which should aim to identify, communicate and reduce workplace hazards. See Section 5.2 and Appendix C for more details.

In terms of dispatch, local dispatchers are included in the fire department workplace health and safety program. In addition, the Option C system would meet the Occupational Health and Safety Regulation.

Further, it is important for the regional service establishment bylaw to be consistent with the operations of LIVFD, including the dispatch system. After adopting a recommended dispatch option, the regional board should revise the LIVFD fire protection service establishment bylaw to ensure consistency with the dispatch system.

6.2.3.7.14 House numbering or other property/location identifier system

The degree to which the dispatch system is able to accurately and effectively locate incidents.

This interest is closely related to the community interest “Local people accurately & effectively” as described in section 6.2.3.5.13.

6.2.3.7.15 Ability to implement any “next generation” communications

The degree to which the dispatch system is able to implement a text message option for hearing impaired, or other media usage (e.g. pictures).

The Option C system cannot communicate text messages or other media such as pictures. However, Option C is an incremental step towards Option E, which would provide text messaging capabilities for communications.

6.2.3.7.16 Appropriate dispatch recording practices and records management system

The degree to which the dispatch system includes and supports a dispatch documentation practices and records management system, including maintenance of dispatch personnel, training, and operations (with call times) records, appropriate storage and retention of records, and ensuring privacy concerns are addressed.

This interest is related to the LIVFD interest “Simplify documentation” as described in section 6.2.3.6.24.

The Option C system would include a documentation system in which dispatchers record on paper incident details, including time of call, nature of call, who responded, who and what equipment was deployed, conclusion of dispatch related to incident.

The call centre used by Option C would allow documentation regarding incident call-in times, times to transfer calls to BC Ambulance, and times to reach a local dispatcher, if required by the LIVFD. Some aspects of documentation would be managed by the local dispatcher, as in the current system. Reports would be maintained in the LIVFD record files as specified by PRRD.

6.2.3.7.17 Ensure compliance with all relevant statutes and regulations

The degree to which the dispatch system complies with relevant statutes and regulations, including:

- *Industry Canada*
- *Canadian Radio-television and Telecommunications Commission (CRTC)*
- *Freedom of Information and Protection of Privacy Act (FIPPA)*
- *Office of the Fire Commissioner (OFC)*
- *BC Building Code*
- *Workers Compensation Act*

The Option C system, as described, complies with the above statutes and regulations. Radio frequencies are licensed per Industry Canada. No personal information related to identifying structure locations would be available at external agencies. The only personal information recorded would be in the reverse directory, used to index into the Incident and Resource Locator Tool. This reverse directory would only be used by local dispatchers, and would be stored securely in read-only format. Personal information, per FIPPA, is protected by limiting transmission of personal information during dispatch and by all LIVFD members signing a non-disclosure agreement. Workers health and safety issues are addressed in section 6.2.3.7.12.

Under the Office of the Fire Commissioner “Playbook”, LIVFD has been assigned as an “Exterior Operations Service Level” department. This service level defines minimum requirements for fire services personnel and department operational competencies. These requirements relate to LIVFD firefighter training and operations, and does not refer to dispatch.

6.2.3.7.18 Ensure compliance with any relevant PRRD bylaws and policies

The degree to which the dispatch system is consistent with applicable PRRD bylaws and policies

The primary PRRD bylaw related to dispatch is bylaw 391 enacted “to provide for the operation of the Lasqueti Island Volunteer Fire Department”. It is very important that the LIVFD operations are consistent with this bylaw. Divergence between LIVFD operations and this bylaw can be resolved in two primary ways: (i) the PRRD board can revise the

bylaw to match operations (as may be required for changes to the dispatch system); or (ii) the LIVFD can revise operations to match the bylaw.

6.2.4 Option D: PSAP / VHF system

6.2.4.1 System description

This section provides an overview of Option D, which differs from Option C in only one aspect: instead of a call-centre answering emergency calls, Option D makes use of a Public Safety Answering Point (PSAP). The process overview diagrams are identical for Options C and D, except changing the “call centre” with “PSAP”. Option D also differs from Option B (NI 9-1-1) in one key aspect: dispatch is done locally by LIVFD instead of remotely by NI 9-1-1.

The use of a PSAP instead of a call centre lead to the following more specific differences between Options C and D:

- A PSAP is reach via a three-digit 911 call, whereas a call centre is reached via a ten-digit number.
- PSAP call centres must meet more stringent standards regarding targets for call answer and transfer times, and backup systems (although both provide reliable 24/7 call answering services).
- Use of a PSAP call centre service likely costs somewhat more than a call centre.

A PSAP can only transfer calls, while a call centre can provide more flexible call handling services.

Two key characteristics of this option are worth mention:

1) The trend for consolidation of PSAPs over the province, with a reduction in the number of PSAPs in the past few years from 13 to 10, implies that over the relatively near-term, most or all PSAPs will be consolidated into E-Comm (which already handles over 80% of the 911 calls in the province). This implies that selecting any PSAP other than E-Comm is likely to end up with the eventual transfer of the service to E-Comm. So, consideration of this option should be considered in the context of E-Comm providing the PSAP service.

2) The E-Comm’s web site states that call takers will “remain on the line with caller until the (emergency response) agency answers”. In the current context, this means transfer of medical calls to BC Ambulance and transfer of fire calls to local LIVFD dispatchers. Given that local dispatchers are not on standby 24/7 to receive calls instantly (nor would this be feasible), this option may not be feasible unless the PSAP is comfortable working with a radio patch system.

Since this option may not be feasible, it does not merit a detailed analysis and evaluation. However, as a hybrid between Option B (NI 9-1-1) and Option C (local: call centre + VHF radios), it is informative to mention how interests may be met differently by this option.

These unique aspects of this option affect a number of community, LIVFD and PRRD interests relative to Option C.

6.2.4.2 Interests

The following interests, among others, may be positively affected relative to Option C:

Community interests:

- Redundancy (because a PSAP may have a more resilient backup)
- One point of contact (One phone number?) (because of use of 9-1-1 number)
- Retain insurance coverage/mortgage (at least at current levels) for those who have it (because of use of 9-1-1, as recommended by Fire Underwriters Survey)

LIVFD interests:

- That a community team puts together a reliable system that PRRD will be OK with (because PRRD may prefer that emergency services on Lasqueti use a PSAP)

PRRD interests:

- Ability to implement any “next generation” communications

Conversely, the following interests, among others, may be negatively affected relative to Option C:

Community interests:

- Local control
- Not be tied into a contract that we can’t get out of (because of potential applicability of “no withdrawal” regulation)
- Future-proofing (because it may be more rigid, so incremental improvements may be more difficult)
- Knowing what we are getting into/committing to (because of consolidation trend mentioned above)
- Avoid intermediaries who may not understand the situation on Lasqueti (because a PSAP has a more rigid structure than a non-PSAP call centre)
- Minimize follow-on implications and obligations
- Don’t want to be dependent on Vancouver/Victoria etc. (e.g. storm, earthquake, or too busy)

LIVFD interests:

- Maximum local control and ownership (ability to have a voice)

6.2.4.3 Cost analysis

6.2.4.3.1 Setup costs

Same as Option C (See section 6.2.3.3.1)

Total set-up (initial capital investment) costs:	Approximately $22,500 to $33,000

6.2.4.3.2 Annual operating costs

PSAP:	$1,600 to $7,600 / year[53]
Repeater maintenance:	$1,000 / year
Radio and pager repair and replacement:	$5,000 / year[54]
Total annual operating costs:	Approximately $7,600 to $13,600 / year

6.2.4.3.3 In-kind contributions

VHF radio and pager implementation

VHF radio and pager training

Incident Locator Tool setup

Incident Locator Tool data collection

Incident Locator Tool training

Incident Locator Tool data upkeep

Volunteer support group

Repeater design

Repeater installation

6.2.4.3.4 Projected future capital costs

Assuming a future NI 9-1-1 transition from analogue VHF radios to APCO P25 digital radios, there will be a significant capital cost to replace all radio equipment in order to maintain compatibility with NI 9-1-1.

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[53] Based on assumption that costs would be at least as much as the call centre for Option C, and at most as much as NI 9-1-1 for Option B.

[54] PRRD 2016-2020 Financial plan, pg 35-42 (Jan 14, 2016 Rural Services Committee agenda), regional fire department communications operations and maintenance expenditures for 2016 include $5,150 for Savary Island FD, $5,000 for Malaspina FD and $6,000 for Northside FD. Lasqueti Island FD shows communications O & M expenditures were projected to increase from $1,094 in 2015 to $5,000.

6.2.5 Option E: Call centre / VHF / texting

6.2.5.1 System description

6.2.5.1.1 Overview

This section provides an overview of Option E, with a focus on high-level view of how it meets the core service requirements (described in section 5.1). Fire and medical emergency response processes are described separately. Option E is an extension of Option C (call centre plus VHF radios) to include text messaging (via the cellular, internet and/or VHF networks) as an additional mode of communication.

6.2.5.1.2 Fire emergencies

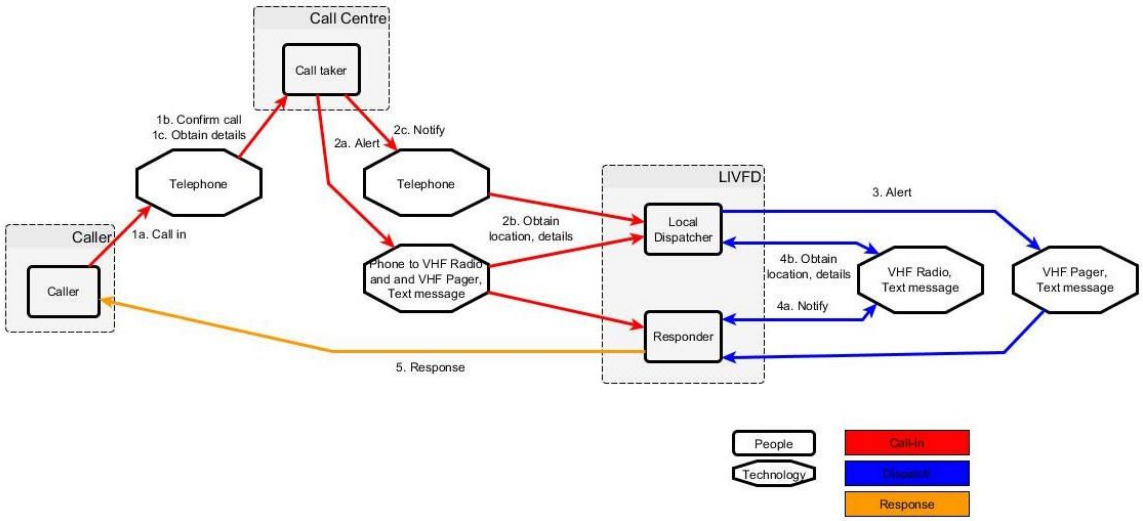


Figure 21 - Fire emergency response process in Option E (call centre plus VHF radios plus texting)

Emergency incident call-in

Call-in for fire emergencies is identical to Option C (Figure 21), except that the call taker can also send a text message to all on-duty responders (step 2a in Figure 21). Depending on the call centre service provider, it may be possible for callers to call-in an emergency via text message.

Emergency alerting and response notification

Alerting and response notification are also identical to Option C, except that both alerting by dispatchers (step 3 in Figure 21) and notification/receiving incident details (steps 4a and 4b in Figure 21) can additionally make use of text messaging.

Emergency incident response

Incident response is identical to Option C.

6.2.5.1.3 Medical emergencies

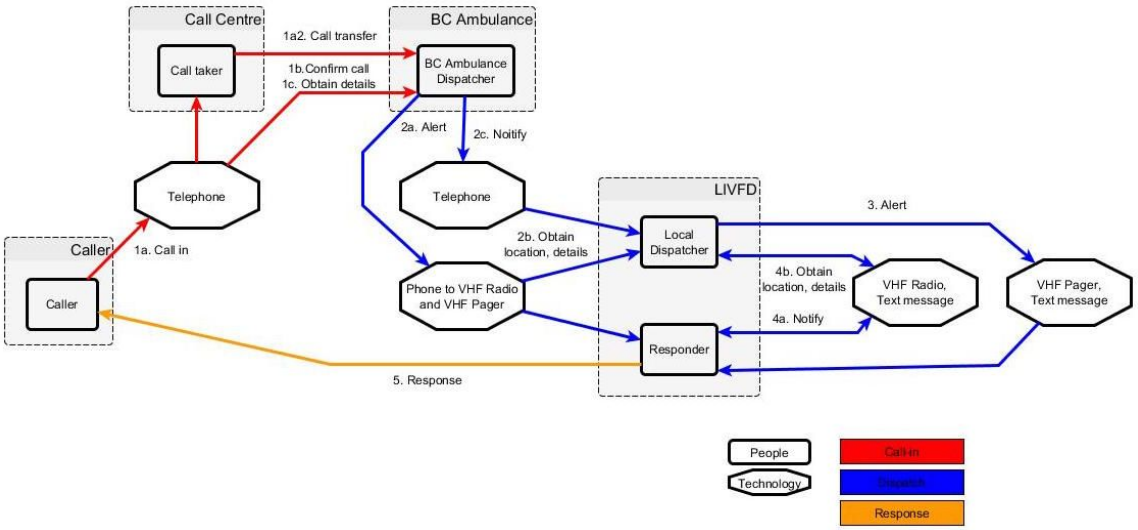


Figure 22 - Medical emergency response process in Option E (call centre plus VHF radios plus texting)

Emergency incident call-in

Call-in for medical emergencies is identical to Option C.

Emergency alerting and response notification

Alerting and response notification between BC Ambulance and LIVFD are also identical to Option C.

Alerting and response notification between local dispatchers and responders is identical to Option C, except that both alerting by dispatchers (step 3 in Figure 22) and notification/receiving incident details (steps 4a and 4b in Figure 22) can additionally make use of text messaging.

Emergency incident response

Incident response is identical to Option C.

6.2.5.1.4 Key components of Option E (call centre + VHF radios + texting)

The key components and distinguishing characteristics of Option E encompass those of Option C (call centre + VHF radios) plus additional elements to support text messaging.

The following are key components related to dispatch (equipment, outside and local services, etc.) of Option E:

- Telephone system: common to all options for call-in, as well as for one alternative for communications with BC Ambulance and the call centre. The cellular sub-network is used for texting via cell phones and smartphones.
- Use of a call centre to receive all emergency calls (fire and medical).
- Optional use of directly calling BC Ambulance for medical emergency calls.
- Use of local dispatch and VHF communications network.
- Use of VHF radios and VHF pagers.
- VHF radios: used during the dispatch as well as response steps for communications connected to a phone call from the call centre or BC Ambulance to LIVFD, as well as between LIVFD members.
- Text messaging: used during dispatch as well as response steps as an option model of communications. Text messaging may be done using cell phones and smartphones via the cellular network, smart phones where internet/intranet wi-fi is available, or via the VHF network.
- Use of local mapping tool (Incident Locator and Resource Tool) to identify incident location, nearby resources (e.g. water sources) and nearby hazards.

The following are key distinguishing characteristics related to dispatch of Option E:

- Use of a call centre to provide 24/7 answering service for emergency calls.
- Continued role of local dispatchers, with adaptations to the role for communications with call centre and use of VHF radios and pagers, as well as cell phones and/or smart phones.
- Expanded options for communication (increased redundancy): VHF radios and pagers, as well as texting.
- Use of local mapping tool, created and maintained locally, which encodes both objective mapping and local knowledge, to identify incident location, as well as nearby resources and risks.
- Use of existing VHF communication tower(s) on Lasqueti to provide adequate coverage at low cost.
- Use of existing internet communications infrastructure on Lasqueti (provided by Lasqueti Internet Access Society; LIAS).
- Future potential use of LIAS intranet, when established.

6.2.5.2 Cost analysis

6.2.5.2.1 Setup costs

Same as Option C (See section 6.2.3.3.1), plus

$40,000 to $65,000[55] for a fairly comprehensive system

Total set-up (initial capital investment) costs: Approximately $62,500 to $98,000

6.2.5.2.2 Annual operating costs

Same as Option C (See section 6.2.3.3.2), plus

Maintenance of equipment and infrastructure use to support texting: $0 to $4,000[56] / year

Total annual operating costs: Approximately $7,600 to $11,600 / year

6.2.5.2.3 In-kind contributions

Same as Option C (See section 6.2.3.3.3), plus

Set up and training of text message system capabilities

6.2.5.2.4 Projected future capital costs

Assuming a future NI 9-1-1 transition from analogue VHF radios to APCO P25 digital radios, there will be a significant capital cost to replace all radio equipment in order to maintain compatibility with NI 9-1-1.

[55] Based on estimate from DesignIt Corporation.
[56] Based on estimate from DesignIt Corporation.

6.2.5.3 Community interests

6.2.5.3.1 Firefighter and first responder safety

The degree to which the dispatch system increases firefighter and first responder safety.

Same as for Option C.

6.2.5.3.2 Appropriateness of cost/benefit given Lasqueti situation

The relative costs to benefits of the dispatch system given the needs of the community, the remote nature of Lasqueti Island, the size of the population and the ability to pay for the service.

The call centre + VHF + texting system provides additional means of communication at additional costs.

Cost details can be found in section 6.2.5.2.

6.2.5.3.3 Ensure dispatch involves appropriate training

The degree to which the dispatch system supports and facilitates appropriate training of dispatchers, first responders and firefighters.

Same as for Option C, with additional training regarding text message communications.

6.2.5.3.4 Local knowledge

The ability to use LIVFD's local knowledge to dispatch, locate, and respond to incidents. Use of local knowledge is valuable because it increase the effectiveness and appropriateness of emergency response. However, local knowledge can be unavailable, ad-hoc and informal.

Same as for Option C.

6.2.5.3.5 Minimal points of failure

The degree to which the dispatch system has the fewest parts that if they fail, service is disrupted.

Inclusion of text messaging as a communications option reduces the minimal points of failure, as more components are involved, and these components are more complex. To address this, additional redundant components will be required.

6.2.5.3.6 Redundancy

The degree to which the dispatch system continues to operate in the presence of failures and faults, including technological failures, operational failures, and human error.

Inclusion of text messaging as a communications option increases the redundancy when compared to Option C.

Text messages require a significantly lower signal strength compared to traditional pages. A traditional pager requires a signal strength of -60 to -65 db[57], where a cell phone can reliably receive text messages with a signal strength higher than -95 db[58].

As text messaging is a store-and-forward system, this improves reliability of delivery, as when the receiver enters a region of better coverage, the message will be delivered.

6.2.5.3.7 Easy to use and understand

The degree to which the dispatch system can easily be understood by all involved parties, including the public, and the degree to which the system is easy for dispatchers to successfully dispatch firefighters and first responders.

Same as for Option C for the public. Dispatchers and responders additionally have option of text messaging. Given the ubiquity of text message, this increases ease of use by LIVFD members.

6.2.5.3.8 Happy first responders and firefighters

The degree to which the first responders and firefighters are happy with the dispatch system, and feel that it meets their needs.

Same as for Option C, but possible a modest increase due to ability to use text messaging.

6.2.5.3.9 Local dispatch

The degree to which the dispatch system allows for dispatching to be done by dispatchers on Lasqueti.

Same as for Option C.

6.2.5.3.10 Retain B.C. Ambulance understanding about Lasqueti situation

The degree to which the dispatch system allows for the relationship between B.C. Ambulance and Lasqueti LIVFD to be retained for medical emergencies.

Same as for Option C.

6.2.5.3.11 Local control

The degree to which a local group (e.g. LIVFD) are able to make decisions regarding management and operation of the dispatch system.

Same as for Option C.

6.2.5.3.12 Accessible to all

[57] http://www.hpl.hp.com/hpjournal/98feb/feb98a7.pdf
[58] On-island testing with Rogers cell service and iPhone 5 phone.

The degree to which the dispatch system is accessible to all areas of Lasqueti Island where emergency services are provided.

Same as for Option C, with an increase in accessibility due to ability of text messaging to function in areas with poor signal strength for voice communications.

6.2.5.3.13 Locate people accurately & effectively

The degree to which the dispatch system is able to accurately and effectively locate incidents.

Same as for Option C.

6.2.5.3.14 Not tied to contract we can't get out of

The degree to which the dispatch system can be adjusted and changed as needed. Refers in part to the "No Withdrawal" regulation for regional emergency telephone services.

Same as for Option C.

6.2.5.3.15 Feedback when successful dispatch

The degree to which the dispatch system lets the public calling in know that help is on the way.

Same as for Option C.

6.2.5.3.16 Local repairability

The degree to which the dispatch system can be maintained and modified by a local group (e.g. the LIVFD).

Same as for Option C.

6.2.5.3.17 Future-proofing

The degree to which the dispatch system can be future-proofed, upgraded, and be resilient to technological changes and changes in needs.

Option E provides substantial flexibility to incrementally adopt future technologies as they become available. It supports taking immediate advantage of improvements in cellular coverage, VHF coverage and Wi-fi coverage.

If a future Lasqueti intranet is implemented, it can be used by incrementally expanding communications options. Keeping local control, and not being tied into a system that cannot be withdrawn, would allow this option to more rapidly keep pace with technological change

6.2.5.3.18 Knowing what we are getting into/committing to

The degree to which the groups responsible for the dispatch system clearly communicate with the community regarding decisions and consequences associated with those decisions.

Same as for Option C.

6.2.5.3.19 Simplicity

The degree to which the dispatch system is simple, both with respect to its design and use.

Option E would be in some respects simpler to use than Option C, because the option of text messaging for communications would provide an additional tool for LIVFD members. From a technical and maintenance perspective, however, Option E is substantially more complex than Option C, with many more components and more complex components.

6.2.5.3.20 Tax implications & costs

The degree to which the dispatch system requires or avoids high short-term and/or long-term tax costs.

The costs for the call centre + VHF + texting system will be higher than for Option C. Cost will include all costs for Option C, as well as costs associated with supporting text messaging. These costs include hardware (communication devices such as smartphones), possible infrastructure improvements, and software.

6.2.5.3.21 Dispatch recognizes that some people are accessible by trail or water access only

The degree to which the dispatch system recognizes that some residents and locations on Lasqueti Island have no road access.

Same as for Option C.

6.2.5.3.22 Equal value and access for everyone

The degree to which all people who pay for the dispatch system receive equal service.

Same as for Option C, but possible a modest increase due to ability to use text messaging.

6.2.5.3.23 Not dependent on systems that will be non-functional in a disaster

The degree to which the dispatch system will continue to function in the event of a major disaster, such as an earthquake or major storm.

Same as for Option C, but increasing resilience due to potential use of future Lasqueti intranet. Also, partial loss of functionality for the cellular network may allow text messaging to function, even if signal strength or system overload does not support voice communication.

6.2.5.3.24 Ability to be involved

The degree to which the public can be involved in decisions that affect the local dispatch system.

Same as for Option C.

6.2.5.3.25 Takes advantage of existing local infrastructure

The degree to which the dispatch system uses local infrastructure, such as communication towers, etc.

Same as for Option C, but with potential need for new communications infrastructure. Conversely, Option E may make future potential use of LIAS local internet infrastructure.

6.2.5.3.26 Avoid intermediaries who may not understand the situation on Lasqueti

The degree to which the dispatch system avoids external dependencies that may not understand or may not be interested in accommodating the situation on Lasqueti.

Same as for Option C.

6.2.5.3.27 Being local helps with disaster scenarios

The degree to which the dispatch system assists with local disaster preparedness and response.

Same as for Option C.

6.2.5.3.28 Get better telephone system

The degree to which the dispatch system can improve reliability of land-lines or cellular coverage.

Same as for Option C.

6.2.5.3.29 Broader questions about how to help LIVFD

The degree to which the dispatch system can assist with other investments needed to help the LIVFD. Does this system fit into/assist with broader strategic planning?

Same as for Option C, except that increased flexibility of text messaging may help foster discussions about future changes and directions.

6.2.5.3.30 Minimize follow-on implications and obligations

The degree to which the dispatch system minimizes additional requirements that may occur due to aspects of the system or associated contracts or investments.

Same as for Option C.

6.2.5.3.31 Don't want to be dependent on Vancouver/Victoria

The degree to which the dispatch system avoids dependencies on the major metropolitan areas that are likely to be overloaded or down in the event of a major event.

Same as for Option C.

6.2.5.3.32 Not invest in old analogue system that will need to be replaced

The degree to which the dispatch system avoids use of older technologies that are likely to be retired in the near future.

Same as for Option C, except that Option E explicitly sets a direction for increased use of current and future digital communications.

6.2.5.3.33 One point of contact

The degree to which the dispatch system uses a single point of contact (phone number) to call for emergency services.

Same as for Option C.

6.2.5.3.34 Retaining the character of the community

The degree to which the dispatch system retains the character of the Lasqueti community.

Same as for Option C.

6.2.5.3.35 Retain insurance coverage

The degree to which the dispatch system assists in retaining insurance coverage (e.g. for mortgages) by meeting a sufficient protection grade set by the Fire Underwriters Survey.

Same as for Option C.

6.2.5.3.36 Need to recognize that Lasqueti is willing to accept a higher level of risk

The degree to which the dispatch system reflects the attitude of many residents that our community accepts a "higher level of risk" associated with emergencies.

Same as for Option C.

6.2.5.3.37 Easier than remembering a phone number

The degree to which the means by which the public reaches the dispatch system can be easier than remembering a phone number, for example, having a single button to press.

Same as for Option C.

6.2.5.4 LIVFD interests

6.2.5.4.1 When reporting a fire, caller should be able to talk to a person

Whether or not the dispatch system provides 24/7 capability by which a caller can directly talk to a person.

Same as for Option C.

6.2.5.4.2 Easy to use and understand

The degree to which the dispatch system is user friendly and available to all, including kids, adults, infirm, visitors.

This interest is closely related to the community interest “Easy to use and understand” described in section 6.2.5.3.7.

6.2.5.4.3 Equal provision of service

The degree to which the dispatch system serves all residents served equally, subject to local conditions.

This interest is closely related to the community interests “Accessible to all” described in section 6.2.5.3.12, and “Equal value and access for everyone” described in section 6.2.5.3.22.

6.2.5.4.4 Call-outs (e.g. pagers) that work everywhere

The degree to which system provides good geographic coverage to receive incident alert calls.

Same as for Option C, except the additional capability of text messaging would increase net coverage.

6.2.5.4.5 Reliable call-outs

The degree to which alerting system provides continuous and resilient coverage.

This interest is similar to the PRRD interest “Effective communications network linking dispatchers and emergency responders” described in section 6.2.5.5.3.

Same as for Option C, except the additional capability of text messaging would increase redundancy and hence reliability of call-outs.

6.2.5.4.6 System should be able to pass reliable messages (numeric or voice)

The degree to which alerting system provides a reliable method to communicate between dispatchers and responders.

This interest is similar to the previous interest as well as the PRRD interest “Effective communications network linking dispatchers and emergency responders” described in section 6.2.5.5.3.

The ability to pass reliable messages depends on coverage (see interest described in section 6.2.5.4.4 regarding coverage) as well as usability, functionality, training, and reliability.

Same as for Option C, except the additional capability of text messaging would increase redundancy and functionality of messages.

6.2.5.4.7 Effective, easy-to-use home location (with consideration of confidentiality)

The degree to which the dispatch system is able to accurately and effectively locate incidents.

This interest is closely related to the community interest “Local people accurately & effectively” as described in section 6.2.5.3.13.

Same as for Option C.

6.2.5.4.8 Streamlined system: no extra steps

The degree to which the dispatch system minimizes steps needed by callers, dispatchers and responders to use the system.

This interest is related to the community interest “Simplicity” as described in section 6.2.5.3.19, but with a focus on steps required during use of the system.

Same as for Option C, but with additional capability for using text messaging in some steps.

6.2.5.4.9 Secure communication system

The degree to which the emergency communication system protects personal information and privacy.

Protection of personal information is legislated by the Freedom of Information and Protection of Privacy Act (FIPPA). Compliance with the provisions of the FIPPA is a requirement (see PRRD interest “Ensure compliance with all relevant statutes and regulations” described in section 6.2.5.5.17).

Same as for Option C, with the addition of text messaging capability of non-personal information over reasonably secure cellular and internet networks.

6.2.5.4.10 No changes to First Responder dispatch

The degree to which the dispatch system support the continued role of local dispatchers.

Same as for Option C.

6.2.5.4.11 System that functions over the long term (i.e. avoid changing system again in near future)

The degree to which the dispatch system remains stable, with little or incremental change for improvements over time.

Responsibility for management and changes to the Option E system would be the authority of the LIVFD and PRRD, with assistance from the proposed community advisory group. Unless legislation change, there is no reason that this system cannot function over the long term.

Option E is most feasibly achieved by first adopting Option C and the incrementally adding texting capabilities that can make use of the most current applicable technologies. These changes can be implemented incrementally. Functionality is likely to remain stable.

6.2.5.4.12 Eliminate non-emergency calls

The degree to which the dispatch system reduces likelihood of non-emergency calls, and unnecessary response efforts in case of non-emergency calls.

Same as for Option C.

6.2.5.4.13 Maximum local control and ownership (ability to have a voice)

The degree to which local groups (e.g. LIVFD and community) are able to make decisions regarding management and operation of the dispatch system.

This interest is closely related to the community interest “Local control” as described in section 6.2.5.3.11.

6.2.5.4.14 Community is happy with service

The degree to which the dispatch system supports good relations with community, implement a service supported by the community, and not get squeezed between community and regional district.

Same as for Option C.

6.2.5.4.15 The system meets PRRD requirements

The degree to which the dispatch system complies with relevant statutes and regulations.

The PRRD requirements were included in the terms of reference for the E-DAC, and represented in the PRRD interests.

This interest is closely related to the PRRD interest “Ensure compliance with all relevant statutes and regulations” as described in more detail in section 6.2.5.5.17.

6.2.5.4.16 That a community team puts together a reliable system that PRRD will be OK with

The degree to which the dispatch system meets requirements and supports good relations with the regional district.

The PRRD requirements were included in the terms of reference for the E-DAC, and represented in the PRRD interests.

The E-DAC was formed to make a recommendation for a reliable system that meets requirements, as well as meets community, LIVFD and PRRD interests to the degree possible.

This interest is closely related to the PRRD interest “Ensure compliance with all relevant statutes and regulations” as described in more detail in section 6.2.5.5.17.

6.2.5.4.17 To help increase and maintain LIVFD membership

The degree to which the dispatch system protects firefighters / first responders safety and morale, and supports degree to which community is happy with fire service and operations.

Same as for Option C, with the additional capability of text messaging that may increase options for LIVFD members, and hence satisfaction with membership.

6.2.5.4.18 To have adequate resources to implement the service

The degree to which the dispatch system ensures adequate funding and administrative support for the service.

Same as for Option C.

6.2.5.4.19 That funding is not lost

The degree to which the dispatch system ensures that funding levels are maintained, that the LIVFD has input to funding needs.

Same as for Option C.

6.2.5.4.20 To have clear, feasible service policies to implement

The degree to which the fire service bylaw is consistent with implementation of fire protection service.

Same as for Option C.

6.2.5.4.21 That dispatch service not influence land-use; limit follow-on implications (e.g. changes to road requirements)

The degree to which the dispatch system minimizes additional requirements that may occur due to aspects of the system or associated contracts or investments.

This interest is closely related to the community interest “Minimize follow-on implications and obligations” as described in section 6.2.5.3.30.

6.2.5.4.22 Educate public about fire safety (e.g. Fire Smart)

The degree to which the dispatch system supports individual efforts to reduce fire risks.

Same as for Option C.

6.2.5.4.23 Need to consider equipment upgrades

The degree to which there is an appropriate cost/benefit allocation for dispatch to maintain options for funding for other department equipment and training needs (e.g. fire-fighting boat for beach fires and waterfront homes that are water access only; quad).

There are always tradeoffs and opportunity costs when considering how to allocate a limited resource, such as tax dollars. Hence, this interest is closely related to the community interest “Appropriateness of cost/benefit given Lasqueti situation” as described in section 6.2.5.3.2.

6.2.5.4.24 Simplify documentation

The degree to which the dispatch system supports documentation of incident dispatch.

Same as for Option C.

6.2.5.5 PRRD interests

6.2.5.5.1 Effective support for public and emergency responder safety

The degree to which the dispatch system increases public, firefighter and first responder safety.

Same as for Option C, with additional safety provided by capability for text messaging communications.

6.2.5.5.2 Comprehensive dispatch system description

The recommended dispatch system must be a complete description about usage, operations, infrastructure and costs.

Same as for Option C, with additional capacity for text messaging communications.

6.2.5.5.3 Effective communications network linking dispatchers and emergency responders

The degree to which the communications network used for emergency response supports communications among LIVFD members.

Same as for Option C, with increased communications linkages of text messaging capabilities.

6.2.5.5.4 Communications system effectiveness/coverage across the service area

The degree of coverage for communications devices used by LIVFD members.

This interest is closely related to the LIVFD interest “Call-outs (e.g. pagers) that work everywhere” described in section 6.2.5.4.4.

6.2.5.5.5 Meets communications equipment standards

The degree to which the equipment used for dispatch communications meets relevant standards.

The Option E system primarily relies on VHF pagers, VHF radios and telephones for communications, with additional use of cellular and smart phones.

In order to provide additional text-based and data-based communication technologies, all wireless devices must conform to Industry Canada rules and regulations, including channel licensing rules.

The Option E system proposes using a combination of licensed and license-exempt frequencies and devices[59]. Exactly what types of devices and licenses would be required is a future exercise.

[59] https://www.ic.gc.ca/eic/site/smt-gst.nsf/eng/sf08655.html

6.2.5.5.6 Communications equipment redundancies in case of main system failure

The degree to which the dispatch system continues to operate in the presence of failures and faults, including technological failures, operational failures, and human error.

This interest is closely related to the community interest “Redundancy” described in section 6.2.5.3.6.

6.2.5.5.7 Surge capacity for times of major emergencies or disasters

The degree to which the dispatch system will continue to function under high call volumes in the event of a major disaster, such as an earthquake or major storm.

Same as for Option C.

6.2.5.5.8 Plan for alternative power supply for all necessary components in case of power failure

The degree to which there is backup power supply available for components of the dispatch system.

Same as for Option C.

6.2.5.5.9 Dispatcher training

The degree to which the dispatch system supports and facilitates appropriate training of dispatchers.

This interest is closely related to the community interest “Ensure dispatch involves appropriate training” described in section 6.2.5.3.3.

Same as for Option C.

6.2.5.5.10 Dispatching staffing to ensure 24/7 service

Whether or not the dispatch system provides 24/7 service.

This interest is closely related to the LIVFD interest “When reporting a fire, caller should be able to talk to a person” described in section 6.2.5.4.1.

Same as for Option C.

6.2.5.5.11 Longer term dispatch succession plan

The degree to which the dispatch system supports recruitment and training of new dispatchers to replace retiring dispatchers.

Same as for Option C.

6.2.5.5.12 Ensure applicable PRRD obligations to meet Workers Compensation Act Occupational Health and Safety Regulations regarding dispatcher operations

The degree to which the dispatch system supports meeting legal worker safety requirements (statutes and regulations).

Same as for Option C.

6.2.5.5.13 Ensure PRRD obligations are met per Bill C-45 for effective workplace safety

The degree to which the dispatch system meets the provisions of Bill C-45 regarding criminal liability of an organization such as PRRD

Same as for Option C.

6.2.5.5.14 House numbering or other property/location identifier system

The degree to which the dispatch system is able to accurately and effectively locate incidents.

This interest is closely related to the community interest “Local people accurately & effectively” as described in section 6.2.5.3.13.

Same as for Option C.

6.2.5.5.15 Ability to implement any “next generation” communications

The degree to which the dispatch system is able to implement a text message option for hearing impaired, or other media usage (e.g. pictures).

The Option E system would provide text messaging capabilities for communications.

6.2.5.5.16 Appropriate dispatch recording practices and records management system

The degree to which the dispatch system includes and supports a dispatch documentation practices and records management system, including maintenance of dispatch personnel, training, and operations (with call times) records, appropriate storage and retention of records, and ensuring privacy concerns are addressed.

This interest is related to the LIVFD interest “Simplify documentation” as described in section 6.2.5.4.24.

Same as for Option C.

6.2.5.5.17 Ensure compliance with all relevant statutes and regulations

The degree to which the dispatch system complies with relevant statutes and regulations, including:

- *Industry Canada*
- *Canadian Radio-television and Telecommunications Commission (CRTC)*
- *Freedom of Information and Protection of Privacy Act (FIPPA)*
- *Office of the Fire Commissioner (OFC)*
- *BC Building Code*
- *Workers Compensation Act*

Same as for Option C.

6.2.5.5.18 Ensure compliance with any relevant PRRD bylaws and policies

The degree to which the dispatch system is consistent with applicable PRRD bylaws and policies

Same as for Option C.

7. Option Evaluation

7.1 Rating How Well Interests are Met by Each Option

As described in Chapter 2, each E-DAC member rated the degree to which each interest was met or not met by each option. These ratings were put on a scale from 0 (interest not met at all by option, or option has no effect on interest) to 3 (interest is very well met by option). As with interest importance, the average of these evaluation ratings represents the overall rating by the committee (but with values for each interest / option combination).

The average rating values are shown in Tables 5, 6, and 7 for the community, LIVFD and PRRD interests, respectively. Note that Option D was not evaluated by all committee members.

It is important to interpret these values carefully. Different committee members may have applied different, and equally valid, interpretations of how well an interest was met by each option. For example, if half of the committee members assigned a value of 3 (well met) and the other half assigned a value of 1 (poorly met), the average would be 2 (moderately met). The evaluation values should be interpreted as the degree to which the committee as a whole considers that an option meets an interest, subject to the diverse views and interpretations of the committee members. Since there may more than one valid interpretation of how an option meets a particular interest, care should be taken to avoid interpreting these values beyond their intended use for evaluating options.

Table 5 Evaluation ratings for how well each option meets each community interest (high or well met = 3, moderately met = 2, poorly met = 1, not met = 0). Average for committee.

#	Community Interest	Option A: Current system	Option B: NI 9-1-1	Option C: Call centre + VHF	Option D: PSAP + VHF	Option E: Call centre + VHF + texting	Ideal (max)
1	Firefighter and first responder safety	1.7	2.3	2.6	2.1	2.3	2.6
2	Appropriateness of cost/benefit given Lasqueti situation	1.8	1.3	2.7	2.4	2.4	2.7
3	Ensure dispatch involves appropriate training	1.9	2.5	2.3	2.4	2.4	2.5
4	Local knowledge	2.2	1.7	2.9	2.7	2.9	2.9
5	Minimal points of failure	1.6	1.5	1.9	1.8	2.0	2.0
6	Redundancy	1.7	2.4	2.3	2.5	2.6	2.6
7	Easy to use and understand	1.4	2.7	2.4	2.4	2.4	2.7
8	Happy first responders and firefighters	1.3	2.1	2.7	2.3	2.7	2.7
9	Local dispatch	2.9	1.4	2.9	2.4	2.9	2.9

10	Retain B.C. Ambulance understanding about Lasqueti situation	2.9	1.4	2.9	2.6	2.9	2.9
11	Local control	2.8	0.9	2.7	1.8	2.7	2.8
12	Accessible to all	2.0	1.9	2.1	2.0	2.3	2.3
13	Locate people accurately & effectively	1.4	2.0	2.6	2.4	2.6	2.6
14	Not tied into a contract that we can't get out of	2.9	0.9	2.8	1.8	2.8	2.9
15	Feedback when successful dispatch	1.5	2.5	2.8	2.8	2.8	2.8
16	Local repairability	1.1	0.9	2.1	1.9	2.1	2.1
17	Future-proofing	1.0	1.7	2.6	2.1	2.8	2.8
18	Knowing what we are getting into/committing to	2.7	1.8	2.9	1.9	2.9	2.9
19	Simplicity	1.9	2.0	2.4	2.3	2.2	2.4
20	Tax implication & costs	2.6	1.3	2.6	2.1	2.3	2.6
21	Dispatch recognizes that some people have no roads, water access only	2.5	1.7	2.9	2.4	2.9	2.9
22	Equal of value and access for everyone	1.7	1.8	1.9	1.8	2.1	2.1
23	Not dependent on systems that will be non-functional in a disaster	1.0	1.1	1.6	1.1	1.7	1.7
24	Ability to be involved	2.3	1.0	2.9	1.9	2.7	2.9
25	Takes advantage of our existing local infrastructure	2.4	1.2	2.8	2.3	2.8	2.8
26	Avoid intermediaries who may not understand the situation on Lasqueti	2.2	1.1	2.1	1.4	2.1	2.2
27	Being local helps with disaster scenarios	0.8	0.8	1.4	1.3	1.4	1.4
28	Get better telephone system	0.1	0.5	0.1	0.1	0.1	0.5
29	Broader questions about how to help LIVFD	0.9	1.3	1.8	1.6	1.7	1.8
30	Minimize follow-on implications and obligations	2.6	1.1	2.8	1.9	2.7	2.8
31	Don't want to be dependent on Vancouver/Victoria	2.2	0.9	2.7	1.8	2.7	2.7
32	Not invest in old analogue system that will need to be replaced	0.9	2.0	2.4	2.4	2.8	2.8

33	One point of contact	1.3	2.7	2.8	2.8	2.8	2.8
34	Retaining the character of the community	2.2	1.1	2.2	1.7	2.3	2.3
35	Retain insurance coverage	0.6	1.4	0.9	1.3	0.9	1.4
36	Need to recognize that Lasqueti is willing to accept a higher level of risk.	0.9	0.7	1.1	0.6	1.1	1.1
37	Easier than remembering a phone number	1.0	2.2	1.7	1.6	1.7	2.2

Table 6 Evaluation ratings for how well each option meets each LIVFD interest (high or well met = 3, moderately met = 2, poorly met = 1, not met = 0). Average for committee.

#	LIVFD Interest	Option A: Current system	Option B: NI 9-1-1	Option C: Call centre + VHF	Option D: PSAP + VHF	Option E: Call centre + VHF + texting	Ideal (max)
1	When reporting a fire, caller should be able to talk to a person	1.0	3.0	2.9	2.8	2.9	3.0
2	Easy to use and understand (system that is user friendly and available to all, including for kids, adults, infirm, visitors)	1.6	2.7	2.6	2.2	2.6	2.7
3	Equal provision of service	1.8	2.2	2.2	2.0	2.3	2.3
4	Call-outs (e.g. pagers) that work everywhere	1.3	2.6	2.3	2.3	2.6	2.6
5	Reliable call-outs	1.4	2.8	2.8	2.5	2.9	2.9
6	System should be able to pass reliable messages (numeric or voice)	1.6	2.9	2.8	2.7	2.9	2.9
7	Effective, easy-to-use home location (with consideration of confidentiality)	1.4	1.9	3.0	3.0	3.0	3.0
8	Streamlined system: no extra steps	1.8	2.6	2.6	2.3	2.4	2.6
9	Secure communication system	1.8	2.1	2.5	2.4	2.6	2.6
10	No changes to First Responder dispatch	2.9	1.3	2.4	2.3	2.2	2.9
11	System that functions over the long term (i.e. avoid changing system again in near future)	1.2	2.6	2.7	2.3	2.8	2.8
12	Eliminate non-emergency calls	1.2	1.9	1.8	1.7	1.8	1.9
13	Maximum local control and ownership (ability to have a voice)	2.8	0.8	3.0	1.7	2.9	3.0

14	Community is happy with service	1.8	1.1	3.0	2.0	2.9	3.0
15	The system meets PRRD requirements	1.4	3.0	2.3	2.5	2.2	3.0
16	That a community team puts together a reliable system that PRRD will be OK with	1.6	1.7	2.7	2.7	2.8	2.8
17	To help increase and maintain LIVFD membership	1.0	1.3	1.9	1.3	2.0	2.0
18	To have adequate resources to implement the service	1.6	1.9	2.3	2.2	2.3	2.3
19	That funding is not lost	1.1	1.4	1.6	1.2	1.6	1.6
20	To have clear, feasible service polices to implement	2.0	2.3	2.9	2.7	2.8	2.9
21	That dispatch service not influence land-use; limit follow-on implications (e.g. changes to road requirements)	2.4	1.2	3.0	2.5	3.0	3.0
22	Educate public about fire safety (e.g. Fire Smart)	0.8	0.8	1.1	1.2	1.1	1.2
23	Need to consider equipment upgrades	1.0	1.6	2.2	1.8	2.2	2.2
24	Simplify documentation	1.4	2.2	2.3	2.4	2.2	2.4

Table 7 Evaluation ratings for how well each option meets each PRRD interest (high or well met = 3, moderately met = 2, poorly met = 1, not met = 0). Average for committee.

#	PRRD Interest	Option A: Current system	Option B: NI 9-1-1	Option C: Call centre + VHF	Option D: PSAP + VHF	Option E: Call centre + VHF + texting	Ideal (max)
1	Effective support for public and emergency responder safety	1.8	2.5	2.8	2.5	2.8	2.8
2	Comprehensive dispatch system description	1.9	2.3	2.7	2.6	2.7	2.7
3	Effective communications network linking dispatchers and emergency responders	1.5	2.7	2.9	2.7	2.9	2.9
4	Communications system effectiveness/coverage across the service area	1.4	2.2	2.6	2.3	2.7	2.7
5	Meets communications equipment standards	1.9	2.8	2.8	2.7	2.8	2.8
6	Communications equipment redundancies in case of main system failure	1.4	2.1	2.3	2.2	2.4	2.4
7	Surge capacity for times of major emergencies or disasters	1.2	1.5	2.2	2.0	2.2	2.2

8	Plan for alternative power supply for all necessary components in case of power failure	1.5	2.1	2.2	2.3	2.2	2.3
9	Dispatcher training	1.8	2.5	2.6	2.6	2.6	2.6
10	Dispatcher staffing to ensure 24/7 service	1.6	2.7	2.6	2.3	2.6	2.7
11	Longer term dispatcher succession plan	1.2	2.0	1.6	1.3	1.6	2.0
12	Ensure applicable PRRD obligations to meet Workers Compensation Act Occupational Health and Safety Regulations regarding dispatcher operations	1.7	2.7	2.6	2.7	2.6	2.7
13	Ensure PRRD obligations are met per Bill C-45 for effective workplace safety	1.7	2.9	2.5	2.7	2.5	2.9
14	House numbering or other property/location identifier system	0.8	2.4	3.0	2.9	3.0	3.0
15	Ability to implement any “next generation” communications	0.9	2.0	2.6	2.3	3.0	3.0
16	Appropriate dispatch recording practices and records management system	1.3	2.8	2.6	2.5	2.4	2.8
17	Ensure compliance with all relevant statutes and regulations	1.6	2.8	2.6	2.8	2.4	2.8
18	Ensure compliance with any relevant PRRD bylaws and policies	2.1	2.8	2.6	2.8	2.6	2.8

7.2 Weighting Interest Evaluations by Interest Importance

The interest importance ranks (see Chapter 4) are considered as priority weights that indicate the degree to which each interest should contribute to the evaluation relative to other interests. These importance ranks range from 0 (interest should not contribute at all to the evaluation) to 3 (interest is of highest importance for evaluation).

The simplest method to apply this weighting is to multiply the interest evaluations for each option by the interest importance. These are called “weighted evaluation ratings”.

The theoretical “ideal” system was defined by taking the maximum weighted value for each interest over all options (without regard for feasibility, but to provide an upper bound).

These weighted ratings are shown in Tables 8, 9 and 10 for the community, LIVFD and PRRD interests, respectively.

Table 8 Weighted evaluation ratings for each community interest (evaluation ratings multiplied by interest importance ranking). Average for committee.

#	Community Interest	Option A: Current system	Option B: NI 9-1-1	Option C: Call centre + VHF	Option D: PSAP + VHF	Option E: Call centre + VHF + texting	Ideal (max)
1	Firefighter and first responder safety	5.1	6.9	7.7	6.4	7.0	7.7
2	Appropriateness of cost/benefit given Lasqueti situation	5.2	3.8	7.7	7.0	6.9	7.7
3	Ensure dispatch involves appropriate training	5.3	7.0	6.5	6.7	6.8	7.0
4	Local knowledge	6.4	4.9	8.4	7.9	8.4	8.4
5	Minimal points of failure	4.3	4.2	5.3	4.9	5.6	5.6
6	Redundancy	4.8	6.7	6.5	7.0	7.2	7.2
7	Easy to use and understand	3.6	7.0	6.4	6.2	6.4	7.0
8	Happy first responders and firefighters	3.4	5.3	6.9	5.9	6.9	6.9
9	Local dispatch	7.8	3.8	7.8	6.6	7.8	7.8
10	Retain B.C. Ambulance understanding about Lasqueti situation	7.8	3.8	7.8	6.9	7.8	7.8
11	Local control	7.3	2.3	6.9	4.6	6.9	7.3
12	Accessible to all	5.2	4.9	5.5	5.2	6.0	6.0
13	Locate people accurately & effectively	3.6	5.2	6.6	6.2	6.6	6.6
14	Not tied into a contract that we can't get out of	7.5	2.3	7.2	4.6	7.2	7.5
15	Feedback when successful dispatch	3.8	6.3	6.9	6.9	6.9	6.9
16	Local repairability	2.8	2.3	5.3	4.7	5.3	5.3
17	Future-proofing	2.5	4.3	6.4	5.4	6.9	6.9
18	Knowing what we are getting into/committing to	6.5	4.3	6.9	4.5	6.9	6.9
19	Simplicity	4.6	4.8	5.9	5.4	5.3	5.9

20	Tax implication & costs	6.2	3.5	6.1	5.1	5.5	6.2
21	Dispatch recognizes that some people have no roads, water access only	6.0	4.1	6.9	5.7	6.9	6.9
22	Equal of value and access for everyone	4.3	4.6	4.9	4.6	5.3	5.3
23	Not dependent on systems that will be non-functional in a disaster	2.7	2.9	4.2	3.1	4.5	4.5
24	Ability to be involved	5.5	2.4	6.9	4.5	6.4	6.9
25	Takes advantage of our existing local infrastructure	5.5	2.8	6.4	5.2	6.4	6.4
26	Avoid intermediaries who may not understand the situation on Lasqueti	4.9	2.5	4.9	3.2	4.9	4.9
27	Being local helps with disaster scenarios	2.0	2.0	3.7	3.3	3.7	3.7
28	Get better telephone system	0.3	1.3	0.3	0.3	0.3	1.3
29	Broader questions about how to help LIVFD	2.0	2.9	4.0	3.7	3.8	4.0
30	Minimize follow-on implications and obligations	5.7	2.4	6.1	4.1	5.9	6.1
31	Don’t want to be dependent on Vancouver/Victoria	4.9	2.2	5.9	3.9	5.9	5.9
32	Not invest in old analogue system that will need to be replaced	1.9	4.2	5.0	5.1	5.8	5.8
33	One point of contact	2.6	5.4	5.6	5.5	5.6	5.6
34	Retaining the character of the community	4.6	2.3	4.7	3.6	4.9	4.9
35	Retain insurance coverage	1.3	3.0	1.9	2.8	1.9	3.0
36	Need to recognize that Lasqueti is willing to accept a higher level of risk.	1.7	1.3	2.1	1.1	2.1	2.1
37	Easier than remembering a phone number	1.5	3.3	2.5	2.4	2.5	3.3

Table 9 Weighted evaluation ratings for each LIVFD interest (evaluation ratings multiplied by interest importance ranking). Average for committee.

#	LIVFD Interest	Option A: Current system	Option B: NI 9-1-1	Option C: Call centre + VHF	Option D: PSAP + VHF	Option E: Call centre + VHF + texting	Ideal (max)
1	When reporting a fire, caller should be able to talk to a person	2.9	8.7	8.4	8.2	8.4	8.7
2	Easy to use and understand (system that is user friendly and available to all, including for kids, adults, infirm, visitors)	4.0	6.9	6.6	5.6	6.6	6.9
3	Equal provision of service	4.8	6.0	6.0	5.8	6.3	6.3
4	Call-outs (e.g. pagers) that work everywhere	3.5	6.5	6.1	6.1	6.6	6.6
5	Reliable call-outs	4.0	7.8	7.8	7.0	8.1	8.1
6	System should be able to pass reliable messages (numeric or voice)	4.4	8.1	7.8	7.5	8.1	8.1
7	Effective, easy-to-use home location (with consideration of confidentiality)	3.8	4.9	7.8	7.8	7.8	7.8
8	Streamlined system: no extra steps	4.6	6.6	6.6	6.1	6.4	6.6
9	Secure communication system	3.9	4.7	5.5	5.3	5.8	5.8
10	No changes to First Responder dispatch	7.1	3.3	6.0	5.7	5.4	7.1
11	System that functions over the long term (i.e. avoid changing system again in near future)	3.7	6.9	7.2	6.3	7.5	7.5
12	Eliminate non-emergency calls	2.6	4.0	3.7	3.5	3.7	4.0
13	Maximum local control and ownership (ability to have a voice)	7.5	2.4	8.1	4.5	7.8	8.1
14	Community is happy with service	3.4	2.1	5.7	3.8	5.5	5.7
15	The system meets PRRD requirements	3.9	8.1	6.3	6.8	6.0	8.1
16	That a community team puts together a reliable system that PRRD will be OK with	4.0	4.9	6.9	6.9	7.2	7.2
17	To help increase and maintain LIVFD membership	2.6	3.5	4.9	3.7	5.2	5.2
18	To have adequate resources to implement the service	4.6	4.9	6.0	6.0	6.0	6.0

19	That funding is not lost	2.9	3.7	4.0	3.2	4.0	4.0
20	To have clear, feasible service polices to implement	5.9	6.1	7.5	6.9	7.2	7.5
21	That dispatch service not influence land-use; limit follow-on implications (e.g. changes to road requirements)	6.1	3.0	6.6	5.5	6.6	6.6
22	Educate public about fire safety (e.g. Fire Smart)	1.4	1.2	1.8	1.6	1.8	1.8
23	Need to consider equipment upgrades	2.4	3.3	4.2	3.4	4.2	4.2
24	Simplify documentation	3.6	5.5	5.1	5.3	4.9	5.5

Table 10 Weighted evaluation ratings for each PRRD interest (evaluation ratings multiplied by interest importance ranking). Average for committee.

#	PRRD Interest	Option A: Current system	Option B: NI 9-1-1	Option C: Call centre + VHF	Option D: PSAP + VHF	Option E: Call centre + VHF + texting	Ideal (max)
1	Effective support for public and emergency responder safety	5.4	7.5	8.3	7.5	8.3	8.3
2	Comprehensive dispatch system description	7.1	7.7	8.0	7.7	8.0	8.0
3	Effective communications network linking dispatchers and emergency responders	4.5	8.1	8.6	8.0	8.6	8.6
4	Communications system effectiveness/coverage across the service area	3.9	6.1	7.1	6.3	7.4	7.4
5	Meets communications equipment standards	4.7	6.8	6.7	6.5	6.7	6.8
6	Communications equipment redundancies in case of main system failure	4.2	6.1	6.5	6.3	6.9	6.9
7	Surge capacity for times of major emergencies or disasters	2.6	3.5	4.7	4.2	4.7	4.7
8	Plan for alternative power supply for all necessary components in case of power failure	4.6	5.8	6.2	6.3	6.2	6.3
9	Dispatcher training	5.4	8.3	7.7	7.7	7.7	8.3
10	Dispatcher staffing to ensure 24/7 service	4.4	7.5	7.1	6.3	7.1	7.5
11	Longer term dispatcher succession plan	2.6	4.8	3.5	2.8	3.5	4.8

12	Ensure applicable PRRD obligations to meet Workers Compensation Act Occupational Health and Safety Regulations regarding dispatcher operations	4.9	7.7	7.2	7.7	7.2	7.7
13	Ensure PRRD obligations are met per Bill C-45 for effective workplace safety	4.8	8.3	7.2	7.7	7.2	8.3
14	House numbering or other property/location identifier system	2.5	7.4	8.3	7.9	8.3	8.3
15	Ability to implement any “next generation” communications	1.9	4.2	4.8	4.4	5.7	5.7
16	Appropriate dispatch recording practices and records management system	4.3	8.4	7.7	7.5	7.3	8.4
17	Ensure compliance with all relevant statutes and regulations	4.6	8.1	7.4	8.2	7.1	8.2
18	Ensure compliance with any relevant PRRD bylaws and policies	4.9	6.5	6.1	6.6	6.1	6.6

7.3 Summary of Option Evaluations

The weighted evaluation ratings were summed for each option over all interests (Table 11: “weighted evaluation”). This was done separately for each stakeholder group to (a) account for the different number of interests for each stakeholder group; and (b) to allow comparison of each option in terms of each stakeholder interests.

The overall evaluation rating for each option was obtained by measuring the summed ratings against the theoretical ideal system, reported as the percent of the ideal reached by the option (Table 11: “relative to ideal”).

To assist interpretation, the evaluation percentages were converted to grades as follows (Table 11: “grade (relative to ideal)”): letters represent 10% intervals:

- A’s: 90-100%,
- B’s: 80-90%,
- C’s: 70-80%,
- D’s: 60-70% and
- E’s: 50-60%.

For each interval, a ‘+’ or ‘-‘ is added to the letter for the top or bottom 1/3rd, respectively (e.g. A- is 90-93%, A is 93-97% and A+ is 97-100%).

To provide a measure of divergence (or conversely, agreement) among committee members, E-DAC calculated the average difference between the overall committee evaluations (“relative to ideal” value) and the evaluations of individual members (Table 11: “average divergence”).

Lower percentages indicate higher levels of agreement (e.g. an average divergence of 5% means that on average individual evaluations were within 5% of the committee average). This provides an objective way to compare the degree of difference between option evaluations (e.g. if the average divergence for two options is less than 10%, but the overall evaluations for those options differ by more than

10%, then this indicates that the majority of the committee rated one option higher than the other). Overall, the level of agreement was high relative to differences between options.

The reason E-DAC focused on divergence for the "relative to ideal" values (i.e. the percentage of ideal numbers) instead of divergence for the weighted evaluation ratings was to account for differences in how individual members tended to set ratings as a whole (e.g. some members tended to give lower values for all options compared to other committee members, based on how they interpreted the meaning of "how well an interest was met"). Comparing ratings scaled relative to the respective ideals for committee members focuses on fundamental differences in how well committee members considered each option to meet the stakeholder interests.

The evaluation rating summaries as shown in table 11. Note that the results change only slightly when only "very important" interests are included.

Table 11. Evaluation rating summaries: sum of weighted evaluation ratings for each option, as well as percentage relative to ideal benchmark.

Stakeholder group	Evaluation indicator	Option A: Current system	Option B: NI 9-1-1	Option C: Call centre + VHF	Option D: PSAP + VHF	Option E: Call centre + VHF + texting	Ideal (max)
Community	weighted evaluation	161	143	211	180	211	219
	relative to ideal	**73**	**65**	**96%**	**82%**	**95**	
	grade (relative to ideal)	C	D	A	B-	A	
	average divergence	6%	12	3%	8%	4%	
LIVFD	weighted evaluation	97	123	147	132	147	153
	relative to ideal	**63**	**80**	**96%**	**86%**	**96**	
	grade (relative to ideal)	D	B-	A	B	A	
	average divergence	10	10	5%	7%	5%	
PRRD	weighted evaluation	77	123	123	120	124	131
	relative to ideal	**59**	**94**	**94%**	**92%**	**95**	
	grade (relative to ideal)	E	A	A	A-	A	
	average divergence	11	13	4%	8%	4%	

7.4 Consultation and Level of Support from Community and LIVFD

7.4.1 Community consultation and support

A second public forum was held Nov 27, 2016 to obtain input and feedback. The forum was well attended (over 60 attendees, in addition to most E-DAC members). Some LIVFD members attended and provided input at the public forum. The options and evaluation methods were presented, and there was a lot of open discussion and question answering to help participants understand the details of each option. At the end, the participants were asked, by show of hands, which

option they preferred. The response was a unanimous preference for Option C, as well as a standing ovation to thank the E-DAC for their work and community service. This response confirmed that the E-DAC evaluation adequately captured the community interests with respect to the options.

The E-DAC final report was posted on-line with a link provided on the Lasqueti email list, and the public was invited to provide input on the options, report and recommendation prior to submission to the PRRD Board. Printed copies were placed at the post office and local store. An article was published in the local newsletter.

7.4.2 LIVFD consultation and support

A meeting was held with LIVFD in October, 2016 to confirm and revise the LIVFD interests assessed in the E-DAC evaluation.

The E-DAC chair met with LIVFD dispatchers (all dispatchers except one attended) on December 5, 2016 to review and discuss the options from the perspective of the local dispatchers. This was important because the role and operations of local dispatchers are significantly affected by any of the options (other than the current system).

Dispatchers were particularly supportive of the Incident and Resource Locator Tool and the concept of a local fire department support group. The local dispatchers were asked which option they preferred (except for S. Kristinsson, as she is a voting member of E-DAC). The response was unanimous preference for Option C, with the proviso that implementation of changes would be done incrementally to help dispatchers adjust to changes in procedures and technologies (i.e. to avoid overwhelming local volunteer dispatchers).

Further, if Option C is adopted, local dispatchers were supportive of committing to a review of the system (e.g. after 5 years) to assess whether implementation was completed and whether the system worked as designed and described, and to decide on further steps as an outcome of the review (e.g. to continue with the system, to make incremental changes towards inclusion of texting capabilities as in Option E, or to adopt the NI 9-1-1 system).

Over 35% of the LIVFD attended either the public forum or the dispatcher meeting (including E-DAC members of LIVFD). In addition, an opportunity was provided for in-person discussion and information sharing between the E-DAC chair and LIVFD members.

LIVFD members were invited to provide input on the options, report and recommendation, prior to submission to the PRRD Board, as described in section 7.4.1.

7.5 Pros and Cons of Each Option

The committee research and discussions, and the interest-based evaluation process, helped highlight the key pros and cons of each option.

7.5.1 Option A: current system

Key Pros

- Ability to talk immediately with a medical dispatcher
- Low cost (no capital investment needed, but pager service costs are increasing)

- Familiarity of use
- Locally developed, under local control
- Uses local knowledge (but limited ability to distribute it among LIVFD members)

Key Cons
- Caller doesn't talk immediately to a person for fire calls
- Relatively poor signal coverage for commercial pagers
- Relatively non-robust pagers
- Reliance only on local knowledge for locating incidents
- Relatively low redundancy
- Relatively low capacity to receive high levels of calls at once

7.5.2 Option B: NI 9-1-1

Key Pros
- Well-known, single number for call-in
- Ability to talk immediately with a medical or fire dispatcher
- Fire dispatchers on stand-by 24/7
- Relatively good signal coverage for VHF pagers and radios
- Robust pagers
- Relatively high redundancy (e.g. backup systems)
- Consistent with other PRRD regional fire departments
- Preferred option from a PRRD-only perspective

Key Cons
- Cost would be either very expensive or prohibitively expensive
- Lack of community support (and hence negative impact on LIVFD member recruitment)
- 9-1-1 service (as implemented via a regional emergency telephone service) cannot be withdrawn, even if a preferable system is identified
- Required introduction of civic addressing (raising costs and other concerns)
- Loss of local control and increased dependence on large institutions (e.g. E-COMM in Vancouver and NI 9-1-1 fire dispatch centre in Campbell River) over which LIVFD and community would have little influence
- Community concerns about follow-on implications that may be imposed via a service that for which withdrawal is not possible, and that depends on institutions over which Lasqueti would have little influence
- Possible loss over time of local dispatchers (and hence ability to use Incident and Resource Locator Tool)
- Limited ability for using local knowledge to locate incidents (based on civic addresses)
- Introduction of NI 9-1-1 fire dispatch centre between LIVFD medical first responders communications with BC Ambulance dispatcher

7.5.3 Option C: call centre / VHF

Key Pros
- Single number for call-in
- Ability to talk immediately with a medical or local dispatcher (except in the case when no local dispatcher can be reached in a timely manner for a fire call, in which case the caller still reaches the call centre operator who will ensure LIVFD is alerted

appropriately)
- Good cost/benefit given the Lasqueti taxpayer base, geography and high level of volunteerism
- Reasonable signal coverage for VHF pagers and radios that can be incrementally improved over time with modest cost
- Robust pagers
- Relatively high redundancy (e.g. distributed local dispatchers and power systems; and backup systems)
- Relatively high local control and local reparability
- Relatively high flexibility to establish procedures the work on Lasqueti and to incorporate incremental improvements (e.g. to make use of new technology when available, or to introduce more text messaging in a shift towards Option E)
- Continuation of integral role for local dispatchers
- Broad community support
- Uses local knowledge in a way that can be distributed among LIVFD members (e.g. via the Incident and Resource Locator Tool)
- Continued direct communications with BC Ambulance during medical calls
- Local fire department support group that can help with implementation of the option, as well as help LIVFD with community relations and meeting administrative gaps (e.g. member recruitment and retention planning)
- Improved community-PRRD relations
- Maintains potential, after a 5-year review, to either continue with Option C (if it works fine), incrementally shift to Option E (if text messaging capabilities would improve aspects of communications) or to shift to NI 9-1-1.

Key Cons
- Continued reliance on volunteer efforts (however, Lasqueti has a high level of volunteerism)
- Requires PRRD to support a dispatch system for LIVFD that differs from the NI 9-1-1 system used by other regional fire departments

7.5.4 Option D: PSAP / VHF

The key pros and cons are similar to Option C, except:

Key Pros
- More stringent standards applied to a PSAP and a call centre regarding building construction, call transfer time targets, and backup systems

Key Cons
- Not feasible for fire calls because volunteer dispatchers are not on stand-by 24/7 to received transfer of fire calls from the PSAP
- Given trend of PSAP consolidation, use of a PSAP is likely equivalent to use of E-COMM, which would be similar to the NI 9-1-1 system without the NI 9-1-1 fire dispatch centre
- Increased costs and reduced flexibility compared with use of a call centre
- May need to be implemented by PRRD using a regional emergency telephone service, and hence the no withdrawal regulation would then apply

Due to the infeasibility for local dispatches to be on stand-by to receive transfer of fire calls from the PSAP, this option was not evaluated in detail, and cannot be recommended.

7.5.5 Option E: call centre / VHF / text

The key pros and cons are similar to Option C, except:

Key Pros

- Ability for LIVFD members to use cell phones and smart phones, which many already carry, to community via text messaging
- Text messaging capability can be incrementally added to Option C

Key Cons

- Increased complexity of procedures protocol
- Increased capital investment cost

8. Recommendations

8.1 Dispatch System Recommendation

At the E-DAC meeting held December 13, 2016, the following motion was passed:

> *THAT the Lasqueti Emergency Dispatch Advisory Committee (E-DAC) recommend to the Powell River Regional District Board to adopt dispatch Option C, as described in the final report from E-DAC.*

This recommendation forms the primary recommendation from E-DAC to the PRRD board. The details of this option are described in Chapter 6 of this report. Section 8.2 of this chapter describes implementation steps as proposed by the E-DAC to achieve implementation within a timely and feasible manner, taking into consideration the budget process of PRRD and the capacity of LIVFD members to adjust to changes.

8.2 Other Recommendations

The E-DAC also made several of the related recommendations to the PRRD.

8.2.1 Mapping tool recommendation

At the E-DAC meeting held May 17, 2016, the following motion was passed unanimously:

> *THAT given the dispatch gaps identified to date, including the NI9-1-1 option, all options to be recommended by EDAC shall include a local mapping component.*

That is, the E-DAC recommends use of the Incident and Resource Locator Tool, developed as part of the E-DAC process, regardless of which dispatch option is adopted. At the E-DAC meeting held December 13, 2016, the following motion was passed:

> *THAT the Lasqueti Emergency Dispatch Advisory Committee (E-DAC) recommend to the Powell River Regional District Board to support the adoption of the Incident and Resource Locator Tool by the Lasqueti Island Volunteer Fire Department, as described in the final report from E-DAC.*

8.2.2 Telephone service recommendation

A functioning phone system is of central importance for calling in fire and medical emergencies. The lack of investment by Telus to maintain coverage per their obligations to CRTC is one of the main barriers to reliable delivery of emergency services on Lasqueti, common to any dispatch option. When telephone service disruption occurs, repairs are not made in a timely manner (taking sometimes many months). Further, Telus is not responsive to community complaints, and seems to instead “blame the victim” (Lasqueti residents) for poor coverage caused by their lack of adequate investment obligations as a monopoly.

At the E-DAC meeting held December 13, 2016, the following motion was passed:

> *THAT the Lasqueti Emergency Dispatch Advisory Committee (E-DAC) recommend to the Powell River Regional District Board to continue to communicate with provincial and federal governments regarding inadequate maintenance and investment*, and regarding the essential need *to ensure reliable and available phone service on Electoral Area “E” for emergency dispatch.*

8.2.3 Volunteer fire department support group recommendation

One element of the Option C dispatch system is the creation of a volunteer support group to help the LIVFD, under supervision of the Fire Chief, to implement the dispatch system. The Option C recommendation focuses on the function of this group to help reduce the burden on LIVFD, in particular regarding changes to the dispatch system. The recommendation does not specify the administrative composition of the group, which could be an LIVFD committee, a Lasqueti Community Association (LCA) committee, an independent non-profit society (e.g. “Friends of LIVFD”), etc. This support group should likely not be a PRRD advisory committee because the goal is to help and support LIVFD, not advise the PRRD Board.

If this fire department support group was to be set up as an LIVFD committee, the Fire Chief already has the authority to create committees within the LIVFD under the authority of Bylaw 391 (Lasqueti Island Volunteer Fire Department Operations). However, to meet the goal of lifting burden off firefighters, medical first responders and local dispatchers, an LIVFD committee would need to additionally be able to include people who want to contribute but are not already filling these other roles. This can be achieved if PRRD made some relatively minor changes to Bylaw 391 to define a role for an "auxiliary support member". Section 8.4 includes proposed draft changes to Bylaw 391 to help the PRRD Board and staff to consider and support this option.

At the E-DAC meeting held December 13, 2016, the following motion was passed:

> *THAT the Lasqueti Emergency Dispatch Advisory Committee (E-DAC) recommend to the Powell River Regional District Board to facilitate changes to Bylaw 391 (Lasqueti Island Volunteer Fire Department Operations Bylaw) to authorize the Lasqueti Fire Chief to appoint fire department members with fire department support roles (i.e. not firefighter or medical first responder roles). Allowing fire department members with fire department support roles would enable the Fire Chief to create a fire department support committee, under the direction of the LIVFD, to provide volunteer assistance for the LIVFD to implement the selected emergency dispatch option, and that can include members with roles of firefighers, local dispatchers, medical first responders and fire department support.*

8.3 Implementation Steps

The Option C (call centre + VHF) dispatch option can be implemented in a phased manner. The following steps need to be done. More details are provided for the immediate next steps to be done early in 2017. Details of later steps will be refined as implementation proceeds:

- January 2017: PRRD Board considers endorsing E-DAC recommendations and adopting the Option C dispatch system for the LIVFD.

  The E-DAC report would likely be reviewed by the Board at the Rural Services Committee and/or Committee of the Whole in January 2017, and recommendations considered to be adopted formally at the Board meeting in January 2017.

- January 2017: The LIVFD Fire Chief convenes a meeting with former E-DAC members, fire department members and others as appropriate (e.g. members of the Lasqueti Community Association) to work out an appropriate structure for the proposed “LIVFD support group”, which is primarily a decision of the Fire Chief. This

group could be an LIVFD committee, a committee of the Lasqueti Community Association (LCA), a stand-alone society (e.g. “Friends of LIVFD”), or a joint LIVFD/LCA committee. As the concept of the support group is to report to the Fire Chief, it would likely not be structured as a PRRD advisory committee (which reports to the Board, like E-DAC).

- February 2017: LIVFD support group is formed and populated. The first step of the LIVFD support group would likely be to prioritize steps for implementing the Option C dispatch system. Other tasks that the LIVFD support group might do to help LIVFD could also be discussed.

  High priority items that can be implemented relatively quickly include:
  - Setting up a contract, and terms of service, for a call centre,
  - Completing collection of GPS points for the Incident and Resource Locator Mapping Tool,
  - Completion of the first version of Incident and Resource Locator Tool, and
  - Working collaboratively with PRRD staff to complete the Privacy Impact Assessment for the reverse directory

- March 2017: PRRD Board would include appropriate amounts for the LIVFD budget for implementing Option C (e.g. VHF pagers).

- Spring/summer 2017: PRRD Board and staff review, in collaboration with LIVFD, the fire service bylaws (Bylaw 341 and Bylaw 391) to identify and make any changes required for governance of the Option C dispatch system. Any concerns should be flagged early, and related implementation steps should await changes to the bylaws.

- Spring 2017: documenting procedures for the call centre handling of emergency calls from Lasqueti, as well as changes to operational procedures of LIVFD dispatchers.

- Spring 2017: completion of the first version of the Incident and Resource Locator Tool, including development of training materials.

- Spring/summer 2017: completion of setup and testing of a new local VHF repeater.

- Summer 2017: continued training of LIVFD members on use of VHF radios.

- When the VHF pagers are purchased: comparison of Rogers pagers with VHF pagers.

- Ongoing and future steps:
  - review of usage and contents of Incident and Resource Locator Tool,
  - collection of additional information for Incident and Resource Locator Tool and reverse directory,
  - testing of VHF radio and pager coverage,
  - transition to use VHF pagers instead of Rogers pagers (and cancellation of Rogers pager service), including training, and
  - public education on how to access emergency services.

- 2022: Dispatch system review

8.3.1 Proposed Changes to Bylaw 391

One option for a local support group to help LIVFD implement the Option C dispatch system would be as an LIVFD committee, reporting directly to (and possibly including) the Fire Chief.

According to Bylaw 391 (Lasqueti Island Volunteer Fire Department Operations Bylaw 391, 2005), the LIVFD Fire Chief already has the authority to create committees within the LIVFD. One key goal of the support group is to allow volunteers not presently members of LIVFD to help take on some of the burden of implementing Option C, such as completing the Incident and Resource Locator Tool, obtaining quotes of costs and service terms from call centres, expanding and testing the VHF network on Lasqueti, training on VHF radio and pager use, etc. To reduce the burden on firefighters, medical first responders and local dispatchers, this would require that the Fire Chief can appoint members of the fire department that do not have these roles. Further, the roles of medical first responders and local dispatchers are not well defined in Bylaw 391 (e.g. the member appointment section states that all members “shall be a volunteer fire fighter”). This issue was raised in the Fire Services Review, 2012.

To support an "LIVFD support committee", and to better define different types of member roles in the fire department, it is required that the PRRD make some relatively minor changes to Bylaw 391. Below are some detailed suggestions for such changes, based on introducing the concept that the Fire Chief can define different roles in the department, and assign one or more roles to members. This would align the current structure of LIVFD with the bylaw regarding local dispatchers and medical first responders, and would allow the Fire Chief to define a role for "auxiliary support member".

Proposed revisions to Bylaw 391:

(i) General: make gender neutral

(ii) Change section 4(a):
"… *volunteer fire fighter of Lasqueti Island Volunteer Fire Department*"
to
"… *volunteer member of Lasqueti Island Volunteer Fire Department*"

(iii) Add new section 4(b):
"*The Fire Chief may assign and unassign roles to other members, and shall assign responsibility and duties to be carried out by each member role.*"

(iv) Add to section 1:
"***Member Role***" *a named set of responsibility and duties defined by the Fire Chief, such as "fire fighter", "medical first responder", "local dispatcher", and "auxiliary support*;"

(v) Renumber section 4(b) to 4(c), and section 4(c) to 4(d).

(vi) Change section 5(b):
"… *suitability for work as a fire fighter.*"
to
"… *suitability for work in their assigned role(s)."*

(vii) Change section 5(b):

"… unsuitable for the position of volunteer fire fighter …"

to

"… unsuitable for the position of their assigned role(s) …"

(viii) Change section 7(a):

"*.. which clearly identifies the member's seniority and rank.*"

to

"*… which clearly identifies the member's role(s), seniority and rank.*"

(ix) Add new section 7(c):

"*When a role of a member is assigned or unassigned, the roster shall be adjusted to add an assigned role or remove an unassigned role.*"

Appendix A. E-DAC Terms of Reference

Schedule 'A' - Resolution #9.3 - November 26, 2015

Electoral Area 'E' Emergency Dispatch Advisory Committee
Terms of Reference

Name
Electoral Area 'E' Emergency Dispatch Advisory Committee

Members
The committee shall consist of
a) 9 regular voting members who must
   (i) own property or reside within Electoral Area 'E'; and
   (ii) be 18 years or older; and must include
   (iii) the Fire Chief of the Lasqueti Island Volunteer Fire Department (LIVFD)
   (iv) one current First Responder with the LIVFD
   (v) one current Dispatcher with the LIVFD
   (vi) Local Emergency Coordinator

b) 1 Non-voting member:
   (i) Regional District Electoral Area 'E' Director

The majority of voting members must reside within Electoral Area 'E'.

Individuals who have an interest in a business that may benefit from this committee's recommendations or who may otherwise be in a conflict of interest are excluded from the committee.

Term of Membership
The PRRD will advertise applications for membership in the local newspaper and through postings on the PRRD and Lasqueti Island websites.

Members will be appointed by the PRRD Board.

The committee's term will end no later than December 2016. The committee may end earlier if all goals are completed.

Purpose
An effective emergency dispatch system is integral to public safety as well as the safety of emergency responders. This committee is being formed to research and advise the Powell River Regional District on the best options to implement and support emergency dispatch within Electoral Area 'E'.

Goals:
1. Recommend to the PRRD Board an emergency dispatch system that effectively supports public and emergency responder safety
2. Research and explain all necessary components
3. Clearly identify all forecasted costs for the recommended system

Deliverables
This committee will recommend an effective emergency dispatch system, detailing all necessary components. Specifically, the committee will research all aspects of the recommended system ensuring that the system is sustainable in regard to financial, technical, and human resources requirements. The committee will submit a business case to the PRRD Board addressing the following:

- Public phone number(s) to reach dispatchers.
- Communications network linking dispatchers and emergency responders.
- Communications system effectiveness/coverage across the service area.
- Communications equipment standards.
- Communications equipment redundancies in case of main system failure.
- Surge capacity for times of major emergencies or disasters.
- Plan for alternative power supply for all necessary components in case of power failure.
- Dispatcher training.
- Dispatcher staffing to ensure 24/7 service and will include a longer term dispatcher succession plan.
- Identify any applicable specific obligations by the PRRD to meet Workers Compensation Act Occupational Health and Safety Regulations regarding dispatcher operations.
- Ensure PRRD obligations per Bill C-45 for effective workplace safety.
- House numbering or other property/location identifier system.
- Ability to implement any "next generation" communications (ie text message option for hearing impaired, or other media usage).
- Appropriate dispatch recording practices including call times and all relevant communications records. All dispatch personnel, training, and operations records must be maintained in a records management system that ensures appropriate storage and retention of records and ensuring privacy concerns are addressed.
- Ensure the recommended dispatch system equipment, structures, and operations comply with all relevant statutes and regulations, particularly but not limited to: Industry Canada, Canadian Radio-television and Telecommunications Commission (CRTC), Freedom of Information and Protection of Privacy Act, Office of the Fire Commissioner, BC Building Code, Workers Compensation Act, and any relevant PRRD bylaws and policies.
- All costs for equipment purchasing, training, ongoing maintenance, licences, contracts, professional fees and any other anticipated necessary expenditures for the system's first ten years.
- Any major capital items (ie communications towers) must show anticipated lifecycle and replacement costs.

Scope / Jurisdiction / Authority
This scope of this committee is limited to matters related to emergency dispatch within Electoral Area 'E'. This committee is an advisory committee, reporting to the Board of the PRRD, and as such it has no direct authority over any PRRD services.

Resources and Budget
Committee members will serve without remuneration.

Costs of copying and circulating materials for agendas and miscellaneous expenses will be financed through the Lasqueti Island Fire Protection Service budget.

Governance
The Committee shall conduct meetings in accordance with the Powell River Regional District Board Procedure Bylaw:

The Committee will elect a chair at its first meeting.

The Chair will approve each meeting's agenda. Members are to contact the Chair at least one week in advance of the meeting to advise of items they would like included on the agenda.

The objective will be to make decisions by consensus. If a consensus cannot be reached, a majority vote will prevail.

Members are expected to regularly attend the meetings. Absence from 3 consecutive meetings without notification to the Chair and without reasonable cause will be grounds for a member to be removed from the committee.

A quorum will consist of a majority of members of the Committee.

Frequency of Meetings
The committee will meet at least once per month with dates and location to be determined by committee members. Additional meetings may be scheduled as required to deal with current business.

Record of Meetings
The committee will elect one member to act as the committee recorder for preparing agendas and minute taking.

The committee recorder shall prepare an agenda which shall be circulated to the committee members at least 48 hours in advance. The committee may waive the requirement for advance notice of the agenda in emergency situations requiring a special meeting.

Wherever possible, information will be circulated in advance by e-mail.

The committee recorder shall prepare minutes of committee meetings. Copies of minutes shall be circulated to committee members. Minutes of the prior meeting will be circulated as part of the agenda package and adopted at the following meeting. Meeting minutes will be forwarded to the PRRD one day after adoption.

Reporting Mechanism
The committee will provide at least one written report:

- prior to the March 2016 meeting of the PRRD Board, and
- at the committee's conclusion in December 2016 or before this time if the committee chooses to conclude earlier. This final report will include the business case for the recommended dispatch system.

The committee may provide additional reports during its term to the PRRD Board if it so chooses.

Additional Notes
The committee is recommended to review the following documents for understanding of current standards and discussions on emergency dispatch:

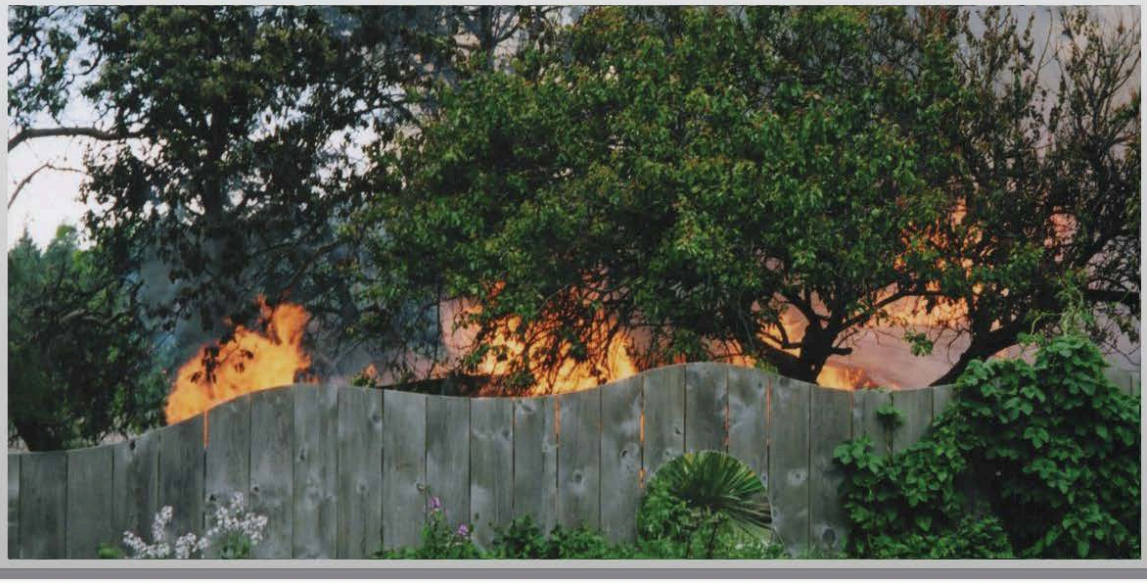
- NFPA Standard 1061 Standard for Professional Qualifications for Public Safety Telecommunications Personnel.
- NFPA Standard 1221 Standard for the Installation, Maintenance, and Use of Emergency Services Communications Systems.
- 9-1-1 Services in British Columbia: Background Review in Relation to a Province-Wide Call Answer Levy. Study produced by Dave Mitchell & Associates Ltd, 2013 for UBCM.
- Strategic Vision Summary of Consultation Comments, Ministry of Justice 2015 summary of 9-1-1 PSAP workshop for input for the future of future of emergency communications across the province.
- British Columbia Earthquake Preparedness Consultation Report, Henry Renteria (2014), particularly Recommendation 8.5.

Appendix B. E-DAC Interim Report

E-DAC Emergency Dispatch Advisory Committee
Powell River Regional District - Electoral Area "E" (Lasqueti)

Initial Report

2016-03-11



E-DAC Emergency Dispatch Advisory Committee
Powell River Regional District - Electoral Area "E" (Lasqueti)

March 11, 2016

To: Chair Brabazon
Powell River Regional District

On behalf of the Lasqueti Emergency Dispatch Advisory Committee, please find enclosed our Initial Report, fulfilling the first part of the Terms of Reference, for consideration at the March 17th PRRD Committee of the Whole meeting.

If you require further information, please do not hesitate to contact me.

Sincerely,

Andrew Fall, Chair

History of Emergency Dispatch in Electoral Area "E"

Organized fire protection has been provided on Lasqueti Island for over 50 years. Formal protection was initiated in the 1970's to collectively protect lives and property on Lasqueti Island.

In the early years, there were approximately four to five house fires per year, primarily due to poor building fire safety and lower levels of fire safety awareness. The number of house fires has declined to an average of approximately one per year, despite an increase in population.

Goals of Fire Protection on Lasqueti Island

1. Building fire safety & education
2. Wildfire and interface fire safety & education
3. Active response to contain fires
4. Protection of buildings
5. Health and Safety at a fire scene

The dispatch system used on Lasqueti has evolved over time to use appropriate technology given the remote and rural nature of the community and the limited tax base available.

Dispatch initially consisted of a hand-cranked siren at the fire hall at False Bay. Everyone (volunteers and other members of the community) would respond. Over time, a telephone call tree was established, which was then extended for emergency medical response.

In the mid 1990s, fire alerting transitioned to a paging system to allow rapid notification to all fire personnel and allow community members to report fires via telephone. The location of a fire was determined by calling back the number on the pager, or using a reverse directory and local knowledge when no one could be reached. Paging was also used for communication within the fire department, with the use of VHF radios introduced for tactical communication in the mid 1990's. In the 2000's, the role of dispatcher was introduced, and two repeaters were installed to increase radio coverage. Over time, especially with the addition of medical first response calls, the role of dispatcher evolved into a dedicated team.

Pager-Based Dispatch on Lasqueti Today

The Pager-based system currently used by Lasqueti Island Volunteer Fire Department (LIVFD) has eight components:

1. The process used to report a fire, including the fire emergency phone number, is communicated via laminated cards distributed to the public, a special section in the Lasqueti phone book, and by postings in public places.

   The goal is to ensure that as many residents and visitors as possible have clear instructions on how to notify the LIVFD in the event of a fire.

2. In the event of a fire, a caller dials a local ten-digit fire emergency phone number, enters the phone number from where they are calling plus *555 at the prompt, and if possible, then waits by the phone for a call-back.

3. The entered phone number is sent via pager to all LIVFD members and dispatchers, together with the *555 identifier which signifies a fire call.

4. LIVFD dispatchers immediately call the entered phone number to gather details.

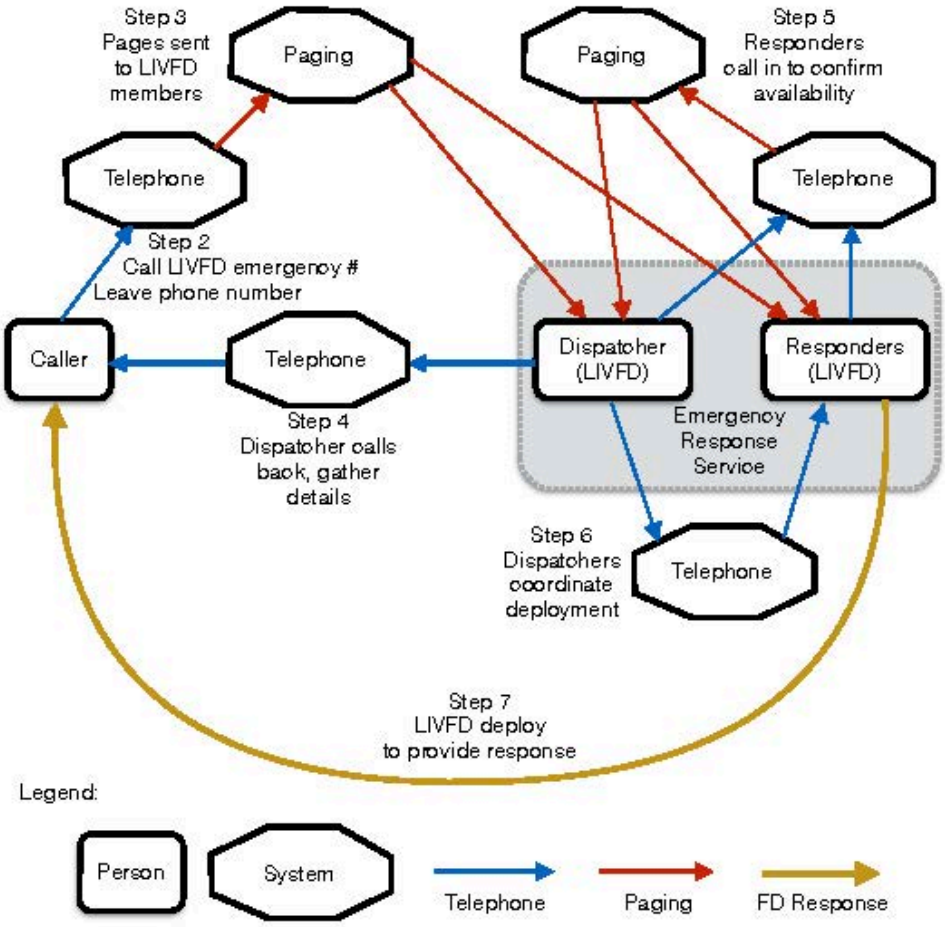
5. While dispatchers are gathering details, LIVFD members call in to the same fire emergency phone number, leaving their ID number and phone number where they can be reached to indicate that they are available. Once they have called in, they start assembling to respond to the fire emergency.

6. LIVFD dispatchers collect pages to determine member availability and contact information, and coordinate initial deployment of resources via phone.

7. LIVFD members deploy to fight fire.

8. LIVFD dispatchers document times and resources deployed, and provide communication support until released by the incident commander.

This is illustrated in the below diagram:



In 2014, Telus announced that their paging service was going to be discontinued. This triggering a re-assessment of the dispatch system.

Community Consultation

In response to the impending discontinuation of Telus pager service, in late 2014, the Powell River Regional District (PRRD) proposed that Lasqueti Island be included in the North Island 9-1-1 service.

This proposal resulted in a series of community discussions and meetings during 2015 to discuss the advantages and disadvantages of this option, along with initial explorations of other options available to maintain and improve the existing Lasqueti fire dispatch service.

Community Interests

The following interests were collected at a series of community meetings:

- Want to be involved
- Local control
- Local dispatch
- Local knowledge
- Local repairability
- Simplicity
- Takes advantage of our existing (local) infrastructure
- Avoid intermediaries who may not understand the situation on Lasqueti
- Retain the understanding from B.C. Ambulance about situation on Lasqueti
- Not be tied into a contract that we can't get out of
- Equal of value and access for everyone
- Retaining the character of the community
- Minimal points of failure
- Redundancy
- Not wanting to be dependent on systems that will not function in the event of a disaster
- Easy to use and understand
- Appropriateness of cost/benefit given Lasqueti situation
- Dispatch needs to recognize that people have no roads, water access only
- Knowing what we are getting into/committing to
- Minimize follow-on implications and obligations
- Needs to be safe for first responders and firefighters
- Happy first responders and firefighters
- Ensure that the dispatch process involves appropriate training
- Need to recognize that Lasqueti is willing to accept a higher level of risk.
- Way for people to know they are doing the right thing
- Feedback when successful dispatch
- One point of contact (One phone number?)
- Easier than remembering a phone number (One button to press?)
- Tax implications/costs (immediate and over time)
- Retain insurance coverage/ mortgage (at least at current levels) for those who have it
- Don't want to be dependent on Vancouver/Victoria etc (e.g. storm, earthquake, or too busy)
- Future-proof/upgradable/not a dead end/resilient to technology changes and changes in needs
- Not invest in old analogue system that will need to be replaced
- Broader questions about how to help LIVFD? What is the best investment?
- Get better telephone system - Improve reliability of landlines or cellular coverage. PRRD should help us get reliable service
- Locate people accurately/ effectively (e.g. GPS)
- Being local helps with disaster scenarios
- Earthquake, helps being self-reliant
- Accessible to all

Community Engagement

As part of the PRRD's commitment to public engagement, a collaborative process was undertaken to:

- Identify stakeholders to ensure everyone with an interest in the issue was able to be involved.
- Define goals and objectives to work towards consensus & collaboration.
- Distribute information to ensure that the stakeholders are informed about the issue at hand.
- Exchange views to understand perspectives from all stakeholders.
- Enable a dialogue between stakeholders to assist in reaching a solution which all can agree on.
- Bring legitimacy to the process through ensuring that stakeholders have taken part in creating the solution and are supportive of the results.

In order to balance the many interests expressed by the community, along with the core requirements of the service, and legal, statutory, and regulatory requirements, a multi-disciplinary committee consisting of community members, core stakeholders, PRRD staff, and the Electoral Area "E" elected representative was identified as the most appropriate method by which to evaluate and recommend an option for emergency dispatch.

PRRD's Committee Terms of Reference

The Emergency Dispatch Advisory Committee was formed in January of 2016, with a mandate to undertake the activities required to recommend an effective emergency dispatch system, detailing all necessary components. Specifically, the committee will research all aspects of the recommended system ensuring that the system is sustainable in regard to financial, technical, and human resources requirements.

Areas to be addressed by the committee shall include:

- Public phone number(s) to reach dispatchers
- Communications network linking dispatchers and emergency responders
- Communications system effectiveness/ coverage across the service area
- Communications equipment standards
- Communications equipment redundancies in case of main system failure
- Surge capacity for times of major emergencies or disasters
- Plan for alternative power supply for all necessary components in case of power failure
- Dispatcher training
- Dispatcher staffing to ensure 24/7 service and will include a longer term dispatcher succession plan
- Identify any applicable specific obligations by the PRRD to meet Workers Compensation Act Occupational Health and Safety Regulations regarding dispatcher operations
- Ensure PRRD obligations per Bill C-45 for effective workplace safety
- House numbering or other property/location identifier system
- Ability to implement any "next generation" communications (ie text message option for hearing impaired, or other media usage)
- Appropriate dispatch recording practices including call times and all relevant communications records. All dispatch personnel, training, and operations records must be maintained in a records management system that ensures appropriate storage and retention of records and ensuring privacy concerns are addressed.
- Ensure the recommended dispatch system equipment, structures, and operations comply with all relevant statutes and regulations, particularly but not limited to: Industry Canada, Canadian Radio-television and Telecommunications Commission (CRTC), Freedom of Information and Protection of Privacy Act, Office of the Fire Commissioner, BC Building Code, Workers Compensation Act, and any relevant PRRD bylaws and policies.
- All costs for equipment purchasing, training, ongoing maintenance, licences, contracts, professional fees and any other anticipated necessary expenditures for the system's first ten years.
- Any major capital items (ie communications towers) must show anticipated lifecycle and replacement costs.

The Committee shall produce two reports, an initial report prior to the March 2016 meeting of the PRRD Board, and a final report prior to the December 2016 meeting of the PRRD Board.

Outline of Committee Work

In order to address the terms of reference, the committee has undertaken the following program of work:

1. Form a series of sub-groups to research legal requirements and obligations, communication technologies, and mapping and routing. These sub-groups will include interested members of the public who are able to contribute their knowledge and expertise in these areas.

2. Form a series of sub-groups to research available options to meet Lasqueti's emergency dispatch challenges and needs.

3. Engage with the community to solicit feedback, input and review of evaluations and recommendations to ensure that the recommendation has broad community support.

4. Evaluate identified options based on the community interests, the interests of the LIVFD, and the interests of the PRRD as expressed in the terms of reference.

5. Provide an emergency dispatch recommendation to the PRRD.

6. Provide supporting materials justifying and explaining the recommendation.

The Final Report will describe the process, evaluation and final recommendation, along with supporting materials as appendices. This will provide the PRRD Board and Staff with sufficient materials to evaluate and adopt the recommendation given that the specified criteria have been met.

Outline of the Final Report

This section clearly communicates what the committee intends to present to the PRRD in the final report, such that the PRRD Board and Staff are aware of what is planned and can recommend any changes early in the process. If no changes are recommended by the PRRD, then the committee will take that as acceptance of the above stated direction and the below summarized deliverables for the Final Report.

Part 1 - Interests

The Final Report shall include a section that provides additional details on community, LIVFD and PRRD interests. Where possible, this section shall also extract quantifiable requirements that can be used to evaluate and rank possible solutions.

Part 2 - Core Service Requirements

The Final Report shall include a section that provides details on legal, regulatory and operational needs mandatory for delivering fire protection dispatch on Lasqueti Island.

This section shall contain a description of LIVFD operations, and a list of requirements, including if they are mandatory (SHALL), such as B.C. government law, recommendations (SHOULD), such as NFPA best practices, or if they are options (MAY).

Part 3 - Systems

The Final Report shall include two or more sections describing possible systems to provide an emergency dispatch service for Lasqueti Island.

Each system description shall include, at a minimum, details on the workflow, components, reliability, costs, maintenance, roles & responsibilities, governance, sustainability, deployment, training and documentation.

Each system description shall provide sufficient details to enable an evaluation to be undertaken based on the interests and requirements captured in parts one and two.

At a minimum, two systems shall be described:

a) the existing system (as a baseline for comparison)
b) the NI 9-1-1 option

Part 4 - Evaluation

The Final Report shall include a section that evaluates the systems included in part three, based on the interests and requirements, and includes justifications for weighting, and a final cost/benefit analysis.

Part 5 - Recommendation

The Final Report shall include a recommendation of which system to proceed with, including how that system should be configured and used, how it should be paid for, operated, maintained, and established. This will include a detailed business plan, and statements of support for feasibility and practicality.

Part 6 - Appendices

The Final Report shall contain multiple appendices that describe technical details and business plan details, and other materials used in the evaluation of the available systems.

The Final Report will refer to the appendices throughout.

Conclusion

We request that the Board accept this report, and pass a resolution for staff to provide feedback to the Committee regarding the contents of this report by the end of April, 2016.

Sincerely,

Emergency Dispatch Advisory Committee

Andrew Fall, Chair
Craig Houston
David Slik, Secretary
Don Dempster
Karl Darwin
Kristos Seiler
Merrick Anderson
Richard Carlson
Ross Thompson
Sue Kristinsson

Appendix C. Details on Legal and Regulatory Requirements

Appendix C.1 Workers Compensation Act and Regional Fire Protection Services

The Workers Compensation Act (**www.bclaws.ca/civix/document/id/complete/statreg/96492_00**;"the Act" in this section and the next) is the underlying statute that defines the responsibilities of employers and workers for safe work environments, compensation for workplace incidents, terms of the Workers Compensation Board ("the Board"), and enforcement.

Under the Act, a **"worker"** includes a member of a fire brigade or an ambulance driver or attendant working with or without remuneration, when serving a regional district. A **"workplace"** means any place where a worker is or is likely to be engaged in any work and includes any vessel, vehicle or mobile equipment used by a worker in work.

The Act has four parts:

- Part 1 relates to compensation
- Part 2 relates to industries not covered within the scope of Part 1 (not applicable here)
- Part 3 relates to occupational health and safety
- Part 4 relates to appeals to decisions made by the Board (not summarized here)

Part 1: Compensation to Workers and Dependents.

- Workplace incidents include personal injury and death arising during employment, mental disorders, occupational disease, communicable disease, or loss of hearing.
- Common illnesses, diseases and injuries related to **firefighting** (e.g. lung cancer, heart disease, heart injury) are presumed for firefighters, unless otherwise proven, subject to minimum firefighting work, other exposure to hazards, and history of smoking tobacco.

Part 3: Occupational Health and Safety.

Division 1 — Interpretation and Purposes

- Purpose: to benefit all citizens of BC by promoting occupational health and safety and protecting workers and other persons present at workplaces from work related risks to their health and safety, including:
  (a) to promote commitment to a high standard of occupational health and safety.
  (b) to prevent work related accidents, injuries and illnesses,
  (c) to encourage education regarding occupational health and safety,
  (d) to ensure a healthy and safe occupational environment,
  (e) to ensure that people who are in a position to affect occupational health and safety share that responsibility to the extent of each party's authority and ability to do so,
  (f) to foster cooperative and consultative relationships between employers, workers and others regarding occupational health and safety, and to promote worker participation in occupational health and safety programs and processes, and
  (g) to minimize the social and economic costs of work related accidents, injuries and illnesses, in order to enhance the quality of life for British Columbians and the competitiveness of British Columbia in the Canadian and world economies.

Division 2 — Board Mandate

- The mandate of the Board is to be concerned with occupational health and safety generally, and with the maintenance of reasonable standards for the protection of the health and safety of workers in BC and the occupational environment in which they work
- The Board functions, duties and powers include:
  (a) to **make regulations** to establish standards and requirements for the protection of the health and safety of workers and their occupational environment;
  (b) to **undertake inspections, investigations and inquiries** on matters of occupational health and safety and occupational environment;
  (c) to provide services to **assist joint committees**, worker health and safety representatives, employers and workers in maintaining reasonable standards for occupational health and safety and occupational environment;
  (d) to **promote public awareness and education** on matters related to occupational health and safety and occupational environment;
- **Subject to appeal provisions, the Board has exclusive jurisdiction to inquire into, hear and determine all those matters and questions of fact and law arising or required to be determined under Part 3 of the Act, and the action or decision of the Board is final and conclusive and is not open to question or review in any court.**

Division 3 — General Duties of Employers, Workers and Others

Employers must:

- ensure the health and safety of all workers at the workplace
- comply with the Act, the regulations and any applicable orders
- remedy any workplace conditions that are hazardous to worker health or safety
- ensure that workers
  (i) are made aware of all known or reasonably foreseeable health or safety hazards to which they are likely to be exposed by their work,
  (ii) comply with the Act, the regulations and any applicable orders, and
  (iii) are made aware of their rights and duties under the Act and the regulations,
- establish occupational health and safety policies and programs in accordance with the regulations,
- provide and maintain in good condition protective equipment, devices and clothing as required by regulation and ensure that these are used by the employer's workers,
- provide to the employer's workers the information, instruction, training and supervision necessary to ensure the health and safety of those workers in carrying out their work and to ensure the health and safety of other workers at the workplace,
- make a copy of this Act and the regulations readily available for review by the employer's workers and, at each workplace where workers of the employer are regularly employed, post and keep posted a notice advising where the copy is available for review,
- consult and cooperate with the joint committee, and
- cooperate with the Board, officers of the Board and any other person carrying out a duty under the Act or the regulations.

Workers must:

- take reasonable care to protect the worker's health and safety and the health and safety of other persons who may be affected by the worker's acts or omissions at

work, and
- comply with the Act, the regulations and any applicable orders.
- carry out his or her work in accordance with established safe work procedures as required by the Act and the regulations,
- use or wear protective equipment, devices and clothing as required by the regulations,
- not engage in horseplay or similar conduct that may endanger anyone,
- ensure that the worker's ability to work without risk to his or her health or safety, or to the health or safety of any other person, is not impaired by alcohol, drugs or other causes,
- report to the supervisor or employer
  (i) any contravention of the Act, the regulations or an applicable order of which the worker is aware, and
  (ii) the absence of or defect in any protective equipment, device or clothing, or the existence of any other hazard, that the worker considers is likely to endanger anyone,
- cooperate with the joint committee, and
- cooperate with the Board, officers of the Board and any other person carrying out a duty under the Act or the regulations.

Supervisors must:
- ensure the health and safety of all workers under direct supervision,
- be knowledgeable about the Act and applicable regulations,
- comply with the Act, the regulations and any applicable orders.
- ensure that the workers under his or her direct supervision
  (i) are made aware of all known or reasonably foreseeable health or safety hazards in the area where they work, and
  (ii) comply with the Act, the regulations and any applicable orders,
- consult and cooperate with the joint committee, and
- cooperate with the Board, officers of the Board and any other person carrying out a duty under the Act or the regulations.

Owners of a workplace must
- provide and maintain the owner's land and premises that are being used as a workplace in a manner that ensures the health and safety of persons at or near the workplace,
- give to the employer or prime contractor at the workplace the information known to the owner that is necessary to identify and eliminate or control hazards to the health or safety of persons at the workplace, and
- comply with the Act, the regulations and any applicable orders.

Directors and officers of a corporation must ensure that the corporation complies with the Act, the regulations and any applicable orders.

<u>Division 4 — Joint Committees and Worker Representatives</u>
- An employer must establish and maintain a joint health and safety committee in each workplace where 20 or more workers of the employer are regularly employed.

- A joint committee must have at least 4 members, at least half of which must be

worker representatives, and have 2 co-chairs, one each selected by workers and the employer.

- A joint committee has the following duties and functions in relation to its workplace:
  (a) to identify situations that may be unhealthy or unsafe for workers and advise on effective systems for responding to those situations;
  (b) to consider and expeditiously deal with complaints relating to worker health and safety;
  (c) to consult with workers and the employer on issues related to occupational health and safety and occupational environment;
  (d) to make recommendations to the employer and the workers for the improvement of the occupational health and safety and occupational environment of workers;
  (e) to make recommendations to the employer on educational programs promoting the health and safety of workers and compliance with the Act and the regulations and to monitor their effectiveness;
  (f) to advise the employer on programs and policies required under the regulations for the workplace and to monitor their effectiveness;
  (g) to advise the employer on proposed changes to the workplace, including significant proposed changes to equipment and machinery, or the work processes that may affect the health or safety of workers;
  (h) to ensure that accident investigations and regular inspections are carried out as required by the Act and the regulations;
  (i) to participate in inspections, investigations and inquiries under the Act or regulations;
  (j) to carry out any other duties and functions prescribed by regulation.

- A joint committee must establish its own rules of procedure, including rules respecting how it is to perform its duties and functions, and must meet regularly at least once each month, unless another schedule is permitted or required by regulation or order.
- The employer must provide the joint committee with the equipment, premises and clerical personnel necessary for the carrying out of its duties and functions.

- On request of the joint committee, the employer must provide information respecting
  (a) the identification of known or reasonably foreseeable health or safety hazards to which workers at the workplace are likely to be exposed,
  (b) health and safety experience and work practices and standards in similar or other industries of which the employer has knowledge,
  (c) orders, penalties and prosecutions under the Act or the regulations, and
  (d) any other matter prescribed by regulation.

- After each joint committee meeting, the committee must prepare a meeting report and provide a copy to the employer, who must retain a for at least 2 years and ensure that the retained reports are readily accessible to the joint committee members, workers of the employer, officers and other persons authorized by the Board or the minister.

- The employer must post at the workplace the names and work locations of the joint committee members, the reports of the 3 most recent joint committee meetings, and copies of any applicable orders under this Division for the preceding 12 months.

Division 10 — Accident Reporting and Investigation

- An employer must immediately notify the Board of the occurrence of any accident that
  (a) resulted in serious injury to or the death of a worker,
  (b) involved a major structural failure or collapse of a building, bridge, tower, crane, hoist, temporary construction support system or excavation,
  (c) involved the major release of a hazardous substance,
  (c.1) involved a fire or explosion that had a potential to cause serious injury to a worker, or
  (d) was an incident required by regulation to be reported.

- Except as otherwise directed by an officer of the Board or a peace officer, a person must not disturb the scene of an accident that is reportable except so far as is necessary to
  (a) attend to persons injured or killed,
  (b) prevent further injuries or death, or
  (c) protect property that is endangered as a result of the accident.

- Serious incidents must be investigated and reported by the employer.

Division 11 — Inspections, Investigations and Inquiries

- The WCB has authority to conduct workplace inspections, investigations and inquiries.

Division 12 — Enforcement

- The WCB has many powers to enforce compliance with the Act through agreements, orders, suspension or cancellation of certificates, penalties, court injunctions, etc.

Division 15 — Offences

- A person who contravenes the Act, the regulations or an order commits an offence.
- If a corporation commits an offence, an officer, director or agent of the corporation who authorizes, permits or acquiesces in the commission of the offence also commits an offence.

- A person is not guilty of an offence if the person proves that the person exercised due diligence to prevent the commission of the offence.
- A worker is not guilty of an offence if he/she proves that the offence was committed as a result of instructions given by the employer or supervisor, and despite his/her objection.

Appendix C.2 Occupational Health and Safety Regulation and Regional Fire Protection Services

The Occupational Health and Safety Regulation ("the Regulation" in this section) was created by the Workers Compensation Board to implement their obligations and authority under the Act (specifically Part 3 of the Act). (http://www2.worksafebc.com/Publications/OHSRegulation/Home.asp)

- **General duty**: Despite the absence of a specific requirement, all work must be carried out without undue risk of injury or occupational disease to any person
- **Notice to workers**: Every employer must post in a conspicuous place at each workplace any placard issued by the Board titled "Notice to Workers".
- A **contravention** of this Regulation will be deemed to be a contravention of the Act, and will make the appropriate person(s) liable for any penalty prescribed by the Act

Not all parts relate to regional fire protection services. Part 3 includes general requirements. Parts 5 to 34 relate to various issues and situations. Part 31 is specific to firefighting, All of Part 31 should be read by all FD members. Key issues from relevant parts include:

Part 3: Rights and Responsibilities

- An **occupational health and safety program** must be initiated and maintained by each employer that has a workforce of 20 or more, or a moderate or high risk of injury. This program must be designed to prevent injuries and occupational diseases, and include
  (a) a statement of the employer's aims and the responsibilities of the employer, supervisors and workers,
  (b) provision for the regular inspection of premises, equipment, work methods and work practices, at appropriate intervals, to ensure that prompt action is undertaken to correct any hazardous conditions found,
  (c) appropriate written instructions for reference by workers,
  (d) provision to hold periodic management meetings to review health and safety activities and incident trends, and for determining necessary courses of action,
  (e) provision for prompt investigation of incidents to determine the action necessary to prevent their recurrence,
  (f) maintenance of records and statistics, including reports of inspections and incident investigations, with provision for making this information available to the joint committee and, upon request, to an officer or the workers, and
  (g) provision by the employer for the instruction and supervision of workers in the safe performance of their work.

- **Inspections**: Employer must ensure that regular inspections are made, including buildings, structures, grounds, excavations, tools, equipment, machinery and work methods and practices, at intervals that will prevent the development of unsafe working conditions.
- A special inspection must be made when required by malfunction or accident.

- An inspection must, where feasible, include the participation of the joint committee.

- **Correction of unsafe conditions**: Unsafe or harmful conditions found in an inspection must be remedied without delay.
- If a person observes what appears to be an unsafe or harmful condition or act, they must report it as soon as possible to a supervisor or to the employer, and the receiving person must investigate the reported unsafe condition or act and must ensure that any necessary corrective action is taken without delay.
- If emergency action is required to correct a condition that constitutes an immediate threat to workers only those qualified and properly instructed workers necessary to correct the unsafe condition may be exposed to the hazard, and every possible effort must be made to control the hazard while this is being done.

- **Refusal of unsafe work**: A person must not carry out or cause to be carried out any work process or operate or cause to be operated any tool, appliance or equipment if that person has reasonable cause to believe that to do so would create an undue hazard to the health and safety of any person.
- A worker who refuses to carry out a work process or operate a tool, appliance or equipment due to safety must immediately report the circumstances of the unsafe condition to his or her supervisor or employer.
- A supervisor or employer receiving a safety report must immediately investigate the matter and ensure that any unsafe condition is remedied without delay, or if in his or her opinion the report is not valid, must so inform the person who made the report.
- If the supervisor or employer response does not resolve the matter and the worker continues to refuse to carry out the work process or operate the tool, appliance or equipment, the supervisor or employer must investigate the matter in the presence of the reporting worker and in the presence of a worker member of the joint committee,
- If the above investigation does not resolve the matter and the worker continues to refuse to carry out the work process or operate the tool, appliance or equipment, both the supervisor, or the employer, and the worker must notify an officer, who must investigate the matter without undue delay and issue whatever orders are deemed necessary.

- **Occupational First Aid**: The employer must ensure that a person who is designated as a first aid attendant has necessary certification and meets requirements of the Board
- The employer must provide adequate and appropriate equipment, supplies, facilities, first aid attendants and services for first aid, and to transport injured workers for treatment (being more than 20 minutes from a hospital, if LIVFD workplace is determined to be high risk of injury, and 6-10 workers per shift: Level 1 first aid kit, ETV equipment, first aid attendant with level 1 certification and transportation endorsement).
- The employer must conduct an assessment of the workplace circumstances, including
  (a) the number of workers who may require first aid at any time,
  (b) the nature and extent of the risks and hazards, and types of injuries likely to occur,
  (d) any barriers to first aid being provided to an injured worker, and

(e) time that may be required to transport an injured worker to medical treatment.

- The employer must review the assessment annually, or after a significant change.
- First aid equipment, supplies and facilities must be kept clean, dry and ready for use, and be readily accessible at any time a worker works in the workplace.

- **First aid procedures**: The employer must keep up-to-date written procedures for providing first aid at the worksite including
  (a) the equipment, supplies, facilities, first aid attendants and services available,
  (b) the location of, and how to call for, first aid,
  (c) how the first aid attendant is to respond to a call for first aid,
  (d) the authority of the first aid attendant over the treatment of injured workers and the responsibility of the employer to report injuries to the Board,
  (e) who is to call for transportation for the injured worker, and the method of transportation and calling, and
  (f) prearranged routes in and out of the workplace and to medical treatment.
- The employer must post the procedures conspicuously in suitable locations throughout the workplace or, if posting is not practicable, the employer must adopt other measures to ensure that the information is effectively communicated to workers.
- The first aid attendant and all other persons authorized to call for transportation for injured workers must be trained in the procedures.

- **Communication and availability:** The employer must provide an effective means for
  communication between the first aid attendant and the workers, and for the first aid attendant to call for assistance.
- The employer must not assign, and the first aid attendant must not undertake, employment activities that will interfere with the attendant's ability to receive and respond to a request for first aid.

- **First aid records:** The employer must maintain at the workplace for at least 3 years, in a form acceptable to the Board, a record of all injuries and exposures to contaminants covered by the Regulation that are reported or treated.
- First aid records are to be kept confidential and may not be disclosed except as permitted by the Regulation or otherwise permitted by law.
- First aid records must be available for inspection by an officer of the Board.
- Workers may request or authorize access to their first aid records for any treatment or report about themselves.

- **Young and new workers**: An employer must ensure that before a young (under 25 years old) or new worker begins work, they are given health and safety orientation and training specific to that workplace, including
  (a) supervisor name and contact;
  (b) the employer's and worker's rights and responsibilities under the Act and Regulation including reporting of unsafe conditions and right to refuse to perform unsafe work;
  (c) workplace health and safety rules;

(d) hazards to which the worker may be exposed;
(e) working alone or in isolation;
(f) violence in the workplace;
(g) personal protective equipment;
(h) location of first aid facilities and means to summon first aid and reporting incidents;
(i) emergency procedures;
(j) instruction and demonstration of the worker's work task or work process;
(k) the employer's health and safety program;
(l) WHMIS information requirements, as applicable;
(m) contact information for the occupational health and safety committee
(n) additional orientation and training if observation reveals that the worker is not able to perform work safely, or requested by the young or new worker.

- An employer must keep records of all orientation and training

Part 8 Personal Protective Clothing and Equipment:

- A worker is responsible for providing clothing to protect against the natural elements, general purpose work gloves, appropriate safety footwear, and safety headgear.
- An employer is responsible for providing, at no cost to the worker, all other items of personal protective equipment required by this Regulation.
- If an evaluation of workplace conditions is required to determine appropriate personal protective equipment, the evaluation, where practicable, must be done in consultation with the joint committee and with the worker who will use the equipment.
- The employer must ensure that a worker who wears personal protective equipment is adequately instructed in its correct use, limitations and assigned maintenance duties.
- The supervisor must ensure that appropriate personal protective equipment is available to workers, properly worn, and properly cleaned, inspected, maintained and stored.
- A worker who is required to use personal protective equipment must use it in accordance with training and instruction, inspect the equipment before use, refrain from wearing protective equipment outside of the work area where it is required if to do so would constitute a hazard, and report any equipment malfunction to the supervisor or employer.
- A worker who is assigned responsibility for cleaning, maintaining or storing personal protective equipment must do so in accordance with training and instruction provided.
- There are specific regulations regarding headgear, eye and face protection, limb and body protection, footwear, high visibility apparel, buoyancy equipment, and respirators.

Part 11: Fall Protection: regulations to use of fall protection systems (e.g. from ladders) to prevent falls of 3m or more, or when risk of injury from falls is high.

Part 12: Tools, Machinery and Equipment: regulations regarding safe use of tools, machines and equipment, including chain saws.

Part 16: Mobile equipment: regulations regarding mobile equipment, such as ATVs.

Part 17: Transportation

- Vehicles used to transport workers must be designed, maintained and operated in a safe manner, and include seat belts
- If workers are to travel in a worker transportation vehicle, the employer must ensure that (a) reasonable measures are taken to evaluate road, weather and traffic conditions to ensure the safe transit, (b) an inspection of the vehicle by a qualified person before first use on a work shift, and (c) any defect which might affect the safety of workers is corrected before the vehicle is used.
- The operator of a worker transportation vehicle must ensure that the vehicle has been inspected by a qualified person before first use on a work shift.
- The operator must not operate a vehicle in which there is a worker who is not wearing an available seat belt.
- A vehicle used to transport workers must be operated by a driver properly licensed under the provisions of the *Motor Vehicle Act* and, if required, the *Industrial Roads Act*.
- If a vehicle is used to transport workers then: (a) all doors must be closed and latched while the vehicle is in motion; (b) the parking brake must be engaged when the vehicle is left unattended and the wheels blocked or chocked if the circumstances require.
- A worker must not ride in a vehicle standing, unless protected from being thrown off balance, or with any part of the body outside the vehicle unless essential for work, and then only if adequately restrained. Equipment must be secured. The GVWR must not be exceeded. Passenger compartment must be ventilated, have adequate lighting, more than one exit, and communication with operator. A worker must not board or leave a vehicle while it is moving, except in an emergency.

Part 31: Firefighting:

- The employer must ensure the adequate instruction and direction of firefighters in the safe performance of their duties.
- Written procedures must be established and followed by a fire department to
  (a) manage and track firefighters at an emergency incident,
  (b) manage exposure to bloodborne pathogens,
  (c) manage stress arising from an emergency incident that is likely to cause adverse health effect to firefighters,
  (d) provide for effective traffic control at emergency incidents, and
  (e) operate firefighting vehicles during emergency and non-emergency travel.
  (f) operate in specific situations, including firefighting over water, rescue from high angles and water, disaster planning and response; and electrical emergencies.

- The incident commander must make suitable provision for rest and rehabilitation for firefighters at an emergency incident.
- If, in the course of an emergency incident, a firefighter suffers serious injury or death, or is involved in an accident involving a risk of serious injury or death, the

senior firefighter present must immediately impound the protective and other equipment used by the firefighter and keep the equipment out of service until released by the Board.

- The employer must, without delay, notify the Board of any structural failure or manufacturing defects detected in a firefighting vehicle, apparatus, or other emergency equipment referred to in this Part.
- The employer must keep the test and inspection records required by this part available at the workplace for inspection by an officer or the joint committee or worker health and safety representative, as applicable.

- **Personal Protective Clothing and Equipment**: Firefighters must wear personal protective clothing and equipment appropriate to the hazards to which they may be exposed.
- The employer must have written procedures for the inspection, cleaning and drying of protective clothing and equipment at regular intervals, and defective items must be repaired or replaced.
- Firefighters must ensure that the personal protective clothing and equipment used by them is maintained in good condition.
- Safety headgear must be worn by firefighters required to approach the seat of a fire or enter a structure or other hazardous area during an incident. Safety headgear must meet the requirements of NFPA 1972. Headgear meeting the requirements for safety headgear in Part 8 may be used by firefighters (a) while determining the cause of fires, or carrying out duties associated with preventing fires, or (b) at the discretion of the incident commander, while fighting a fire in vegetation that is not within a structure.
- Firefighters required to approach the seat of a fire or enter a structure or other hazardous area during an incident must
  (a) wear protective coats, pants and hoods meeting the requirements of NFPA 1971 or CGSB Standard CAN/CGSB-155.1-M88.
  (b) not wear shirts, trousers, jackets or coveralls that have poor thermal stability or that ignite easily.
  (c) wear gloves meeting the requirements of NFPA 1973.

- **Respirators:** Firefighters who may be exposed to an oxygen deficient atmosphere or to harmful concentrations of air contaminants must wear a self-contained breathing apparatus of a positive pressure type having a rated minimum duration of 30 minutes.
- Respirator use is subject to Personal Alert Safety System, health requirements, operation, fit, entry into buildings, air quality, spare equipment, maintenance and records

- **Transportation:** Firefighters transported by firefighting vehicles must ride in properly secured seats equipped with seat belts, headrests and other whiplash protection (if vehicle ordered after 1998), and with at least 41 cm seating width per occupant.
- Crew cabs on firefighting vehicles must have an effective means of voice communication between the driver and passengers.
- Enclosed crew cabs must be equipped with interior lights, and adequately ventilated.
- All equipment on a firefighting vehicle must be adequately secured.

- A firefighting vehicle must not be moved if the driver's vision is obscured, except on a signal from a designated person, who must ensure that the vehicle can be moved safely.
- Unless air monitoring shows that levels of vehicle exhaust gas components are below the exposure limits established under the Regulation, effective local venting for the exhaust gases must be provided in vehicle areas in firehalls.

- **Aerial Devices and Ground Ladders:** aerial devices must meet the requirements of NFPA 1904, must be inspected and tested at least every 12 months in accordance with NFPA 1913, and must be fitted with a device to lock it in position.
- During operation of an aerial device, an operator must be present a lower controls and in sight of, and in voice contact with, any firefighters on the device.
- Ground ladders used for firefighting must meet the requirements of NFPA 1931, and be used, tested and maintained in accordance with NFPA 1932.

- **Flashlights and hand lanterns:** Battery operated flashlights and hand lanterns that are CSA approved for hazardous locations classified under the CSA Standard C22.1-94, Canadian Electrical Code Part 1, as Class 1, Division 2, Groups A, B, and C must be provided as follows:
  (a) one flashlight for each firefighter;
  (b) at least 4 hand lanterns for each firefighting vehicle.

- **Plaster hooks and pike poles:** Plaster hooks and pike poles must be fitted with electrically non-conductive shafts.

Appendix C.3 Freedom of Information and Protection of Privacy Act and Local Mapping for Locating and Responding to Incidents

The following was taken primarily from:

- Freedom of Information and Protection of Privacy Act (available at http://www.bclaws.ca/EPLibraries/bclaws_new/document/ID/freeside/96165_00)
- Privacy and Access in BC, presentation by J. Van Den Bulk, Min. Labour, Citizens' Services and Open Government, March 28, 2011 (available at https://www2.viu.ca/foipop/documents/privacy-and-access-in-bc.pdf)
- FOIPPA Policy & Procedures Manual (available at http://www2.gov.bc.ca/gov/content/governments/services-for-government/information-management/privacy/resources/foippa-manual)
- Privacy Impact Assessments (available at http://www2.gov.bc.ca/gov/content/governments/services-for-government/information-management/privacy/privacy-impact-assessments)

What is the Freedom of Information and Protection of Privacy Act (FIPPA)?

A provincial statue that applies to all records in the custody, or under the control of, a public body.

FIPPA specifies rights of public access to information (freedom of information), rights of individuals to access and request correction of personal information about themselves, and requirements to prevent unauthorized collection, use or disclosure of personal information (protection of privacy).

Local mapping: The most relevant aspects regard requirements for collection, storage, use, disclosure, security and retention of personal information.

What is personal information?

"Personal information" means recorded information about an identifiable individual other than (business) contact information

Foundation of privacy: an individual's personal information is their own and, to the extent possible, the individual controls how their personal information is collected, used and disclosed.

By the Code of Fair information practices, an individual

(i) Understands the purpose for which the information was collected
(ii) Knows who to contact for queries re: collection, use and disclosure
(iii) Directly provides personal information, or authorizes indirect collection of personal information
(iv) Is protected from un-authorized access or disclosure of personal information
(v) Only provides information that is necessary for program
(vi) Information is only retained for as long as necessary
(vii) Understands and consents to record linkages
(viii) Has access to own personal information

(ix) Can request corrections and updates to own information

The Code of Fair Information practices places limits on collection, use and disclosure of personal information, and requires accuracy and completeness, access, correction, reasonable security and retention of records.

Local mapping: GPS and map data of roads, structures, ponds, waypoints, etc. are not by themselves personal information. People names and phone numbers are personal information. Joining names to map locations is personal information.

Define purpose of program or activity that needs personal information

It is important to define the purpose for collecting and using personal information, and limit collection and use of personal information to the minimum needed. A public body may only collect, use or disclose personal information for authorized purposes.

Local mapping: Purpose: to identify locations of structures for fire and medical emergencies. Need map and GPS data on structures, roads, ponds. Need to identify structure associated with a resident's name (and possibly telephone number).

Collection (s.26, 27)

Personal information can only be collected if authorized under an act, for law enforcement or it is related directly to and necessary for a program or activity that is operating or being planned and evaluated.

Information must be collected directly from the individual except in limited circumstances (e.g. the individual consents to another method of collection).

The individual must be notified of the purpose, legal authority and who to contact with questions, except in limited circumstances (e.g. if the information is not collected directly from the individual the information is about).

Local mapping: Collecting GPS and mapping information is related directly to emergency response, and necessary for effective operation. Names in the mapping database (KML file) must be collected either directly from the residents, or indirectly with consent. Collecting names requires notification.

Accuracy, completeness and correction (s.28, 29)

Every reasonable effort must be made to ensure that personal information is accurate and complete.

People have the right to request correction of personal information.

Local mapping: GPS data will be used to identify structure, pond, road and waypoint locations. These will be adjusted (reconciled) to match Google Earth imagery. The goal is to be as accurate and complete as possible, and so corrections would be welcomed.

Storage and security (s.30, 30.1)

Reasonable security arrangements must be made to protect personal information against risk of unauthorized access, collection, use, disclosure or disposal. These should be appropriate and proportional to the sensitivity of the personal information

Strict policies should be set for security, retention and destruction of personal information

Storage and access must be in Canada.

Safeguards should include physical measures, technological (e.g. passwords) and policies for keeping records secure.

Limit access to “need to know”.

Local mapping: Storage on devices used by dispatchers, responders and mapping volunteers. Devices, whether owned by LIVFD or not, should be password protected. An item could be added to the non-disclosure agreement signed by LIVFD members stating that the mapping location information will be used only for emergency response, and will not be disclosed except as required by law. Decisions about disclosure would be done by the Fire Chief.

Retention (s.31)

At least 1 year if used to make a decision that directly affects the individual.

Local mapping: If use is terminated, keep for 1 year afterwards.

Use (s.32)

Personal information may only be used

(i) for the purpose for which it was obtained or compiled or for a consistent purpose (reasonable connection to the original purpose and is necessary to perform the duties of, or for operating a legally authorized program)
(ii) if the individual has consented to its use, or
(iii) for a purpose for which the personal information has been disclosed to it under the Act.

Local mapping: For use only by LIVFD members for locating incidents.

Disclosure (s.33, 33.1, 33.2)

Personal information may be disclosed only in limited circumstances (e.g. in accordance with FOI, consent, for the purpose for which is was obtained or compiled, if an enactment authorizes disclosure, to comply with a subpoena, warrant or order). Based on need to know.

Local mapping: Disclosure outside LIVFD only if required by law. Disclosure to LIVFD members as part of use, as the information would be necessary for the service.

Access (Freedom of Information, FOI; Part 2)

The public has a right to request any record in the custody or control of a public body, including the right to seek access to personal information about themselves.

Disclosure should be the rule, not the exception, but right of access is limited by exceptions to disclosure (e.g. if disclosure would be harmful to personal privacy).

Local mapping: Non-personal information includes documents describing the mapping system and its use and management. Requests for personal information by third parties would be denied unless required by law.

Information Incidences

Information incidences are all unauthorized events that threaten the privacy or security of information, including accidental or deliberate collection, use, disclosure, disposal, storage, or access to personal information not authorized by FIPPA.

No proceeding may be brought against a public body, the head of a public body, an elected official of a public body or any person acting on behalf of or under the direction of the head of a public body for damages resulting from

(i) the disclosure, or failure to disclose, in good faith of all or part of a record, or any consequences of that disclosure or failure to disclose, or
(ii) the failure to give any notice required if reasonable care is taken to give the required notice.

Local mapping: Establish reasonable policy, procedures and training that aim to prevent information incidents.

Privacy Impact Assessment (s. 69(5.3))

A Privacy Impact Assessment (PIA) needs to be done for new projects or if there are significant changes to a project.

A PIA is a process used to evaluate and manage privacy impacts and to ensure compliance with privacy protection rules and responsibilities.

A PIA can make the difference between an initiative that invades privacy and one that enhances it.

Local mapping: The mapping sub-group will work in a draft PIA, which will clarify

- purpose of mapping data collection and use
- data storage, security and disposal
- if and how information would be disclosed
- prevention of unauthorized collection, use or disclosure of personal information

Appendix D. PRRD Legal Opinion Regarding Minimum Dispatch Service Requirements

YOUNG ANDERSON
BARRISTERS & SOLICITORS

Appendix A

REPLY TO: VANCOUVER OFFICE

VIA EMAIL: ryan.thoms@powellriverrd.bc.ca

February 24, 2015

RECEIVED
FEB 24 2015
POWELL RIVER
REGIONAL DISTRICT

Ryan Thoms
Manager of Emergency Services
Powell River Regional District
202 - 4675 Marine Avenue
Powell River, BC V8A 2L2

Dear Mr. Thoms:

Re: Lasqueti Fire Protection Service Liability
Our File No. 00042-0194

Further to your email of Monday, February 16 and our telephone discussion on Thursday, February 19, 2015, we write to confirm our verbal advice. We will provide you with a brief summary of our advice in this letter, but attach our legal memorandum which has more details that you may find helpful.

In short, you have asked what liability does the PRRD take on if it does not meet dispatch standards for its Lasqueti Island volunteer fire service ("LVFD") and to whom does that liability extend? These concerns result from Telus discontinuing its pager service as of March 31, 2015 which is the current basis for LVFD dispatch service. Our advice, in summary form, follows.

1. PRRD Bylaw No. 391 establishes the LVFD. Section 12 of the bylaw provides the Fire Chief is to maintain responsibility for items in Schedule "D". Schedule "D" includes preparation of specifications for new and existing communication systems which are to be compatible with North Island 9-1-1 dispatch services and the maintenance of the communications systems of the department. Since Telus is withdrawing the current dispatch system, the Fire Chief is obligated to pursue a new communication system. The most clearly compatible system would be the use of the North Island 9-1-1 dispatch service. Under the current wording of the bylaw, implementing a service less than North Island 9-1-1 standard would leave the PRRD exposed to liability.

2. The Courts have recognized negligence claims against local governments for negligent dispatch of emergency services. In your case, as the LVFD is not a legal entity capable of being sued, the PRRD would be the appropriately named entity in any lawsuit. It is also

the PRRD's service as set out in Bylaw No. 391. As such, it is the PRRD, as a whole, that would bear any liability for a negligence claim related to fire dispatch services and not the LVFD or Electoral Area "E".

3. As a matter of policy, the PRRD Board does have latitude to amend Bylaw No. 391 if it wishes to change the dispatch services to Lasqueti Island. By doing so, the Board could enact presumably a lower or different standard for fire dispatch on Lasqueti Island. Although legally this may be achieved, it is not apparent what this alternative service would entail. Until understanding those details, it is hard to advise the PRRD if it could eliminate its liability in this regard as the dispatch standard still must meet some customary regional standards. Further, as the PRRD has the 2008 Fire Underwriter's Survey recommending a 9-1-1 service, it is hard to ignore this earlier expert advice in the face of the Telus withdrawal.

We encourage you to examine the attached legal memorandum for additional detail but we trust this summary is of assistance.

Please do not hesitate to call if we can provide additional assistance.

Yours truly,

YOUNG ANDERSON

Reece Harding
harding@younganderson.ca

RH/mw

Enc(s)

YOUNG ANDERSON
BARRISTERS & SOLICITORS

Memorandum

Privileged & Confidential

TO:	File
FROM:	Michael Moll/Reece Harding
DATE:	February 24, 2015
RE:	Fire Protection Dispatch Service
FILE No.:	42-194

Issue: The Powell River Regional District ("PRRD") provides a volunteer fire protection service within Lasqueti Island in Electoral Area "E" (the "LVFD"). As of the end of March, 2015, the LVFD will no longer be able to use a pager-based emergency fire call system, because Telus is withdrawing the service.

With this withdrawal of service, what is the minimum dispatch service that the LVFD must provide? Can the LVFD use a dispatch service that differs from "North Island 9-1-1"? If the LVFD does or fails to do something that constitutes the negligent provision of a fire protection service, who bears the liability?

Short answer: The bylaw currently applicable to the LVFD effectively requires the LVFD to adopt or otherwise become compatible with North Island 9-1-1 service. The Board of the PRRD may, as a matter of policy, modify this requirement to a different standard although we are unclear what realistic options are available to the Board outside the North Island 9-1-1 service. In implementing a dispatch service, if the LVFD does do something, or fails to do something, that constitutes negligence, the PRRD will be liable for the resultant claim.

ANALYSIS

This memo considers the minimum dispatch service that the LVFD must currently provide, whether it can pursue a different standard of service, and what parties may be liable for negligence related to the provision of that service.

What is the Minimum Dispatch Service the LVFD Must Provide?

Once the pager-systems ends, the minimum dispatch service required by the LVFD is very likely a 9-1-1 service. The standard of service is determined by identifying a duty of care created by the service's establishing bylaw and considering the standard of care that applies to the duty. The writers were unable to identify any statute or regulation that prescribes a level of dispatch service, although the *Emergency Communications Corporations Act* allows local governments to become members of a corporation that provides for such service. North Island 9-1-1 is an emergency communications system under this Act. This standard of service is therefore defined by the duty imposed or implied by LVFD's establishing bylaw when considered with regional practices.

PRRD Bylaw No. 391 establishes the LVFD. Implicit in the creation of any fire department is some duty to be called and to respond to at least some fires, and that the fulfilment of this duty requires some mechanism by which the service can be dispatched. Although some local governments seek to create services such as building inspection services that owe no duty of care to private property owners, a fire protection service imposes some duty to respond to fires (*British Columbia v Canadian Forest Products Ltd*).

Absent any governing enactment, the implicit standard of dispatch service under this duty would be that which is customary. This implicit duty and these standards can be modified by bylaw, however in the case of Bylaw No. 391, the Board has made some prescriptions regarding dispatch. Section 12 of the bylaw provides that:

> *The Fire Chief has the responsibility for ensuring that the items listed in Schedule "D" to this bylaw are included as regular administrative functions for the Fire Department.*

Schedule "D" to the bylaw lists the following administrative functions under the heading "Communications":

- *Maintenance of alarms and dispatch apparatus in proper working order.*
- *Preparation of specifications for new communication systems and additions to existing communication systems which are compatible with NI911 dispatch services.*
- *Maintenance of the communication systems of the Department.*

The establishment of these 'administrative functions' effectively direct the Fire Chief to both maintain the current "dispatch apparatus" and "communication systems" but to also prepare new and additional communication systems that are compatible with the North Island 9-1-1 dispatch service. Read purposefully, Bylaw No. 391 creates a duty to provide a communication and dispatch service for LVFD fire protection services and prescribes some standards for the Fire Chief to apply. The Fire Chief's ability to implement this service may be limited in a practical

sense if the Board has not currently resolved to allow its membership in North Island 9-1-1 to include the LVFD within that service.

Since Telus is withdrawing the current dispatch system, the Fire Chief is obliged to pursue a new communication service. There may be some factual question as to what range of dispatch services can be considered "compatible" with North Island 9-1-1, however the most clearly compatible service is to pursue to use of North Island 9-1-1 dispatch service.

Can the Board Prescribe a Different Standard of Dispatch Service?

The current minimum dispatch service requirements flow from Bylaw No. 391 when it is read with consideration to standard requirements. The Board may prescribe or allow different dispatch methods, but must do so in a manner that is clearly the imposition of a policy decision regarding the standard of service. Given that Bylaw No. 391 currently sets the standard as current system or North Island 9-1-1, this would require amendment to Bylaw No. 391.

The Board does have the discretion to select, as a matter of policy, a form of dispatch service that is of lower standard than typical 9-1-1 although that should be done carefully. In the case of volunteer fire departments, there is no minimum level of service provision. The B.C. Court of Appeal has found that the duty of care for a volunteer fire department and its members is that "with the resources available to them, they will do their best to put the fire out." (*British Columbia v Canadian Forest Products Ltd.)* The amount of resources made available to a volunteer fire department is a policy decision of the PRRD. Policy decisions based on budgetary and public policy considerations are protected and immune from tort liability, whereas the operational implementation of a policy decision is not exempted from the legal requirements of a duty of care (*Meghji v Lee*).

If the Board considered it in the public interest, it could equip the LFVD at a level that is different from that of other volunteer fire departments. There is no statutory requirement that an Electoral Area be served with a fire department, and the Court will not interfere with the level of service prescribed by the Board so long as the decision is reasonable. The LVFD must, however, implement the level of service to the standard required by whatever duty the Board assigns to it.

The Board can, as a matter of policy, specify or allow the Fire Chief to choose a different type of dispatch service. To do this, the Board would need to do two things. First, Bylaw No. 391 would need to be amended to remove the Fire Chief's obligation to maintain the current communication system and pursue new North Island 9-1-1 compatible upgrades. Second, the Board should adopt a policy, whether by resolution or bylaw, that sets outs its decision on what standard of dispatch service should be provided. This will, in effect, confirm a limitation of the "resources available" compared to other LVFD.

Although as legal advisors we cannot evaluate the cost-benefits of various alternatives to 9-1-1, our advice can be that the Board may consider alternative dispatch services. We note in saying this that it is not apparent to us what such dispatch services would be. We also note that in 2008, the Fire Underwriters Survey recommended a 9-1-1- dispatch service to Lasqueti Island. In the face of this recommendation, again, we do not know what alternatives are realistically available to the PRRD.

Who will be Liable if the LFVD is Negligent in Implementing a Dispatch Service?

The Courts have recognized a claim of negligence related to the dispatch of emergency services (*Cragg v Tone; Bayus v Coquitlam (City)*). The claim is not particularly easy to prove, but liability could arise if the Fire Chief fails to administer a communications and dispatch system to that required by bylaw and Board policy and a person suffers loss because of the substandard service.

In such cases, the legal entity that will be liable is the PRRD. The LVFD is not a legal entity and therefore cannot be named as a party in a lawsuit. The Electoral Area director, the Fire Chief or volunteers operating the LVFD can certainly be named as a party to a lawsuit, but the *Local Government Act* provides that these individuals should not be sued for claims relating to the operation of the LFVD unless that particular person caused the loss through malice or gross negligence. Even in such rare cases, the PRRD is likely also to be sued and to be sued and liable to pay all damages.

It is notable that the *Emergency Communications Corporations Act* provides statutory immunity to "protected persons" under the Act. Protected persons include the communications corporation and its employees, but does not include the member municipality. If the Board, as a matter of policy, decides to join North Island 9-1-1, the total potential exposure to liability for the operation of a dispatch service is significantly lower than if the LVFD operates the entire dispatch service itself. Liability may still arise however, for example if North Island 9-1-1 communicates an emergency call to the LVFD and the LVFD response to that communication is negligent and causes loss.

[END]

Appendix E. Regional District Governance Issues

Appendix E.1 Lasqueti Island Fire Protection Service Establishment Bylaw No. 341, 2001

POWELL RIVER REGIONAL DISTRICT

BYLAW NO. 341

****

Being a bylaw to convert and amend the powers of the Lasqueti Island Fire Protection Specified Area

****

WHEREAS under Section 774.2 of the *Local Government Act* a regional district having the power to provide a continued service may adopt a bylaw which converts the service to one exercised under the authority of an establishing bylaw and amends the power to the extent that it could if it were, in fact, exercised under the authority of an establishing bylaw and which:

(a) meets the requirements of Section 800.1 for an establishing bylaw, and

(b) is adopted in accordance with the requirements of Section 802 as if it were a bylaw amending an establishing bylaw.

AND WHEREAS the Board of the Powell River Regional District previously adopted "Lasqueti Island Fire Protection Area Establishment Bylaw No. 50, 1976" which established a specified area for the provision of fire protection within a portion of Electoral Area E.

AND WHEREAS the Board of the Powell River Regional District wishes to convert the aforesaid specified area to a service area and to amend the powers exercised under the bylaw by:

- increasing the maximum annual amount that may be requisitioned for the service from the current rate of $0.304/$1000 to $1.05/$1000 of net taxable value of land & improvements; and
- amending the cost recovery method to allow a portion of the annual requisition to be collected by a parcel tax.

AND WHEREAS the director for electoral area E has consented to the adoption of the bylaw in accordance with Section 801.5 of the *Local Government Act*;

NOW THEREFORE the Regional Board of the Powell River Regional District, in open meeting assembled, enacts as follows:

1. The service created under Bylaw No. 50, cited as the "Lasqueti Island Fire Protection Area Establishment Bylaw No. 50, 1976" is hereby established as a fire protection service for that portion of Electoral Area "E" shown outlined on the plan attached as Schedule A to this bylaw.

2. The costs of providing the service established under Section 1 shall be recovered by requisition of money to be collected by:

   a) property value taxes based on the net taxable values of land and improvements in the service area; and
   b) parcel taxes.

3. The annual amount to be collected by parcel taxes shall not exceed $30,000.

4. The maximum amount that may be requisitioned for the service shall be $1.05/$1000 of net taxable value of land and improvements in the service area;

5. This Bylaw may be cited as the "Lasqueti Island Fire Protection Service Establishment Bylaw No. 341, 2001".

READ A FIRST TIME this **25th** day of **January**, 2001.

READ A FIRST TIME this **25th** day of **January**, 2001.

READ A THIRD TIME this **25th** day of **January**, 2001.

RECEIVED THE APPROVAL OF THE INSPECTOR OF MUNICIPAL AFFAIRS this **14th** day of **March**, 2001.

RECONSIDERED AND ADOPTED this **22nd** day of **March**, 2001.

L. S. Palmer
Chairman

Administrator

I HEREBY CERTIFY that the foregoing is a true and correct copy of Bylaw No. 341 cited as the "Lasqueti Island Fire Protection Service Establishment Bylaw No. 341, 2001" as RECONSIDERED AND ADOPTED by the Board of the Powell River Regional District on the **22nd** day of **March**, 2001.

Dated this **23rd** day of **March**, 2001.

Administrator

Appendix E.2 Lasqueti Island Volunteer Fire Department Operations Bylaw No. 391, 2005

POWELL RIVER REGIONAL DISTRICT

BYLAW NO. 391

****

Being a bylaw to provide for the operation of the Lasqueti Island Volunteer Fire Department.

****

WHEREAS the Powell River Regional District Board has by bylaw established a local service area within Electoral Areas "E" (Lasqueti Island) of the Powell River Regional District;

The Board of the Powell River Regional District in open meeting assembled enacts as follows:

1. In this bylaw:

"Apparatus"	means any vehicle provided with machinery, devices, equipment, or materials for fire fighting, rescue, or other incidents as well as vehicles used to transport firefighters or supplies;
"Board"	means the Board of the Powell River Regional District;
"Equipment"	means any tools, contrivances, devices, or materials used by the Fire Department to combat an incident or other emergency;
"Fire Chief"	means the person appointed by the Board as head of the Fire Department;
"Fire Protection"	means all aspects of fire safety including but not limited to fire prevention, fire fighting or suppression, pre-fire planning, fire investigation, public education and information, training or other staff development and advising;
"Incident"	means a fire or a situation where a fire or explosion is imminent and includes assistance response circumstances described in Section 10 of this bylaw;
"Lasqueti Fire Protection Area"	means that area as outlined in heavy black in Schedule "A" to this bylaw;
"Member"	means any person appointed by the Fire Chief as a Member of the Fire Department and includes volunteer firefighters;
"Peace Officer"	has the same meaning as peace officer under the Interpretation Act, but does not include bylaw enforcement officers of any municipality or regional district.

FIRE DEPARTMENT ESTABLISHED

2. The Fire Department known as the Lasqueti Island Volunteer Fire Department [LIVFD] is established and shall operate in accordance with the provisions of this bylaw.

APPOINTMENT OF FIRE CHIEF

3. The Fire Chief shall be appointed by a resolution of the Board and shall be deemed an officer of the Regional District.

APPOINTMENT OF MEMBERS

4. a) The Fire Chief may appoint members and when appointed, the member shall be a volunteer fire fighter of Lasqueti Island Volunteer Fire Department.

   b) The Fire Chief may appoint other members of the Fire Department to act as Fire Chief on his behalf.

   c) The Fire Chief may appoint other members to act as officers of the Fire Department and shall assign responsibility and duties to be carried out by each officer position.

5. a) All persons issued a letter in the form substantially as set out in Schedule "B" attached to this bylaw are appointed members of the Lasqueti Island Volunteer Fire Department.

   b) All new members shall be subject to a 90 day probation period to permit the Fire Chief to assess the candidate's suitability for work as a fire fighter. Any person who, in the opinion of the Fire Chief, is unsuitable for the position of volunteer fire fighter, may be discharged without notice.

6. a) The appointment of a member may be terminated by:

      (i) notice in writing given by the member;

      (ii) notice in writing from the Fire Chief in the form substantially as set out in Schedule "C" to this bylaw.

   b) The Fire Chief shall maintain a record of all notices issued under clause 6(a)(ii) and all associated documentation.

   c) Where the appointment of a member has been terminated under section 6(a)(ii):

      (i) the Fire Chief shall submit a written report on the termination to the Regional District Administrator;

(ii) the member terminated shall have the right to appeal the termination by submitting a written notice of appeal stating the grounds for the appeal to the Regional District.

7. a) The Fire Chief shall maintain a roster of all current members, which clearly identifies the members' seniority and rank.

b) When the appointment of a member is terminated the roster shall be adjusted to exclude that member.

QUALIFICATIONS

8. a) All members must possess the following qualifications:

i) at least 19 years of age;

ii) hold a valid B.C. driver's licence;

iii) good character;

iv) successful completion of such aptitude and other tests as may be required by the Board or the Fire Chief;

v) medical fitness and a level of eyesight acceptable to the Fire Chief.

b) All members shall be subject to an RCMP criminal record check.

JURISDICTION

9. The jurisdiction of the Fire Chief and the members of the Fire Department extends to the Lasqueti Island Fire Protection Area and no part of the fire Apparatus shall be used beyond the Lasqueti Island Fire Protection Area without:

a) the express authorization of a written contract or agreement entered into by the Regional Board providing for the supply of fire fighting, rescue, or first responder services outside the Lasqueti Island Fire Protection Area; or

b) the written approval of the Regional Board.

AUTHORITY OF FIRE CHIEF

10. The Fire Chief has complete responsibility and authority over the Fire Department, subject to the direction and control of the Board, and in particular he may carry out, or direct his members to carry out, all fire protection activities including but not limited to:

a) first response medical emergencies;

b) rescue operations;

c) mutual aid to fire services including Ministry of Forests;

d) response to hazardous material incidents;

e) public services.

11. Subject to the approval of the Board, the Fire Chief, in consultation with members, may establish rules, regulations, policies and committees necessary for the proper organization and administration of the Fire Department including but not limited to:

a) use, care and protection of Fire Department property;

b) the conduct and discipline of members of the Fire Department; and

c) efficient operation of the Fire Department.

12. The Fire Chief has the responsibility for ensuring that the items listed in Schedule "D" to this bylaw are included as regular administrative functions for the Fire Department.

13. The Fire Chief, or in his absence, the senior ranking member present, shall have control, direction and management of all Fire Department Apparatus, Equipment or manpower assigned to an Incident and, where a member is in charge, they shall continue to act until relieved by a senior member or officer.

14. The Fire Chief shall take responsibility for all Fire Protection matters including the enforcement of the "Fire Services Act" and regulations thereunder.

15. Members of the Fire Department shall carry out the duties and responsibilities assigned by the Fire Chief and the Fire Chief shall report to the Board on the operations of the Fire Department or on any other matter in the manner designated by the Board.

16. The Fire Chief may obtain assistance from other officials as he deems necessary in order to discharge his duties and responsibilities under this bylaw.

17. The Fire Chief or the member in charge of an Incident may request persons who are not members to assist in whatever manner he considers necessary to deal with the Incident including removing furniture, goods and merchandise from any building on fire or in danger thereof and in guarding and securing same and in demolishing a building or structure at or near the fire or other Incident.

18. The Fire Chief or the member in charge of an Incident is authorized to commandeer privately owned equipment which they consider necessary to deal with an Incident.

INSPECTIONS

19. The Fire Chief or any member of the Fire Department authorized by the Fire Chief, may at any reasonable time enter any premises for the purposes of fire prevention inspections and it is an offence under this bylaw to obstruct such an inspection.

DESTRUCTION OF BUILDINGS

20. The Fire Chief, or any other member in charge at a fire is authorized to cause a building, structure, or thing to be pulled down, demolished, or otherwise removed if they deem it necessary to prevent the spread of fire to other buildings, structures or things.

AUTHORITY TO ENTER

21. The Fire Chief or any other member in charge at an Incident is authorized to enter premises or property where the Incident occurred and to cause any member, apparatus, or equipment of the Fire Department to enter as they deem necessary, in order to combat, control, or deal with the Incident. The Fire Chief, or the member in charge at an Incident is authorized to enter, pass through or over, buildings or property adjacent to an Incident and to cause members, apparatus, or equipment of the Fire Department to enter or pass through or over, buildings or property where they deem it necessary to gain access to the Incident or to protect any person or property.

FIRE BOUNDARIES

22. The Fire Chief, or the member in charge at an Incident may at their discretion establish boundaries or limits to keep persons from entering the area within the prescribed boundaries or limits unless authorized to enter by the Fire Chief or member.

23. No person shall enter the boundaries or the limits of an area prescribed in accordance with section 21 unless they have been authorized to enter by the Fire Chief or the member in charge.

24. The Fire Chief, or the member in charge at an Incident may request peace officers to enforce restrictions on persons entering within the boundaries or limits outlined in section 21.

25. No person at an Incident shall impede, obstruct, or hinder a member of the Fire Department or other person assisting or acting under the direction of the Fire Chief or the member in charge.

26. No person shall damage or destroy, or obstruct, impede or hinder the operation of any Fire Department Apparatus or Equipment.

27. No person at an Incident shall drive a vehicle over any Equipment without permission of the Fire Chief or the member in charge.

28. No person shall falsely represent themself as a Fire Department member.

29. No person shall obstruct or otherwise interfere with access roads or streets or other approaches to any emergency, incident, fire hydrant, cistern or body of water designated for fire fighting purposes.

PENALTIES

30. Every person who violates any of the provisions of the bylaw, or who suffers or permits any act or thing to be done in contravention or in violation of any of the provisions of this bylaw, or who neglects to do or refrains from doing any thing required to be done by any of the provisions of this bylaw, or who does any act or thing or omits to do any act or thing thus violating any of the provisions of this bylaw, shall be deemed to have committed an offence and upon summary conviction is liable to imprisonment for a term of not more than six months or to a fine of not more than $2,000.00 or to both fine and imprisonment.

REMUNERATION

31. The Board shall determine the remuneration of all Members of the Fire Department, by policy set from time to time.

CITATION

32. Lasqueti Island District Fire Bylaw No. 266, 1994 is hereby rescinded.

33. This bylaw may be cited for all purposes as the "Lasqueti Island Volunteer Fire Department Operations Bylaw No. 391, 2005".

READ A FIRST TIME this **27th** day of **October**, 2005.
READ A SECOND TIME this **27th** day of **October**, 2005.
READ A THIRD TIME this **27th** day of **October**, 2005.
RECONSIDERED, ADOPTED AND FINALLY PASSED this **27th** day of **October**, 2005.

L. L. Palmer
Chairman

Administrator

I hereby certify the above to be a true and correct copy of Bylaw No. 391 cited as the "Lasqueti Island Volunteer Fire Department Operations Bylaw No. 391, 2005" as RECONSIDERED and ADOPTED by the Board of the Powell River Regional District at its meeting dated this **27th** day of **October**, 2005.

Frances Ladret, Administrator

Dated this **28th** day of **October**, 2005.

SCHEDULE "A"

Map of Lasqueti Island Fire Protection Area

The map of the Lasqueti Island Fire Protection Area is the same as that for Bylaw No. 341 - Lasqueti Island Fire Protection Local Service Area Establishment.

SCHEDULE "B"

APPOINTMENT OF MEMBERS

(Fire Department or Regional District letterhead)

Date:

(NAME)

(ADDRESS)

You are hereby appointed as a volunteer member of the Lasqueti Island Volunteer Fire Department effective _____. You are subject to all applicable provisions of Bylaw No. 391, attached. Please read it carefully.

All new Members are subject to a 90 day probation period to permit the Fire Chief to assess the candidate's suitability for work as a fire fighter. Any person who, in the opinion of the Fire Chief, is unsuitable for the position of volunteer fire fighter, may be discharged without notice.

You will remain a member of the volunteer detachment of the fire department until your appointment is revoked in writing.

Please confirm your agreement by signing the enclosed copy of this letter and returning it to my attention.

Sincerely,

Fire Chief
Lasqueti Island Volunteer Fire Department

_____ _____

Volunteer Member Date

SCHEDULE "C"

NOTICE OF TERMINATION

(Fire Department or Regional District letterhead)

HAND DELIVERED

(date)

(NAME)

(ADDRESS)

Your appointment as a volunteer member of the Lasqueti Island Volunteer Fire Department is hereby revoked effective _____.

Please acknowledge receipt of this letter by signing the copy of this letter.

Sincerely,

Fire Chief
Lasqueti Island Volunteer Fire Department

_____ _____
Volunteer Member Date

This letter has been issued and signed in duplicate, one copy for the member terminated and one copy to be kept on file by the Fire Chief.

SCHEDULE "D"

FIRE DEPARTMENT ADMINISTRATIVE RESPONSIBILITIES

Administration

- Preparation of the general administrative duties of the Department.
- Preparation of the annual budget and 5-year financial plan of the Department for Board review.
- Development and maintenance of a longterm capital expenditure program which addresses requirements for vehicles, equipment, apparatus and buildings.
- Purchase of goods and services authorized in the annual budget in accordance with Regional District purchasing policy.
- Appointment of members. Maintenance of current membership roster.
- Maintenance of personnel and attendance records.
- Maintenance of fire-loss records and maintenance of other records required bythe Regional District.
- Preparation of the annual report of the Department.
- Investigations of fires to determine cause, origin and circumstances, and where appropriate, notify the authority having jurisdiction to conduct an investigation.
- Liaison with water system operators to ensure adequate maintenance of water works for the use of the Department.
- Development and maintenance of Operational Guidelines consistent with WCB regulations.

Communications

- Maintenance of alarms and dispatch apparatus in proper working order.
- Preparation of specifications for new communication systems and additions to existing communication systems which are compatible with NI911 dispatch services.
- Maintenance of the communication systems of the Department.

Equipment and Apparatus

- Preparation of specifications for the purchase of apparatus and equipment as provided for in the annual budget.

- Maintenance of all buildings and fire-fighting, rescue and salvage apparatus of the Department.

- Responsibility for recharging fire-fighting extinguishers and cylinders and for testing and repairing hose on regular basis.

- Provision to members of personal protective clothing and equipment to meet WCB standards.

Training

- Training for all Department personnel in fire administration, fire prevention and fire fighting.

- Examinations of members as required by the Chief.

Fire Prevention

- Conduct fire prevention and familiarization inspections of premises.

- Receipt and processing of reports of fire-prevention inspections.

- Assistance in obtaining necessary approvals from fire commissioner, etc.

Appendix E.3 Bill C-45 and Regional District Services

The following was taken primarily from:

- Bill C-45 Plain Language Guide (available at http://www.justice.gc.ca/eng/rp-pr/other-autre/c45)
- Bill C-45 Overview (available at www.ccohs.ca/oshanswers/legisl/billc45.html)

Bill C-45 and Criminal Liability

Bill C-45 amended the Canadian Criminal Code in 2004 to enable the Crown to apply criminal liability to organizations (including regional districts). *Bill C-45 deals only with the criminal responsibility of an organization and makes no change in the current law dealing with the personal liability of directors, officers and employees*. Directors and officers, like anyone else, are liable for all crimes that they commit personally, whatever the context. What is new is that Bill C-45 allows an organization itself to potentially be held responsible when criminal liability is committed in the context of the organization.

To prove criminal liability in general requires showing that (i) the accused committed a prohibited act (i.e. broke laws), and (ii) the accused had a "guilty state of mind" in committing the offence (e.g. knowledge of wrongdoing, intent to mislead, gross negligence). Demonstrating these two items for organizations is more complicated than for individuals since organizations can only act through employees and agents.

An organization can be a party of an offence if its "*directing mind*" committed a prohibited act and had the necessary state of mind. Directing minds are senior officers, which includes everyone who has an important role in:

- setting policy (which is the current Canadian law); or
- managing an important part of the organization's activities (which is new)

Bill C-45 provides that an organization is responsible for the negligent acts or omissions of its representatives. To prosecute an organization, the Crown needs to prove commission of the prohibited act (e.g. negligence) and requisite guilty mental state (e.g. knowledge & intent). Proving commission is usually done by showing that the alleged crime was committed by representatives (including employees, directors, contractors) acting within the scope of their duties. In offences based on negligence, the court must determine whether an individual acted so carelessly or with such reckless disregard for the safety of others as to deserve criminal punishment. In general, for an organization to be found guilty of committing a crime of negligence, the Crown will have to show that employees committed the act and that a senior officer should have taken reasonable steps to prevent them from doing so.

Bill C-45 covers situations where there is no single person who acted negligently, but the acts of multiple representatives had a net result that was negligent, combined with showing that senior officers departed from the standard of care that could be expected.

Bill C-45 sets out three ways an organization can commit a crime. In all cases, the focus is on a senior officer *who must intend to benefit the organization at least to some degree*.

- If the senior officer actually committed the crime for the direct benefit of the organization.
- If the senior officer directs others to undertake dishonest work. If the senior officer has the necessary intent, but subordinates carry out the actual physical act.
- If a senior officer knows employees are going to commit an offence but does not stop them because he/she wants the organization to benefit from the crime.

Since organizations cannot be imprisoned, the punishment is mainly fines, based on a number of factors (e.g. economic advantage, cost of investigation, etc.).

Bill C-45 and Workplace Health and Safety

Bill C-45 established a legal duty for all persons "directing the work of others" to take reasonable steps to ensure the safety of workers and the public. Bill C-45 is additional to the Occupational Health and Safety Regulation (enforced in BC by WorkSafeBC). Note: the federal government commented: "*the criminal law must be reserved for the most serious offences, those that involve grave moral faults... the Government does not intend to use the federal criminal law power to supplant or interfere with the provincial regulatory role in workplace health and safety*."

Example of how Bill C-45 may be applied by the Crown

On Jun 12, 2006 a landscape contractor was crushed to death when the backhoe his employer was driving failed to stop, pinning the employee to a wall. The investigation of the incident found that the 30 year old backhoe had not received any regular maintenance since the vehicle was purchased and that no formal inspection had been done in the previous five years. Upon further investigation it was discovered that the vehicle had no braking capacity. In September 2010, the employer was convicted of criminal negligence causing death.

Limiting exposure to criminal liability under Bill C-45

Organizations can limit liability and reduce the chances of being charged under the provisions of the Criminal Code by implementing an effective workplace health and safety program. Organizations should:

- know their legal obligations under the Occupational Health and Safety Regulation;
- identify hazards that exist in their workplace;
- take steps to effectively reduce or eliminate these hazards; and
- ensure employees are aware of the company's health and safety program, are informed of any risks, and receive appropriate training and protective equipment.

How Bill C-45 applies to Powell River Regional District (PRRD)

The directing minds of a regional district likely include the Board, which sets policy, as well as Chief Administrative Officer (CAO) and Chief Financial Officer (CFO), as senior officers who are responsible for managing important parts of the organization's activities.

As such, to minimize exposure of the PRRD as an organization under Bill C-45, the PRRD should ensure:

- employees, directors and volunteers are properly informed about the legal obligations of the PRRD under the Occupational Health and Safety Regulation;
- workplace health and safety programs are implemented that cover all relevant regional services. Separate programs may be needed for some services; and
- there is ongoing effort by employees, directors and volunteers to identify and reduce workplace hazards, and opportunity to communicate concerns about workplace hazards

How Bill C-45 applies to the Lasqueti Fire Protection Service

The Lasqueti Fire Protection Service is managed by the Fire Chief who is an officer of the PRRD and "*has complete responsibility and authority over the Fire Department, subject to the direction and control of the Board*" (bylaw 391, 2005). As such, the Fire Chief should likely:

- Ensure an ongoing workplace health and safety program is implemented for the fire service, which should aim to identify, communicate and reduce workplace hazards.

As part of the fire department, local dispatch should be included in the fire department workplace health and safety program. In addition:

- the dispatch system should be designed and implemented to meet the Occupational Health and Safety Regulation; and
- the service establishment bylaw should be revised to be consistent with the adopted dispatch system

Appendix F: Incident and Resource Locator Tool Prototype Details

Appendix F.1 Structure Identifiers: Sectors, Neighbourhoods and Structure Numbers

Below are draft sector and neighbourhood sub-areas of Lasqueti for use in the Incident and Resource Locator Tool. Maps of the sectors and neighbourhoods are shown in Figure 29 and Figure 30, respectively. Figure 31 shows example structure identifiers for in the Northwest: Spring Bay sector.

A. Northwest: Spring Bay
    1. Magic Mountain: Teapot corner to Scotty Bay Rd (except for Schumack Farm)
    2. Scotty Bay: Scotty Bay Rd to road to Maple Bay
    3. Boot Point: Maple Bay to Spring Bay public beach access
    4. Spring Bay: Spring Bay public beach access to end of road
    5. Schumack Farm: accessed via private driveway through and beyond Magic Mountain
B. Southwest: False Bay & Weldon Rd
    6. School / Firehall: Teapot corner to Williams Rd (just past former post office site)
    7. False Bay: Williams Rd to False Bay Dock
    8. False Bay to Lagoon: Weldon Rd from False Bay to Johnson's Lagoon
    9. Heath Rd: from Johnson's Lagoon to end of road
    10. Johnson Farm
    11. Elderberry Lane
    12. Weldon Rd End: from Elderberry Ln to end of Weldon Rd
C. Central-West: Teapot Corner to Lake Rd
    13. Main Rd: Teapot corner to Lennie-Mine Rd: points accessed from or just off Main Rd (does not include Oben Rd)
    14. Oben Rd
    15. Mine Rd: from junction Lennie and Mine Rd
    16. Lennie Rd: from junction at Main Rd
    17. Main Rd: Lennie-Mine Rd to Lake Rd: points accessed from or just off Main Rd (does not include Forbes Rd, Millicheap Rd or Tucker Bay Rd)
    18. Forbes Rd
    19. Millicheap Rd
    20. Tucker Bay Rd
D. Lake Rd
    21. Lake Rd: Lambert Lake: from junction at Main Rd to, and including, Hazelwood Dr
    22. Lake Rd: Ogden Lake: from Hazelwood Dr to road to Osland Reserve
    23. Lake Rd: Old House Bay East: from road to Osland Reserve to Richardson Bay Rod, including road through crown land to set of waterfront residences
    24. Lake Rd: Richardson Bay: end of Lake Road (to Mt. Trematon reserve) and Richardson Bay (including access to residences on west side of Old House Bay)
E. Central-East: Lake Rd to Firehall #2
    25. Community Hall: Main Rd from Lake Road to Gline-Fletcher
    26. Gline-Fletcher Rd
    27. Main Rd: Gline-Fletcher Rd to Boat Cove: includes Boat Cove Rd

28. Main: Boat Cove Rd to Grant Rd: to just past Firehall #2

F. Southeast: Firehall #2 to Squitty Bay

29. Grant Rd
30. Main Rd: Grant Rd to Copley Rd: points accessed from or just off Main Rd (does not include Anderson Bay Rd or Good Rd)
31. Anderson Bay
32. Good Rd: to Rouse Bay
33. Main Rd: Copley Rd to Squitty Bay: includes Copley Bay Rd and Squitty Bay Rd
34. Main Rd: Squitty Bay to Main Rd End

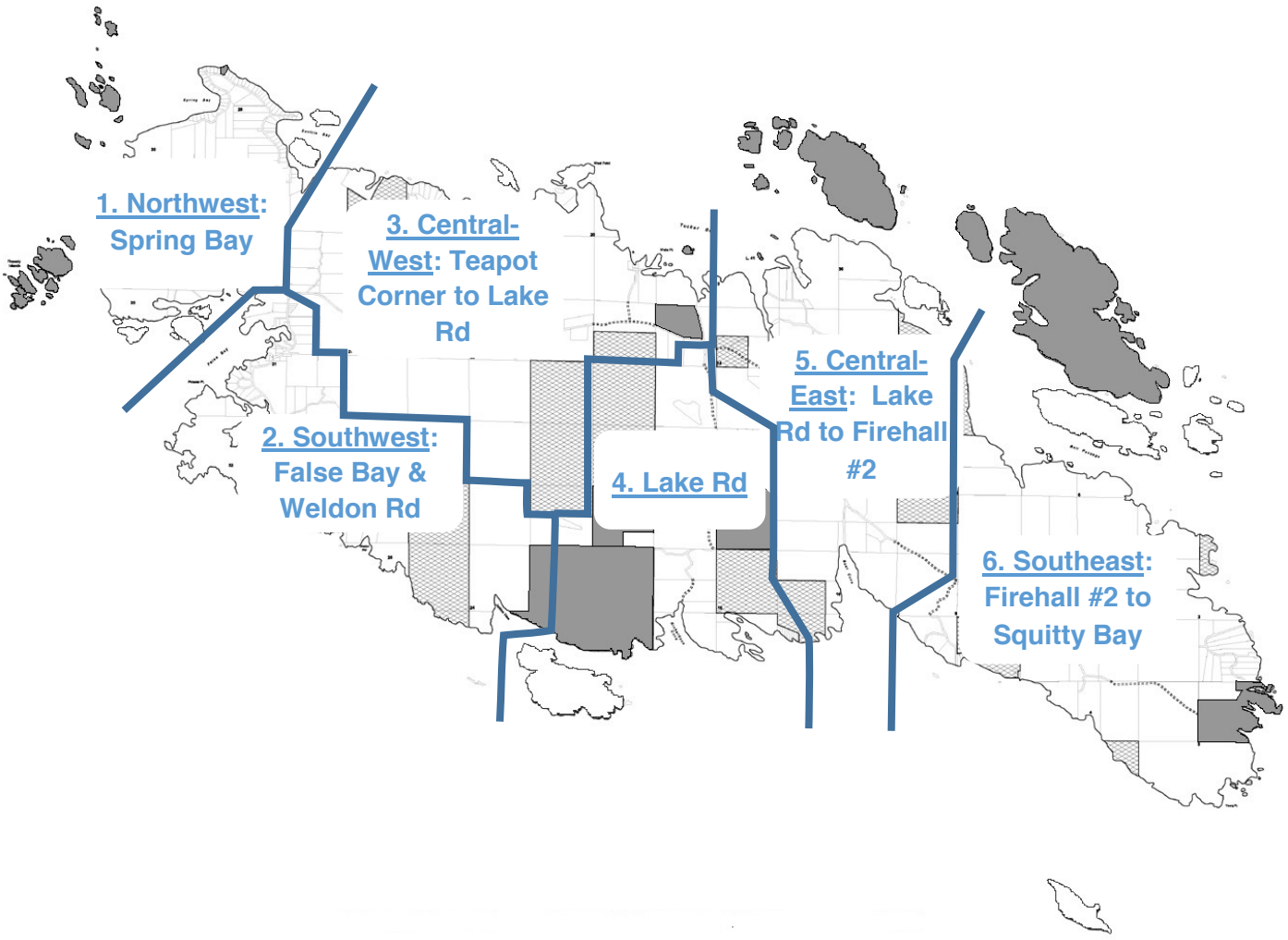


Figure 29 - Lasqueti Mapping for Emergency Route-finding: Sectors 1 to 6

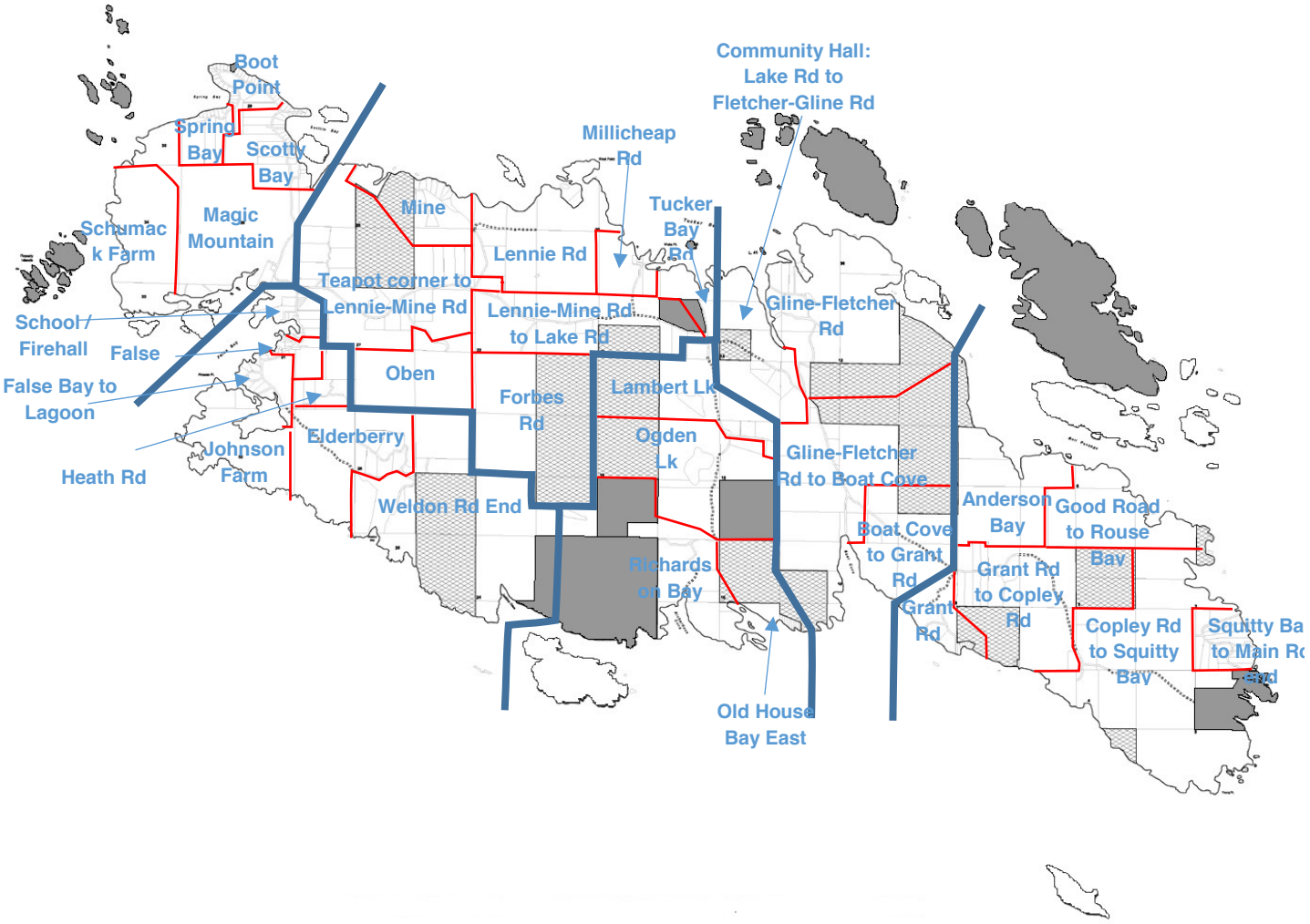


Figure 30 - Lasqueti Mapping for Emergency Route-finding: Neighbourhoods

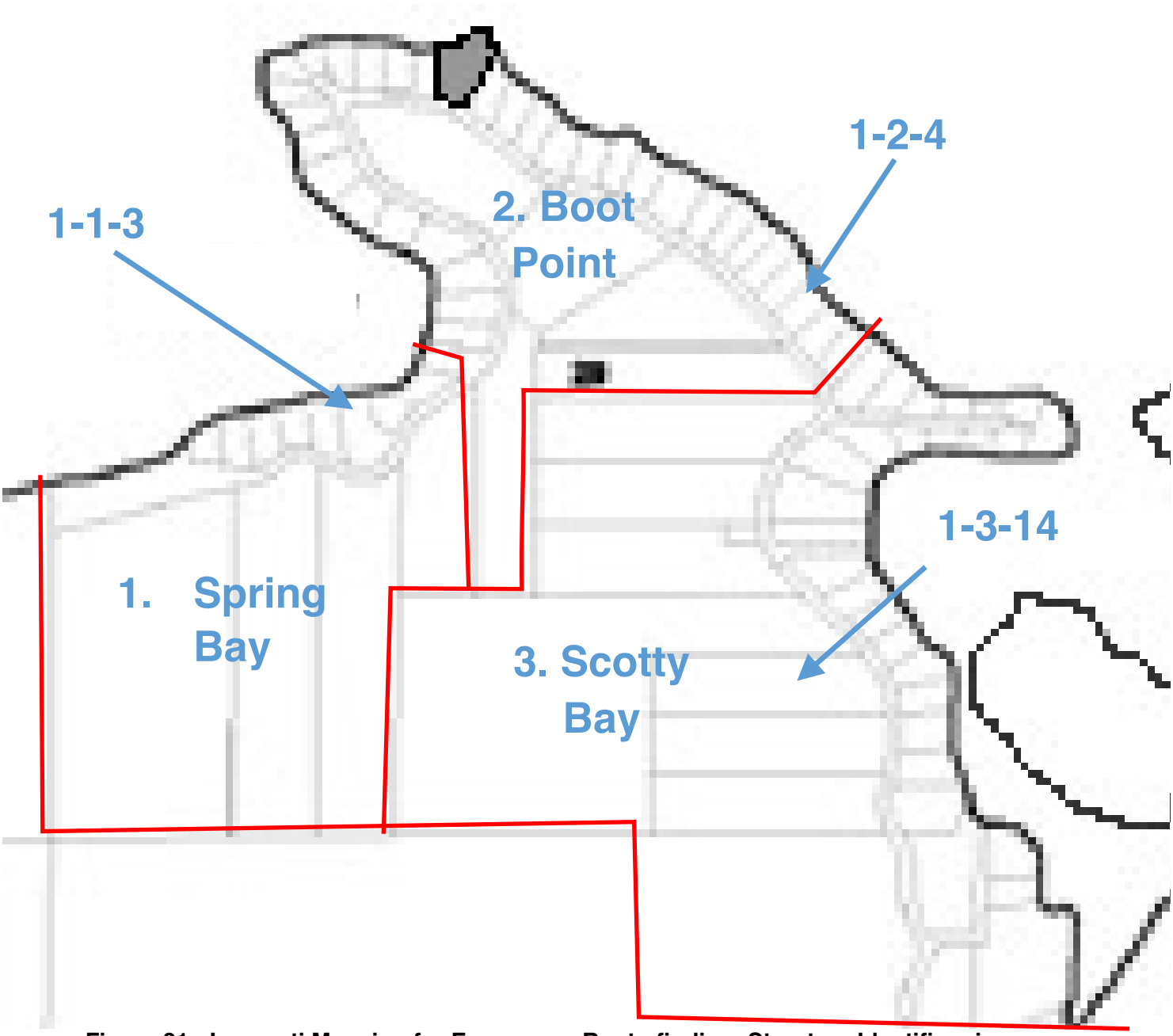


Figure 31 - Lasqueti Mapping for Emergency Route-finding: Structure Identifiers in Northwest: Spring Bay Sector (Sector 1)

Appendix F.2 Draft GPS Data Collection Procedure

The following is the draft procedure used to collect GPS data for construction, validation and correction of the KML file information for the incident and resource locator mapping tool:

1. Collect data for one or more entire “neighbourhoods” in one session. Each of the 34 neighbourhoods has between 5 and 20 residences.
2. Collection works best with two people in a vehicle. The driver can stop to take GPS points while the passenger can write notes.
3. What GPS points to collect:
   - (i) Waypoints: start and end points of neighbourhood (e.g. junction at Main Rd)
   - (ii) Road junctions along public road
   - (iii) Trails and old road junctions at public road
   - (iv) Driveway junctions at public road
   - (v) Driveway forks
   - (vi) Telephone posts
   - (vii) Ponds and other water sources
   - (viii) Residences
   - (ix) Significant outbuildings that are not adjacent to residences
   - (x) Unique landmarks
4. What to document:
   - (i) Point type: waypoint, road, driveway, trail, old road, fork, phone post, pond, well, swamp, creek, salt water, resident, barn, outbuilding, etc.
   - (ii) All points: whether on left, right or at end of primary road/driveway
   - (iii) Waypoints: name of reference roads or structures
   - (iv) Road junctions: name of road
   - (v) Trails and old roads: any identifying features (e.g. overgrown skid road)
   - (vi) Driveway junctions: any identifying features
   - (vii) Driveway forks: any identifying features
   - (viii) Telephone posts: post number
   - (ix) Ponds and other water sources: distance from road or relevant access info
   - (x) Residences: roof type (e.g. metal, shake), structure type (e.g. log, wood frame), location and size of visible propane tanks, if the turnaround is wide or tight, and other relevant info (e.g. charged fire pump)
   - (xi) Significant outbuildings: short description
   - (xii) Unique landmarks: short description
5. Interactions with residents:
   - (i) Don’t visit residents who have asked not to be visited
   - (ii) Phone residents who have asked to be contacted first (or note for a future visit)
   - (iii) Be careful to avoid off-leash dogs if you get out of the vehicle
   - (iv) If a resident is seen, offer the “Notification and request for data” and explain the project. If they agree, record their name and phone number. Verbal agreement is sufficient.

Appendix F.3 Reverse Directory

One implication of using structure locator identifiers is that the mapping tool itself does not include any personal information to which the Freedom of Information and Protection of Privacy Act (FIPPA) applies.

However, using structure locator identifiers also implies that users of the tool must know the identifier for the structure they seek to locate. Structure locator identifiers can be obtained using at least three methods:

(a) The person reporting the incident can provide the identifiers. For example, people could be encouraged and assisted to put the identifier for their home on their emergency number calling card, near their phone. They could provide this information to the call taker and/or dispatcher as appropriate.

(b) Knowledge of the area will be used to identify the structure. For example, if the dispatcher or a responder is familiar with the area or person calling, they could simply look at the mapping tool to identify the structure and its locator id. This enables use of local knowledge, when available.

(c) A *reverse directory* will be constructed to determine a structure locator identifier from other information. Reverse directories can, and have, been used to identify addresses and names given phone numbers. In this context, a reverse directory can be constructed that allows users to identify structure locator identifiers using phone number, resident name, or other defining information.

Clearly, a reverse directory that includes phone numbers and names would constitute personal information, under the FIPPA, and so would be subject to private legislation. To balance the need to protect personal information and privacy, with the need to effectively and safely identify incident locations and nearby resources and risks, the E-DAC proposes to keep the mapping tool spatial information separate from the reverse directory. The purpose of the reverse directory would be to look up structure locator identifiers given name, phone number or other information.

Storing the reverse directory in a separate file accessed via commonly used tools (e.g. Microsoft Excel) would facilitate the ease of use. Searching in spreadsheet tools is simple and fast. Searching can be done over all fields, or only within selected fields (e.g. last name). Once a structure locator id has been found, its spatial location can easily be found using the Google Earth tool (along with routing information, local resources and risks, etc.). The reverse directory would only be needed on devices accessed by dispatchers, which reduces potential for accidental disclosure of personal information.

Appendix F.4 Draft Privacy Impact Assessment, Including Draft Data Collection Notification and Request

Privacy Impact Assessment for Non-Ministry Public Bodies

Lasqueti Island Mapping for Emergency Route-finding

PIA#LIVFD1*[assigned by your privacy office(r)]*

Why do I need to do a PIA?
Section 69(5.3) of the *Freedom of Information and Protection of Privacy Act* (FOIPPA) requires the head of a public body to conduct a privacy impact assessment (PIA) in accordance with the directions of the minister responsible for FOIPPA. Public bodies should contact the privacy office(r) for their public body to determine internal policies for review and sign-off of the PIA. Public bodies may submit PIAs to the Office of the Information and Privacy Commissioner for BC (OIPC) for review and comment.

If you have any questions about this PIA template or FOIPPA generally, you may contact the Office of the Chief Information Officer (OCIO) at the Privacy and Access Helpline (250 356-1851). Please see our PIA Guidelines for question-specific guidance on completing a PIA.

What if my initiative does not include personal information?
Public bodies still need to complete Part 1 of the PIA and submit it along with the signatures pages to their privacy office(r) even if it is thought that no personal information is involved. This ensures that the initiative has been accurately assessed.

Part 1 – General

Name of Department/Branch:	Lasqueti Island Volunteer Fire Department		
PIA Drafter:	Andrew Fall		
Email:	andrew@gowlland.ca	Phone:	250 333 8595
Program Manager:	Ryan Thoms		
Email:	emergcoord@powellriverrd.bc.ca	Phone:	604 485 2260

In the following questions, delete the descriptive text and replace it with your own.

1. **Description of the Initiative**

   What: Locating emergency fire and medical incidents in remote and rural communities can be a challenge. The goal of the Lasqueti Island emergency route and location mapping initiative is to provide information for the volunteer fire department (including firefighters, First Responders and local dispatchers) to improve their ability to effectively locate fire and medical incidents.

   Who: This initiative was started by the mapping group of the Lasqueti Emergency Dispatch Advisory Committee (E-DAC), an advisory committee of the Powell River Regional District (PRRD).

Privacy Impact Assessment for Non-Ministry Public Bodies

Lasqueti Island Mapping for Emergency Route-finding

PIA#LIVFD1*[assigned by your privacy office(r)]*

This work is being implemented operationally by a committee of the Lasqueti Island Volunteer Fire Department (LIVFD) created by the local Fire Chief. The mapping initiative is for use by the LIVFD.

Where: All data aspects of this initiative would take place on Lasqueti Island, under the control of the LIVFD.

When: The E-DAC researched this new initiative as a possible addition to the operations of the local fire department, and recommended that the LIVFD adopt use of this tool, with support from LIVFD. The LIVFD will implement an operational version of the mapping tool in 2017.

Why: Changes to emergency dispatch, and related aspects of response, were contemplated by the E-DAC. Challenges of locating emergency incidents were raised, and the mapping initiative was explored to address this important issue. The E-DAC recommendations to the regional district included supporting use of the "Incident and Resource Locator Tool" developed by the E-DAC.

How and more specifics: Local mapping of structures, ponds, roads, driveways and other waypoints will be collected and used for locating fire and medical emergency incidents in a remote and rural community. This will involve:

- *collection of geopositional (GPS) and other spatial mapping data to identify locations of structures, ponds, roads, driveways and other waypoints*
- *assigning each structure a unique "structure identifier" the integrates sub-areas of the island (sector and neighbourhood) with a number for each structure in each neighbourhood.*
- *storing as a KML file that can be loaded in Google Earth*
- *linking residential structure identifiers with resident names and phone numbers using a reverse directory (with permission of residents) implemented in a searchable spreadsheet or PDF file.*
- *use will be by, and only by, the volunteer fire department dispatchers and responders to identify the route to a fire or medical incident location, as well as nearby resources (e.g. ponds, ocean access) and hazards (e.g. tight access)*
- *The KML file that contains the routing and structure information will be stored on password-protected laptops and hand-held devices, with access only by fire department members.*
- *restrictions on use and disclosure of this information will be added to the non-disclosure statement signed by fire department members*

Benefit: finding structures in a forested, rural community, such as Lasqueti Island, can be challenging. Some roads are narrow and surrounded by dense forest, with unmarked forks. Some large properties have multiple residences on a single title, with a complex driveway network. Hence, the largest challenge in many cases is not locating the boundary of a property, but locating the target structure

once the property has been entered. A visual mapping tool such as Google Earth, with the ability to show routes, forks, waypoints and other identifying points can help local dispatchers describe to responders how to find an incident (e.g. over VHF radio), and can also help responders identify key points along the route (if a mobile device is in the response vehicle). Further, visual mapping of local resources (e.g. ponds and ocean water access), hazards (e.g. driveways where turnaround would be difficult) and structure features (e.g. roof material, presence and location of propane tanks) can help inform responders to improve tactical response to the incident.

Larger process: This initiative would be a component of the emergency services regional service for the Electoral Area (Electoral Area "E", Powell River Regional District). The spatial information would be managed by the LIVFD under the authority of the local Fire Chief.

2. Scope of this PIA

This PIA primarily covers all aspects of this mapping initiative, including collection, storage, security, retention, use, and disclosure.

3. Related Privacy Impact Assessments

No related PIAs.

4. Elements of Information or Data

This initiative involves the following data elements:

- *GPS tracks that identify road and driveway locations*
- *GPS points that identify structures (e.g. residences, outbuilding, fire halls, public buildings), resources (ponds, ocean water access), waypoints (e.g. road junctions, driveway forks, driveway start points at public road)*
- *Text descriptions associated with the GPS tracks and waypoints, as needed, to clarify details about the items, including a unique structure identifier for each residential structure*
- *Resident names and phone numbers associated with the structures in which they reside on Lasqueti Island, stored in a separate reverse directory to be used to look up structure identifiers*

Personal information arises from the joining of resident names and phone numbers with the identifiers of structures in which they reside via the reverse directory.

If personal information is involved in your initiative, please continue to the next page to complete your PIA.

If no personal information is involved, please submit Parts 1, 6, and 7 to your privacy office(r). They will guide you through the completion of your PIA.

Part 2 – Protection of Personal Information

In the following questions, delete the descriptive text and replace it with your own.

5. Storage or Access outside Canada

The reverse directory, as well as the KML file that contains the routing and structure information, will be stored on password-protected laptops and hand-held devices, with access only by fire department members. It will be stored and maintained on Lasqueti Island, and will not be accessible from outside Canada.

6. Data-linking Initiative*

In FOIPPA, "data linking" and "data-linking initiative" are strictly defined. Answer the following questions to determine whether your initiative qualifies as a "data-linking initiative" under the Act. If you answer "yes" to all 3 questions, your initiative may be a data linking initiative and you must comply with specific requirements under the Act related to data-linking initiatives.	
1. Personal information from one database is linked or combined with personal information from another database;	No
2. The purpose for the linkage is different from those for which the personal information in each database was originally obtained or compiled;	No
3. The data linking is occurring between either (1) two or more public bodies or (2) one or more public bodies and one or more agencies.	No
If you have answered "yes" to all three questions, please contact your privacy office(r) to discuss the requirements of a data-linking initiative.	

7. Common or Integrated Program or Activity*

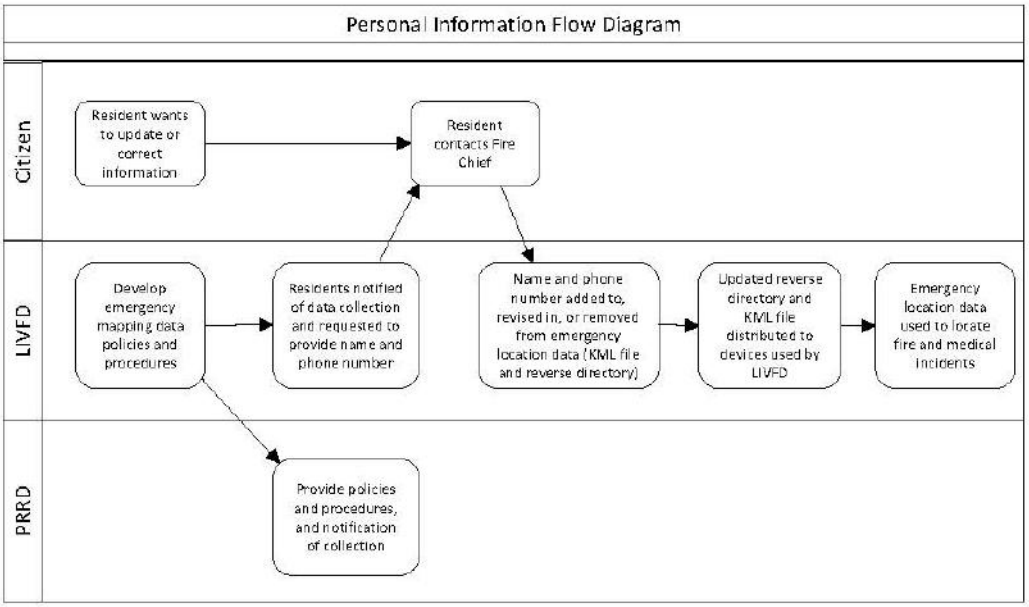
In FOIPPA, "common or integrated program or activity" is strictly defined. Answer the following questions to determine whether your initiative qualifies as "a common or integrated program or activity" under the Act. If you answer "yes" to all 3 of these questions, you must comply with requirements under the Act for common or integrated programs and activities.	
1. This initiative involves a program or activity that provides a service (or services);	Yes
2. Those services are provided through: (a) a public body and at least one other public body or agency working collaboratively to provide that service; or (b) one public body working on behalf of one or more other public bodies or agencies;	No
3. The common or integrated program/activity is confirmed by written documentation that meets the requirements set out in the FOIPP regulation.	No
Please check this box if this program involves a common or integrated program or activity based on your answers to the three questions above.	

**** Please note: If your initiative involves a "data-linking initiative" or a "common or integrated program or activity", advanced notification and consultation on this PIA must take place with the Office of the Information and Privacy Commissioner (OIPC). Contact your public body's privacy office(r) to determine how to proceed with this notification and consultation.***

For future reference, public bodies are required to notify the OIPC of a" data-linking initiative" or a "common or integrated program or activity" in the early stages of developing the initiative, program or activity. Contact your public body's privacy office(r) to determine how to proceed with this notification.

8. Personal Information Flow Diagram and/or Personal Information Flow Table

The following diagram and table outlines the flow of personal information in the mapping initiative and shows how this initiative will collect, use, and/or disclose personal information. Resident names and phone numbers will only be included in the reverse directory if the resident agrees to directly provide their names and phone numbers for the initiative. The updated reverse directory and KML file will be installed (via memory stick) onto devices used by LIVFD members. Residents can request access, updates or corrections to data at any time by contacting the LIVFD Fire Chief. The mapping data will be used ***only*** *for emergency route-finding and response by LIVFD during a fire or medical incident. Initiative policies, including data management and privacy protection, a blank consent form, will be provided to PRRD, and available to the public upon request (or posted to the PRRD web site). There will be no disclosure of personal information contained in the mapping data, except as required by the FOIPPA.*



Privacy Impact Assessment for Non-Ministry Public Bodies

Lasqueti Island Mapping for Emergency Route-finding

PIA#LIVFD1*[assigned by your privacy office(r)]*

Personal Information Flow Table			
	Description/Purpose	**Type**	**FOIPPA Authority**
1.	*Develop emergency mapping data policies and procedures*	*Planning*	*n/a*
2.	*Develop notification of data collection*	*Planning*	*n/a*
3.	*Policies, procedures and notification provided to regional district*	*Panning*	*n/a*
4.	*Provide notification of data collection (via mail, local newsletter, posting at post office and local email list0*	*Collection*	*27(2)*
5.	*Resident contacts Fire Chief to provide name and phone number*	*Collection*	*26(c), 26(e)*
6.	*Resident requests access to their personal information*	*Disclosure*	*33.1(7)*
7.	*Resident requests update or correction to personal information, or removal of their name or phone number*	*Collection*	*26(c), 26(e), 29(1)*
8.	*Resident name and other non-personal information added to, revised in, or removed from emergency location data (reverse directory and/or KML file), and updated to devices used by LIVFD members*	*Collection*	*26(c), 26(e), 29(1)*
9.	*Emergency location data (reverse directory and KML file) used by LIVFD members to locate fire and medical incidents*	*Disclosure and Use*	*33.2(a) 32(a)*

9. Risk Mitigation Table

Risk Mitigation Table				
	Risk	**Mitigation Strategy**	**Likelihood**	**Impact**
1.	*Fire department members could access personal information and use or disclose it for personal purposes*	*Non-disclosure agreement signed by fire department members.*	*Low*	*Low*
2.	*Someone who has not signed fire department non-disclosure agreement could access personal information and use or disclose it for personal purposes*	*Reverse directory and routing and location data (KML file) stored in separate files on password protected devices controlled by fire department members. Reverse directory stored in local read-only format in user devices (e.g. not over the internet).*	*Low*	*Low*

10. Collection Notice

The following collection is the collection notice for this initiative, to be mailed by bulk mail to all residents, posted at the post office, printed in the local newsletter and posted to the local email list server:

Lasqueti Island Volunteer Fire Department (LIVFD)
Mapping Project Notification and Request

Mapping information of the locations of residences, structures, roads, ponds, etc. is being collected by the LIVFD for an emergency route-finding and incident location tool to help firefighters, First Responders and dispatchers.

This information would be used by, *and only by*, our fire department to improve emergency response. The data would be maintained securely on Lasqueti by the LIVFD.

This tool will include, with agreement, resident names and phone numbers. This personal information would be used to identify the location of your residence (residential structure

identifier) on a medical or fire emergency call given your name or phone number. Collecting this personal information is authorized under sections 26(c) and (e) of the Freedom of Information and Protection of Privacy Act (ensuring protection of privacy under this Act) provided:

- You are notified about the purpose, and who to contact for questions (this notice), and
- You provide your name and phone number to us

We request that you please let Fire Chief Richard Carlson know:

1. If you agree or not to include your name and phone number in the mapping tool.
2. If you do not want a mapping team to visit your driveway to take GPS locations of ponds and structures (this takes just a couple of minutes), or if you have any specific restrictions for this visit.
3. If you have any questions about this project.

Richard Carlson, Fire Chief
Email: Richard (at) lasqueti (dot) ca (preferred contact method for this project)
Tel: 250 333 XXXX Address: General Delivery, Lasqueti, V0R2J0

Part 3 – Security of Personal Information

If this PIA involves an information system, or if it is otherwise deemed necessary to do so, please consult with your public body's privacy office(r) and/or security personnel when filling out this section. They will also be able to tell you whether you will need to complete a separate security assessment for this initiative.

11. Please describe the physical security measures related to the initiative (if applicable).

The data will be only held on laptops, desktops and mobile devices under control of fire department members.

12. Please describe the technical security measures related to the initiative (if applicable).

Password protected laptops, desktops and mobile devices. The reverse directory will be stored as a locally-accessed read-only file on user devices (e.g. not over the internet).

13. Does your branch/department rely on any security policies?

Fire department members must sign a non-disclosure statement for their duties as fire fighters, First Responders, dispatchers or fire department support. This non-disclosure statement will be

updated to disallow unauthorized use and disclosure of the mapping information. Collection will follow the mapping data procedures, which are consistent with the FOIPPA.

Contact: Fire Chief Richard Carlson (see notification in Section 10 for contact information)

14. Please describe any access controls and/or ways in which you will limit or restrict unauthorized changes (such as additions or deletions) to personal information.

Modification of the reverse directory or the routing and location data (KML file) will only be done by specified members of LIVFD according to the mapping data procedures.

Normal use by primary users (local dispatchers and responders) will not allow modification.

If modification or deletion of data from a device accidentally occurs, a backup and restore mechanism is provided.

15. Please describe how you track who has access to the personal information.

Access will be limited to LIVFD members who have signed the fire department non-disclosure agreement.

Part 4 – Accuracy/Correction/Retention of Personal Information

16. How is an individual's information updated or corrected? If information is not updated or corrected (for physical, procedural or other reasons) please explain how it will be annotated? If personal information will be disclosed to others, how will the public body notify them of the update, correction or annotation?

Changes to the reverse directory or the routing and location data (KML file) will be done by specified individuals (mapping group), and updated files will be distributed to fire department members via memory stick, as needed.

Changes would include the following:

- *Changes in residents living in residential structures or new residential structures. New or changed residents need to notify the fire department, and provide updated data (names and phone numbers for reverse directory) or request that their personal information is not included in the data.*
- *Changes or new public infrastructure (mainly roads): Infrequent; done when roads change*

- *Changes or new private infrastructure other than residences (ponds, driveways, outbuildings): either when residents notify fire department of change, or during periodic review and update of routing and location data.*

17. Does your initiative use personal information to make decisions that directly affect an individual(s)? If yes, please explain.

Yes, Personal information is used only to identify the location and information about residential structures, and nearby structures, resources and hazards as needed, so that firefighters and First Responders can locate a fire or medical incident. Personal information may improve emergency response.

18. If you answered "yes" to question 17, please explain the efforts that will be made to ensure that the personal information is accurate and complete.

Collection of GPS data will be done to ensure data is as accurate as possible. This data will be reconciled with Google Earth imagery to account for deviations caused by errors in GPS location data and Google Earth imagery georeferencing.

Neighbourhood leaders, established under the emergency plan, will notify new residents of the importance of providing their names and phone numbers to the Fire Chief for updating the mapping data. Further, real estate agents working on Lasqueti will be provided information to notify new buyers of property of the process of providing their names and phone numbers to the fire department.

Note that emergency dispatch and response will not rely on 100% accuracy of current residency. In the event of an incident call, the local dispatcher would identify the identifier of the structure to locate based on direct information from the caller, current resident names, former resident names, and other mapped location information (e.g. proximity to unique features, such as road junctions).

19. If you answered "yes" to question 17, do you have a records retention and/or disposition schedule that will ensure that personal information is kept for at least one year after it is used in making a decision directly affecting an individual?

If the routing and location data cease to be used by the fire department, the reverse directory and KML file will be kept for at least a year before disposal (deletion).

Part 5 – Further Information

20. Does the initiative involve systematic disclosures of personal information? If yes, please explain.

No.

Please check this box if the related Information Sharing Agreement (ISA) is attached. If you require assistance completing an ISA, please contact your privacy office(r).	

21. Does the program involve access to personally identifiable information for research or statistical purposes? If yes, please explain.

No.

Please check this box if the related Research Agreement (RA) is attached. If you require assistance completing an RA please contact your privacy office(r).	

22. Will a personal information bank (PIB) result from this initiative? If yes, please list the legislatively required descriptors listed in section 69 (6) of FOIPPA. Under this same section, this information is required to be published in a public directory.

Yes. The information will be a reverse directory (spreadsheet or PDF file) and spatial structure and resource information (KML file). The KML file will only include non-personal information (e.g. pond locations, roads, structure identifies). The reverse directory will including personal information via the association of resident name(s) and phone numbers with residential structure identifiers. The following information would be provided regarding this PIB to the regional districts to be published in a public directory:

(a) Title: Lasqueti Island Incident and Resource Locator Tool reverse directory

(b) Location: The data is maintained securely on Lasqueti Island by Lasqueti Island Volunteer Fire Department (LIVFD)

(c) Personal information included: name and phone number associated with residential structures

(d) Individuals included: residents of Lasqueti Island that directly provide their names and phone numbers for this initiative

(e) Authority for collecting the personal information: FOIPPA s26(c) and 26(e)

(f) Purposes for which the personal information was collected, and for which it is used and disclosed: Mapping information of the locations of residences, structures, roads, ponds, etc. is being collected by the LIVFD for an emergency route-finding and incident location tool to help firefighters, First Responders and dispatchers.

(g) Persons who use the personal information and to whom it is disclosed: This information is used by, and only disclosed to, LIVFD members to improve emergency response.

Please ensure Parts 6 and 7 are attached to your submitted PIA.

Part 6 – Privacy Office(r) Comments

This PIA is based on a review of the material provided to the Privacy Office(r) as of the date below. If, in future any substantive changes are made to the scope of this PIA, the public body will have to complete a PIA Update and submit it to Privacy Office(r).

Privacy Officer/Privacy Office Representative	Signature	Date

Part 7 – Program Area Signatures

Program/Department Manager	Signature	Date
Contact Responsible for Systems Maintenance and/or Security (Signature not required unless they have been involved in this PIA.)	Signature	Date
Head of Public Body, or designate	Signature	Date

A final copy of this PIA (with all signatures) must be kept on record.

If you have any questions, please contact your public body's privacy office(r) or call the OCIO's Privacy and Access Helpline at 250 356-1851.

Appendix G: Letter from North Island 9-1-1 Corporation to Islands Trust Fund, January 13, 2015

North Island 9-1-1 Corporation
serving the regional districts of Alberni-Clayoquot, Comox Valley, Mt. Waddington, Nanaimo (School District #69), Powell River, and Strathcona

File: 9-RA

January 13, 2015

Islands Trust Fund
200-1627 Fort St
Victoria, BC V8R 1H8

Attention: Islands Trust Fund Board

Dear Sir:

Re: Mt. Trematon Nature Reserve on Lasqueti Island – 9-1-1 fire dispatch services

The North Island 9-1-1 Corporation (NI 911 Corp) was established on January 5, 1995 to manage the provision of 9-1-1 and fire dispatch services to the Comox Valley Regional District, Strathcona Regional District, Regional Districts of Mt. Waddington and Alberni-Clayoquot and a portion of the Nanaimo Regional District. The Powell River Regional District joined the service in 1999. The population served is approximately 215,000 people with funding for the non-profit service sourced through property taxation as assessed by each participating regional district.

NI 911 Corp has agreed to include Lasqueti Island within its existing 9-1-1 and fire dispatch service network after being formally approached by the Powell River Regional District. NI 911 Corp formally requests that the Islands Trust Fund assist with obtaining all necessary approvals to install a fibreglass solar powered radio shelter on or near the peak (east side) of Mt. Trematon. The round shelter is painted dark green and measures six feet in diameter at the base by one foot at the top. It is fifteen feet six inches in height with the antenna housed internally; the enclosure will be anchored by three bolts drilled and epoxied into rock directly below the shelter.

The requests above are the direct result of Telus Communications Inc. formally notifying the Powell River Regional District that CDMA (cellular) technology will not be available after March 31, 2015. The loss of this service from Telus means that the residents of Lasqueti Island will not be able to alert the fire department to medical and fire incidents. The topography of Lasqueti Island creates a significant challenge for establishing a new reliable island wide emergency services communication system to replace the current one.

NI 911 Corp staff have conducted extensive radio testing on Lasqueti and have concluded that the installation of a solar power VHF radio repeater near the peak of Mt. Trematon to be the only reliable, cost effective solution. Initial installation costs will be in the range of approximately $60,000, plus associated legal and administrative costs. The annual operating costs are very low and the site will require very infrequent maintenance.

600 Comox Road, Courtenay, B.C. V9N 3P6
Telephone (250) 334-6000 • Fax No. (250) 334-4358
TOLL FREE: 1-800-331-6007

In the event the request for a solar site on Mt. Trematon is not approved a less desirable alternative is for NI 911 Corp to erect to two separate radio towers, one at each end of the island measuring between 250 and 300 feet each in height. Each tower would require a four acre foot print to include supporting guy wires with initial installation costs in the range of $250,000, not including land lease costs.

NI 911 Corp has previous experience installing radio equipment in sensitive protected areas for the provision of emergency dispatch services. In 2005, a radio tower was installed near the summit of Mt. Geoffrey, in Mt. Geoffrey Nature Park on Hornby Island. NI 911 Corp continues to operate from this site today and remains a tenant in good standing.

We look forward to a response as soon as is practical regarding the feasibility of this request. We will also be happy to provide any other information as necessary upon request.

Sincerely,

Debra Oakman, CMA
Secretary, North Island 9-1-1 Corporation

Enclosures

1. Formal request from Powell River Regional District
2. Resolution by Powell River Regional District regarding Lasqueti
3. Technical Memo from North Island 9-1-1 Technology Manager
4. Technical drawing of proposed radio network
5. Technical Specifications radio communications shelter

cc: A Radke, PRRD