

The District of Oak Bay: *“My City is Getting Ready”*



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Executive Summary

The District of Oak Bay with the support of Royal Roads University has committed to becoming a more disaster resilient community. Students of the Master of Arts in Disaster and Emergency Management (MADEM) program have utilized the United Nations International Strategy for Disaster Reduction (UN ISDR) “Making Cities Resilient” campaign to create a framework for assessing the emergency management practices and strategies of the District of Oak Bay. Based on this assessment, opportunities for improvement have been identified, which if implemented, in whole or in part, will lead to the District of Oak Bay becoming a more resilient community.



The community assessment, based on the ten essentials identified in the UN ISDR “Making Cities Resilient” campaign, examined a variety of community disaster and emergency management elements including:

- Organization and coordination;
- Budgetary assignments;
- Preparation of risk assessments;
- Critical infrastructure that reduces risk;
- Safety of schools and health facilities;
- Realistic, risk-compliant building regulations and land-use planning principles;
- Education programs and training;
- Protection of ecosystems and natural buffers;
- Early warning systems and emergency management; and
- Needs of the survivors are placed at the centre of reconstruction.

The assessment determined that the District of Oak Bay has a well functioning disaster and emergency management capability. There is significant political support for community emergency management, which enables the functioning of emergency organizations and volunteer groups. The District of Oak Bay Emergency Program is actively involved in public education and training within the schools and the community



at large. Important civic infrastructure has been identified and seismic upgrades have begun on several structures in order to address vulnerabilities. While the assessment identifies the District of Oak Bay as well functioning, there are always opportunities for further development examples of which are formalized agreements with community partners; an enhanced volunteer management system and a greater emphasis on climate change mitigation.

Based on the findings within the assessment, it is recommended that the District of Oak Bay apply to the UN ISDR “Making Cities Resilient” campaign as a Role Model Community.

Throughout the process twenty-two mitigation strategies have been recommended. These strategies support all ten essentials, which have been recommended based on the following criteria:

- Ease of decision-making;
- Level of volunteer engagement;
- Support of essentials; and
- Technical expertise.

Each of the ten essentials has incorporated mitigation strategies within their specific section of this document. A list of the top five recommended strategies appears in the Summary of Recommendations section of this report.



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Background

The District of Oak Bay, in partnership with the Disaster and Emergency (MADEM) program at Royal Roads University has committed to making Oak Bay a more resilient community. Through its participation in the United Nations International Strategy for Disaster Reduction (UN ISDR) World Disaster Reduction Campaign 2010 - 2011, "Making Cities Resilient" campaign, the District of Oak Bay is taking positive action to reduce disaster risk in the community. When initially approached by Royal Road University, the municipal council acted quickly and whole-heartedly supported the campaign.

The "Making Cities Resilient" campaign identifies ten essentials of disaster risk reduction that can be adopted by the community. The MADEM students have worked with members of the community to conduct an assessment of Oak Bay based on these essentials and to provide mitigation strategies to build on existing strengths. The culmination of these activities is not only the nomination of Oak Bay as a participating or role model community within this campaign, but also improved disaster resilience within the community.



Summary of Recommendations

1. Continue to improve and embrace community education and training programs.
2. Embrace social media and new technologies for all aspects of disaster management.
3. Initiate recovery strategies that focus on people's needs post disaster.
4. Increase resilience of Oak Bay businesses through comprehensive business continuity planning strategies.
5. Provide Oak Bay managers, leaders, elected officials and staff with education and training to empower them regarding disaster risk reduction strategies.



Process

Community Assessment

The Community Assessment team assessed the District of Oak Bay by establishing regionally appropriate criteria for each of the Essentials described in the United Nations International Strategy for Disaster Reduction (UN ISDR) “Making Cities Resilient” campaign. The essentials are based on the 2005 Hyogo Framework for Action¹ recommendations and the criteria we created are also derived from this and supplemented by emergency management best practices.

For each criterion, descriptors were also created to aid in the community assessment. When a descriptor was identified or the criteria established was met, the text is formatted as bold text; when a descriptor was not identified nor the established criteria met, the text is plain text. The assessment method, due to time constraints, was qualitative, not quantitative.

The number of criteria met determined the ranking of each essential, using a numeric grading of 1, 2 or 3. The “Making Cities Resilient” campaign identifies Level 1 as poor or nothing in place, Level 2 as some progress in place, and Level 3 as in place and well-functioning.

Community Assessment team members met with municipal staff and community members and reviewed essential documentation to assess the level of community resilience within the District of Oak Bay. This assessment facilitated both the ranking of each essential and the identification of opportunities for improvement, which inspired the development of mitigation strategies.

Mitigation Strategies

Similar to the development of the community assessment, the Mitigation Strategies Sub-team established criteria to assess the proposed strategies after meeting

¹ UN ISDR <http://www.unisdr.org/english/campaigns/campaign2010-2011/#Ref>



with the municipality's emergency management program staff and volunteers. Four qualitative criteria were identified that would broadly indicate possible "best fit" proposals for Oak Bay, and indirectly provide a sense of the associated costs and risks.

The first criterion, "Ease of Decision Making", addresses the potential requirement for the District of Oak Bay to engage other municipalities, provincial or federal government in order to implement the proposed strategy. Strategies which would allow the municipality to make decisions independently, but which require consultation are considered as the standard for meeting the criteria. If no consultation would be necessary, the strategy exceeds that standard, as it will be easier to rapidly implement. However those strategies that may require decisions from other governments are rated as only partly meeting the desired standard.

The second criterion, "Level of Volunteer Engagement", indicates the degree to which Oak Bay's strong volunteer base would be engaged by the implementation of the strategy. Strategies that would be staff administered and volunteer delivered are deemed to be the standard of the criteria while those that could be volunteer administered and volunteer delivered were rated as exceeding that standard. Those strategies that required staff administration and staff delivery were rated as having only partly met the desired standard.

The third criterion, "Addresses Multiple Essentials", delineates how well the strategy addresses opportunities for improvement identified in the community assessment. Strategies that address at least one essential are deemed to be the standard for the criteria. Strategies exceeding this standard address more than one essential and those which address less than this amount are rated as only having partly met the standard.

Finally, "Technical Expertise Exists within the Community" identifies the potential difficulty involved in the strategy's implementation and whether a specific skill set is resident with the municipal staff. Those strategies for which the required skill sets are readily available but which may require outside expertise from time to time were deemed to be the standard for this criterion. Those strategies for which all technical expertise was available from municipal staff exceeded the standard while those that would require additional staff with particular technical expertise were rated as having only partly met that standard.



In the Strategy Summary for each of the mitigation strategies, the shaded bullets represent a higher rating as indicated below:

Bullet Style	●	○	⊕
Meaning	Exceeds criteria	Meets criteria	Partly meets criteria

Table 1: Legend for Mitigation Strategies

In developing the proposed mitigation strategies found in this report, team members met with community members, municipal staff, regional and provincial representatives, in addition to performing significant and in-depth literature reviews. All team members worked collaboratively throughout the project to ensure consistency from the findings of the community assessment to the development of proposed mitigation strategies.





Summary of Mitigation Strategies

"Essential" Strategy Number	Title	Ease of decision making	Level of volunteer engagement	Addresses multiple Essentials	Technical expertise exists within the community
1.1	Formation of the Oak Bay Emergency Planning Partners Group	●	⊕	●	●
1.2	Development of a Volunteer Management System	●	○	●	⊕
1.3	Formation of Block Watch SPAN (Strengthening Preparedness Amongst Neighbours) Teams	●	●	●	⊕
1.4	High School Student Volunteer Opportunities	⊕	⊕	●	●
2.1	Incentives for home risk reduction renovation projects	●	⊕	●	●
2.2	Development of a volunteer incentive program for recruitment and retention of volunteers	●	⊕	⊕	●



“Essential” Strategy Number	Title	Ease of decision making	Level of volunteer engagement	Addresses multiple Essentials	Technical expertise exists within the community
3.1	Conduct a complete hazard, risk and vulnerability assessment	○	●	●	●
4.1	Develop critical infrastructure assurance	⊕	⊕	●	●
5.1	School and Health Facilities DEM Safety Profile Database	⊕	○	●	●
5.2	School Emergency Planning Mentorship Program	⊕	⊕	●	●
6.1	Educate the community about the risks of habitation	●	⊕	●	●
6.2	Identify CI & Heritage Buildings requiring seismic upgrade	●	⊕	⊕	⊕
6.3	Building regulations & incentives to upgrade unreinforced concrete masonry	●	⊕	⊕	●



“Essential” Strategy Number	Title	Ease of decision making	Level of volunteer engagement	Addresses multiple Essentials	Technical expertise exists within the community
7.1	Utilize social networking sites as part of overall communications strategy	●	●	●	⊕
7.2	Include video clips on website to provide education	●	⊕	●	⊕
8.1	Explicit by-law protection for natural spaces	●	⊕	●	●
8.2	Conduct climate change impact assessment	●	⊕	●	●
9.1	MASAS registration	●	○	●	●
9.2	CAP – CP registration	●	○	●	●
9.3	On-line preparedness drills for staff & public	●	○	●	●
9.4	Enhance social media expertise	●	⊕	●	●
10.1	Develop a Recovery Plan	⊕	●	●	●

Table 2: Summary of mitigation strategies



Findings

This section presents, for each essential, a statement of the essential, the assessment and suggested mitigation measures.

Essential #1

“Put in place organization and coordination to understand and reduce disaster risk, based on participation of citizen groups and civil society. Build local alliances. Ensure that all departments understand their role in disaster risk reduction and preparedness².”

Assessment

Community involvement stands out in Oak Bay. Indicative of this involvement is the 38.5% response rate to the survey done for the community plan³. The Emergency Plan, part of the community plan, was developed with the participation of Emergency Management Coordinator and many volunteers and community members. Oak Bay residents are also involved in various committees, such as Oak Bay Emergency Program (OBEP), Emergency Social Services (ESS), and Emergency Communications. OBEP played an important role in producing the Emergency Program Strategic Plan; an objective-based work plan for disaster risk reduction.

The robust community engagement is the result of hard work by champions such as Sonja Ruthe (Community Emergency Preparedness Coordinator), Dave Cockle of the Fire Department, numerous volunteers and Block Watch- all of whom strive to make the community a safer place to live. It has also resulted in an impressive volunteer network,

² UN ISDR <http://www.unisdr.org/english/campaigns/campaign2010-2011>

³ Community plan, p. 9



which will soon benefit from a computer-based volunteer management system that will enhance communication and coordination of the local volunteer capacity. This volunteer network is a gateway to out-of-community resources. For example, the Emergency Communications group does a regional communication test every Wednesday and represents an impressive resource network. Volunteers also build networks with volunteers from other municipalities, as recently occurred when a delegation of OBEP volunteers participated in the Vancouver Island Emergency Preparedness Conference.

The commitment to make Oak Bay a safer place to live is championed at the political level. The municipal council is very supportive of disaster risk reduction initiatives, such as the *Making Cities Resilient* program for which this report was produced. The involvement of department heads from the Emergency Planning Policy Committee also demonstrates that municipal resources are engaged in disaster risk reduction and preparedness. Oak Bay also actively participates in disaster risk reduction at the regional and provincial levels, with both Dave Cockle and Sonja Ruthe on the organizing committee of *Shake Out BC*. Cooperation with surrounding municipalities and the Capital Regional District is stressed for disaster preparedness planning in the community plan. Oak Bay also actively works with the academic community, creating a *Green Map* in conjunction with the University of Victoria and partnering with Royal Roads University Disaster and Emergency Management Program for the production of this report.

While a Memorandum of Understanding was signed with all Greater Victoria municipalities for sharing resources during disaster response, no formal agreements are in place for mitigation or preparedness resource sharing. Also, some local actors such as businesses and certain community partners are not yet involved in disaster risk reduction and preparedness.



		Criteria		
		Stakeholder Input	Mechanisms of Coordination	DRR Responsibility
Rating	1	<ul style="list-style-type: none"> No stakeholder input 	<ul style="list-style-type: none"> No mechanism of coordination 	<ul style="list-style-type: none"> No resources for disaster risk reduction
	2	<ul style="list-style-type: none"> Stakeholders identified Some stakeholder input Some informal dialogue 	<ul style="list-style-type: none"> Baseline information established (disaster profile, capacities, resources, etc.) Trends, gaps, challenges and concerns identified 	<ul style="list-style-type: none"> Assigned responsibilities for disaster risk reduction
	3	<ul style="list-style-type: none"> Champions identified Multi-stakeholder input Structured, on-going dialogue Political commitment 	<ul style="list-style-type: none"> Priorities set Result-oriented work plans developed Progress monitored Collaboration with other municipalities and other levels of government 	<ul style="list-style-type: none"> Disaster risk reduction actions controlled and documented
Overall rating for Essential #1: 3				

Table 3: Assessment of Essential #1



Mitigation strategy 1.1: Formation of the Oak Bay Emergency Planning Partners Group

“Essential” Strategy Number	Title	Ease of decision making	Level of volunteer engagement	Addresses multiple Essentials	Technical expertise exists within the community
1.1	Formation of the Oak Bay Emergency Planning Partners Group	●	⊕	●	●

Table 4: Summary of mitigation strategy 1.1

Description

The District of Oak Bay community assessment revealed that there are opportunities to better develop relationships and alliances with:

- local businesses (e.g. Oak Bay Avenue Business Improvement Area);
- schools (i.e. school principals or other relevant stakeholders from both public and private schools, as well as representatives from Greater Victoria School District 61);
- Royal Jubilee Hospital;
- Other groups such as, but not limited to, Kiwanis Club, Heritage Oak Bay, and the local real estate community.

The formation of a new Oak Bay Emergency Planning Partners Group would engage these sectors and provide them with an active voice and a better understanding of the emergency management needs and activities that may impact their organizations. For example, preservation of heritage assets such as select buildings, cemeteries and gardens is considered a priority for Heritage Oak Bay⁴. The Oak Bay Emergency Planning

⁴ Heritage Oak Bay. (2011). *Welcome to Heritage Oak Bay*. Retrieved May 13, 2011 from <http://www.heritageoakbay.ca/>



Partners Group would promote discussion with Heritage Oak Bay stakeholders regarding how disasters may impact community heritage and how preservation activities should be addressed in local emergency management planning.

This option could be implemented and supported by current municipal Emergency Management staff and volunteers, within the existing emergency management budget. The participation of other provincial and federal government representatives would not be required. Although experts may be invited to present to group stakeholders, a high level of technical expertise would not be required by the volunteers themselves. It is also anticipated that once the group is established, it would result in a high level of community engagement.

Mitigation Strategy 1.2: Development of a Comprehensive Oak Bay Volunteer Management System (VMS)

"Essential" Strategy Number	Title	Ease of decision making	Level of volunteer engagement	Addresses multiple Essentials	Technical expertise exists within the community
1.2	VMS Development	●	○	●	⊕

Table 5: Summary of mitigation strategy 1.2

Description

As outlined in the community assessment, the District of Oak Bay has an active and well-established volunteer community. However, as of the date of this report, formal registration and tracking of volunteers is not currently in place at a municipal level. Reportedly, a volunteer management system (VMS) is in the development stage. This presents an ideal opportunity for Emergency Management staff to evaluate the VMS under development for the following functional uses:

- recording volunteer contact information,
- recording up-to-date training information,
- identifying applicable skill sets and abilities,
- identifying volunteers with special knowledge (e.g. retired medical professionals),



- detailing availability and interests,
- tracking participation in community events,
- documenting performance information,
- providing a scheduling function, and
- tracking volunteer in-kind time contributions (this is valuable data when negotiating funding through formal contribution agreements).

It may also be attractive for the District of Oak Bay to have a VMS that can be utilized to track equipment and materials that individuals are willing to loan / donate during emergency events. Furthermore, some VMS permit tracking donors for a specific project or program, as well as individuals who use the volunteer services. This would have the added benefit of assisting Emergency Management staff in the rapid identification of vulnerable individuals during emergency events.

Lastly, the District of Oak Bay should examine their exact VMS needs in consideration of the following questions:

- Does the software require a specific operating system?
- Can the VMS be accessed off-line or is it internet dependent?
- What are the web-based considerations?
- Are there any data privacy concerns?
- What level of security is required?
- Who will input and maintain the data?

This option could be implemented and supported by current municipal Emergency Management staff (with occasional consultation with technical experts such as system developers). Budget implications would be based on whether or not Emergency Management staff decided to enhance the VMS currently under development to reflect the considerations above, or to purchase an off-the-shelf VMS system⁵. Regardless, additional stakeholder engagement would not be required until the VMS was implemented for use in the community.

⁵ Coyote Communications. (2011). *List of Volunteer Management Software*. Retrieved May 13, 2011 from <http://www.coyotecomunications.com/tech/volmanage.html>



Mitigation Strategy 1.3: Formation of Block Watch Strengthening Preparedness Amongst Neighbours (SPAN) Teams (including Citizen and Business SPAN Teams)

“Essential” Strategy Number	Title	Ease of decision making	Level of volunteer engagement	Addresses multiple Essentials	Technical expertise exists within the community
1.3	Formation of Block Watch SPAN Teams	●	●	●	⊕

Table 6: Summary of mitigation strategy 1.3

Description

As the community assessment has described, the Block Watch program⁶ has increased community safety by empowering neighbours to help neighbours. Building on this success, the District of Oak Bay could enhance the Block Watch program to include Strengthening Preparedness Amongst Neighbours (SPAN) Teams⁷ to engage citizens in disaster preparedness. Based on a similar model effectively implemented by other municipalities (e.g. Halifax, Nova Scotia, Seattle, Washington, etc.), these Block Watch SPAN teams can be established on a street by street, block by block level. Block Watch SPAN Teams will empower residents to organize and obtain training on key disaster and emergency management (DEM) topics such as rapid damage assessment, first aid, reception centre operations, search and rescue, gathering local disaster impact intelligence, etc. It is anticipated that the Block Watch SPAN Teams would be a very successful way to engage urban residents and encourage neighbourhood self-sufficiency following a disaster or emergency.

⁶ Oak Bay Police Department. (2011). *Block Watch*. Retrieved May 14, 2011 from <http://www.oakbaypolice.org/blockwatch.html>

⁷ City of Bellevue, Washington. (2011). *Getting ready...SPAN's guide to personal and neighbourhood preparedness*. Retrieved May 14, 2011 from http://www.bellevuewa.gov/pdf/Fire/Getting_Ready_-_SPAN_complete_book.pdf



On a similar note, Block Watch SPAN Business Teams could also be developed. In this scenario, the champions would be respected business representatives from the Oak Bay business community. SPAN Business teams would educate local business owners on the hazards and risks that the business community may experience, explore supply chain risk management⁸, examine the importance of business continuity planning in building community resiliency, and provide guidance on how to develop a business continuity plan (e.g. standardized templates and risk scenarios).

This option can be built upon the existing Block Watch Program, requiring some upfront development and support from the municipal Emergency Management staff. The Block Watch SPAN Business Teams would require additional short-term staffing resources until business community champions are identified and trained to maintain the SPAN Business Teams. As these are citizen and business-based teams, provincial and federal representation is not warranted. However, they do require a high level of community engagement and buy-in. Initial volunteer training (train-the-trainer model) may be provided by the local municipal Emergency Management staff and/or by subject matter experts as required. Given that the Block Watch program framework is already in place, the costs associated with launching the SPAN Teams is believed to be minimal. Associated training expenses would likely decrease once the teams are set up, running and self-sufficient.

⁸ Kaye, D. (2008). *Managing risk and resilience in the supply chain*. London, UK: British Standards Institution.



Mitigation Strategy 1.4: Build Alliances with Local Schools to Provide Disaster and Emergency Management (DEM) Volunteer Opportunities to Students

“Essential” Strategy Number	Title	Ease of decision making	Level of volunteer engagement	Addresses multiple Essentials	Technical expertise exists within the community
1.4	High School Student Volunteer Opportunities	⊕	⊕	●	●

Table 7: Summary of mitigation strategy 1.4

Description

As previously highlighted, the District of Oak Bay has a high success rate building local alliances for the purposes of increasing understanding and reducing disaster risk within the community. An ideal opportunity exists to further engage local schools and students in the disaster and emergency management (DEM) arena through a B.C. Ministry of Education high school graduation requirement. This requirement entails that public high school students fulfill at least 30 hours of community service (or other relevant unpaid work experience) prior to graduation⁹. These students would be extremely valuable volunteers across the entire District of Oak Bay Emergency Management Program and would have an opportunity to learn about DEM, while improving their community’s preparedness for disasters. A sample of where high school student volunteers could be utilized includes:

- Data entry (e.g. into volunteer and other DEM management systems),
- Helping at Emergency Management booths at community events,

⁹ B.C. Ministry of Education. (n.d.). *Policy document: Work experience and/or community service requirements for graduation and workplace safety*. Retrieved May 14, 2011 from http://www.bced.gov.bc.ca/policy/policies/work_experience_req.htm



- Handing out community DEM public information brochures,
- Assisting in the development and management of Oak Bay DEM social media tools, and
- Training senior citizens on the use of social media tools (and thereby increasing their access to on-line DEM information).

This option aligns with the community assessment and promotes a high level of community engagement. It would require outreach effort from the existing Oak Bay Emergency Management staff (and time to complete the Work Experience Agreements for student volunteers), but would not likely require additional staffing resources. The program is a requirement of the B.C. Ministry of Education, but does not involve active staff participation from the B.C. Ministry of Education or the Greater Victoria School District No. 61. The technical expertise to implement this option is already available within existing municipal staff.

Essential #2

“Assign a budget for disaster risk reduction and provide incentives for homeowners, low-income families, communities, businesses and the public sector to invest in reducing the risks they face.”¹⁰

Assessment

The Municipality of Oak Bay has dedicated funds for the Emergency Program. They have identified the need to fund disaster risk reduction strategies. For example, the municipal budget identifies funds for program initiatives such as the School Preparedness Program. Funds allocated for Emergency Social Services also support local programs including the Community Emergency Preparedness Outreach Team. Additionally, Oak Bay has prioritized addressing local vulnerabilities by applying for and obtaining funds under

¹⁰ UN ISDR <http://www.unisdr.org/english/campaigns/campaign2010-2011>



the Joint Emergency Preparedness Program (JEPP), as well as a UBCM grant for the Oak Bay Senior's Mitigation and Preparedness Project.

The Municipality of Oak Bay has enacted a provincially mandated Emergency Management by-law, which identifies the Emergency Management organization structure and key personnel. This by-law also provides the Emergency Management Coordinator and Committee with the authority to function and to plan. This framework has been utilized municipally and appears to function well. Another municipal level exercise is scheduled for this fall. The municipal council is receptive to emergency management initiatives and works closely with the Emergency Program staff to support new and ongoing initiatives.

The current budget for disaster and emergency management is 0.23% of the total budget expenditures. There are currently no municipally provided incentives for investments to reduce the risks faced.

Based on an assessment of the criteria for this essential, the Community of Oak Bay is assessed as a **LEVEL 2**. Oak Bay has both a budget for EM and a by-law that authorizes emergency management planning.



		Criteria	
		Municipal Funding	EM By-law
Rating	1	<ul style="list-style-type: none"> No identification of requirement for funding No funding for DRR / EM 	<ul style="list-style-type: none"> No EM By-law No identification of requirement for EM By-law No policy framework for community EM
	2	<ul style="list-style-type: none"> Identification of requirement for DRR / EM funding Dedicate funds for DRR / EM within operating budgets 	<ul style="list-style-type: none"> Identify EM requirements (Provincial framework / Emergency Program Act) Identification of EM organization (Coordinator / Committee) Passing/adopting of EM By-law by municipal council Ensure EM By-law supported with required funding
	3	<ul style="list-style-type: none"> Prioritize expenditures in order to address local vulnerabilities Recognize and reward DRR / EM champions Provide fiscal incentives for DRR initiatives Actively seek out funding schemes external to community (grants) 	<ul style="list-style-type: none"> Implement EM By-law and identify key personnel Conduct exercises to ensure the proper functioning of the EM organization Ensure that laws and policies specify mechanisms for compliance, control and documentation
Overall rating for Essential #2: 2			

Table 8: Assessment of Essential #2



Mitigation strategy 2.1: Provide incentives for homeowners to enter home risk reduction renovation projects, i.e. seismic upgrading.

“Essential” Strategy Number	Title	Ease of decision making	Level of volunteer engagement	Addresses multiple Essentials	Technical expertise exists within the community
2.1	Provide incentives for homeowners to enter home risk reduction renovation projects	●	⊕	●	●

Table 9: Summary of mitigation strategy 2.1

Description

The community assessment provided within this report reveals that some opportunities exist for the District of Oak Bay to allocate financial resources to improve disaster resilience. One prospect is motivation for homeowners and commercial building owners to invest in reducing the seismic risks they face. The incentives for making the improvements include waiving or reducing building permit fees when starting the project, and one-time property tax reductions for completed projects. This program has the advantage of being developed locally, allowing for community input and heritage preservation.

Since the process is no different from what already exists for persons obtaining building permits, regular employees could deliver the service without additional staffing needs. Volunteers could also lend a hand with the administration and delivery of the service. There is no need for additional technical expertise to deliver this strategy other than what already exists within the municipality, ensuring a high likelihood of success. Similar efforts have been successful in other jurisdictions where up to 40% of single family



homes had some kind of seismic improvement completed when a related plan was implemented¹¹.

Mitigation strategy 2.2: Provide incentives for homeowners to enter home risk reduction renovation projects, i.e. seismic upgrading.

“Essential” Strategy Number	Title	Ease of decision making	Level of volunteer engagement	Addresses multiple Essentials	Technical expertise exists within the community
2.2	Development of a volunteer incentive program for recruitment and retention of volunteers	●	⊕	⊕	●

Table 10: Summary of mitigation strategy 2.2

Description

As demonstrated in other sections of the assessment, volunteers are an extremely valuable human resource and emergency management in the community is heavily dependent on them. While recognition of volunteer efforts is important, it does not provide all the motivation necessary to ensure long-term commitment. Volunteer loyalty results from volunteers being offered training and professional development opportunities¹². The proposed mitigation strategy is to develop an incentive program for volunteers to cover cost of training and professional development. The activities supported by this program can range from courses taught by experts from within or outside of the community, as is presently done, to assistance for those already enrolled in

¹¹ Earthquake Engineering Research Institute (EERI) Northern California Chapter

¹² Hager & Brudney, 2004



college or university programs with tuition or textbooks costs. This strategy could be crucial for the maintenance and continuation of that volunteer base.

This incentive program can be locally driven by volunteers for volunteers, requiring no outside government or technical support. It is also a good fit with current community values. Funding is available for nonprofit volunteer groups from various sources such as Thrifty Foods Smile Card program that delivers 5% of group member purchases to the volunteer organization. An application for this program can be picked up at any Thrifty Food location or on line at the following link;

<http://www.thriftyfoods.com/assets/Minor~Menu/PDFs/smile-card-application.pdf>.

Nonprofit volunteer groups can also approach BC Hydro under its leadership pillar for funding. To apply simply follow the link;

http://www.bchydro.com/community/community_investment/funding_application.html

and fill in the application. If accepted, the funds will be available in 6-12 weeks. Coast Capital Savings also has a community sponsorship program for nonprofit volunteer organizations for amounts up to \$30,000.00. The request for sponsorship must be received by June 3, 2011 or Sept 23, 2011 to be eligible for any funding this year. Follow the link to the application;

<https://grant.grantstream.ca/CoastCapital/GrantRight/gsPageGenerator.php>

Essential #3

“Maintain up-to-date data on hazards and vulnerabilities, prepare risk assessments and use these as the basis for urban development plans and decisions. Ensure that this information and the plans for your city’s resilience are readily available to the public and fully discussed with them.”¹³

¹³ UN ISDR <http://www.unisdr.org/english/campaigns/campaign2010-2011>



Assessment

The Community of Oak Bay has identified local hazards in accordance with provincial framework through the completion of a Hazard, Risk and Vulnerability Assessment (HRVA) in 2004. This document identifies and prioritizes hazards, examines the impact of these hazards on the community and conducts a risk assessment. This HRVA includes an integrated hazards map as well. Most recently, the Capital Regional District (CRD), of which Oak Bay is one community, conducted a risk assessment and identified risks that could impact the 13 communities associated to a variety of disaster / emergency events. This document has been made available to all communities but is presently only a draft document. As of now, the 2004 HRVA is being used, but it has not been updated with the newly available information.

The Community of Oak Bay has also identified local vulnerabilities and has paid particular attention to the at-risk demographic in the area. One example of this the development of a vulnerability map utilizing a geographical information system (GIS) interface, which identifies senior's residences in the area. Using the vulnerability map, the Oak Bay Emergency Program has developed strategies to address the needs of this at-risk population in times of an emergency. One example of this is the Oak Bay Senior's Mitigation and Preparedness Project. Additionally, the community of Oak Bay has identified another vulnerability within their schools. In order to reduce the risk in this population, the Oak Bay Emergency Program is working closely with the schools through the School Preparedness Program.



		Criteria	
		Hazard Analysis	Risk Assessment
Rating	1	<ul style="list-style-type: none"> No identification of any hazards that affect the community Some awareness of potential hazards but no analysis 	<ul style="list-style-type: none"> Community has conducted no assessment of hazards and vulnerabilities affecting the community No existing community or district assessments to reference
	2	<ul style="list-style-type: none"> Identify local hazards in accordance with provincial hazard framework Develop integrated hazards map of geographical area and communities at risk Ensure hazards identified to community 	<ul style="list-style-type: none"> Identify local vulnerabilities Conduct risk assessment of hazards and vulnerabilities Consider social, economic, physical and environment factors
	3	<ul style="list-style-type: none"> Characterize and prioritize hazards that can impact the community (intensity, frequency and probability) 	<ul style="list-style-type: none"> Use new technology for conducting risk assessment as required Consult with all sectors to ensure risk information is comprehensive and includes historical and indigenous knowledge Develop DRR strategies in accordance with identified risk
Overall rating for Essential #3: 3			

Table 11: Assessment of Essential #3



Mitigation Strategy 3.1: Conduct a complete hazard, risk and vulnerability (HRVA) assessment.

“Essential” Strategy Number	Title	Ease of decision making	Level of volunteer engagement	Addresses multiple Essentials	Technical expertise exists within the community
3.1	Conduct a complete hazard, risk and vulnerability assessment	○	●	●	●

Table 12: Summary of mitigation strategy 3.1

It is suggested that the community of Oak Bay undertake a hazard, risk and vulnerability assessment (HRVA) at the community level (e.g. neighborhoods, community groups or individual households). This strategy would increase the public’s awareness of the hazards and risks they face by participating in the overall HRVA process, they would also increase their understanding of the proposed municipality’s HRVA, and its subsequent findings and recommendations.

Using the list of hazards outlined in the municipal Emergency Response Recovery Plan (ERRP), templates from the Provincial Recovery Plan¹⁴, and elements of the Emergency Management British Columbia’s (EMBC) online HRVA, the municipal emergency management staff and outreach program volunteers could develop a community-centric handout and create an on-line checklist. The checklist would enable community groups or households to determine their respective level of vulnerability. Other options for the development of the web-based checklist would be in cooperation with the school districts computer education program whereby high school students would be given the opportunity to develop a pro-forma checklist for use within the Capital Regional District and their own municipality. Assistance in the delivery of handouts could be gained through cooperation with community-based organizations such as St John’s Ambulance and the Oak Bay Business Association (pamphlets available within

¹⁴ BC Community Disaster Recovery Guide www.pep.bc.ca



their businesses). This would augment the normally scheduled (and resourced) Oak Bay outreach program.

Understanding what individual, group or community vulnerabilities are is the first step in establishing personal, family or group methods to remove or reduce these vulnerabilities. These suggested steps and their continued improvement through an annual review of the HRVA would increase the community's resilience to disasters.

Essential #4

“Invest in and maintain critical infrastructure that reduces risk, such as flood drainage, adjusted where needed to cope with climate change.”¹⁵

Assessment

Oak Bay has identified limited Critical Infrastructure (CI) capacity as defined by the National Strategy for Critical Infrastructure (NSCI).¹⁶ The Oak Bay Fire Hall, Police Station and new water distribution lines are examples of key CI that have been successfully identified by Oak Bay community planners. Information pertaining to other Oak Bay CI, such as transportation, communication, energy and utilities currently are separate, independent, pieces of information, which makes it more difficult to prioritize investment and develop long-term strategies.

Concrete steps have been taken to improve resiliency, replacement, and redundancy/backup in select CI. This was recently accomplished by the procurement of mobile generators that will provide a degree of power generation options in the event of an emergency. Yet another excellent example of redundant capabilities within Oak Bay

¹⁵ UN ISDR <http://www.unisdr.org/english/campaigns/campaign2010-2011>

¹⁶ Government of Canada. (2009). *National Strategy for Critical Infrastructure* (Cat. No.: PS4-65/2009E- PDF). Canada, Queen's Printer. Retrieved from <http://www.publicsafety.gc.ca/prg/em/ci/ntnl-eng.aspx>



was the establishment of a back-up EOC within the Municipal Hall. Furthermore, the recognized need to upgrade the community sewage system; including the lift station adjacent to Windsor Park are excellent examples of how Oak Bay is improving resiliency, and replacement of select CI. However, due to a lack of community specific information on climate change impacts, long-term planning for critical infrastructure is not sufficient to allow for associated disaster risk reduction.

Limited sector specific critical facility (building) plans and programs, for ensuring life safety and continuity of services, have been developed using the BC Fire Code, and the BC Building Code. This capability provides a valuable basis for which the development of more robust critical facility emergency plans can take place within Oak Bay. Upgrades to the Fire Hall, Police Station and water distribution system are examples of how the municipality retrofitted existing CI to increase resilience to the earthquake risk.

		Criteria
		Critical Infrastructure
Rating	1	<ul style="list-style-type: none"> No action to increase resilience of critical infrastructure
	2	<ul style="list-style-type: none"> Dispersed information on critical infrastructure Develop priorities for immediate investment in improved resilience, including retrofit, replacement and redundancy/backup capabilities
	3	<ul style="list-style-type: none"> Developed a sector-specific critical facility plans Partnered with utility companies and industrial owners to reduce vulnerability Development of long term strategies to increase CI resilience.
Overall rating for Essential #4: 2		

Table 13: Assessment of Essential #4



Mitigation Strategy 4.1: Develop Critical Infrastructure assurance.

“Essential” Strategy Number	Title	Ease of decision making	Level of volunteer engagement	Addresses multiple Essentials	Technical expertise exists within the community
4.1	Develop critical infrastructure assurance	⊕	⊕	●	●

Table 14: Summary of mitigation strategy 4.1

Description

At present, the District of Oak Bay has a listing of important civic infrastructure. However, the municipality has not established a catalogue of critical infrastructure at either the municipal or regional level. The issues of critical infrastructure and the retention of essential civic services during time of crisis or disaster are considered critical and necessary areas for risk reduction within the District of Oak Bay. It is recommended that the District of Oak Bay develop a catalogue of infrastructure that is critical to the continuity of the community. This catalogue should be informed by community specific information on climate change impacts to ensure future climate -driven disasters are mitigated through critical infrastructure assurance. For example, Oak Bay may build on Capital Regional District’s use of permeable road surfaces as part of their regular road infrastructure maintenance program.

The list below, while not exhaustive, provides examples of the infrastructure considered essential to the continuance of a community:

- temporary accommodation facilities (e.g. recreation centres, schools)
- temporary accommodation facilities with kitchen capabilities
- potential infant care centres
- medical clinics and potential life-saving centres
- sources for potable water
- sources for food
- sources for fuel

It is also recommended that the municipality develop a catalogue of infrastructure that is critical to the continuity of essential social services:



- police services/facilities
- fire service/facilities
- emergency medical transport/facilities
- pharmaceutical facilities
- communications (voice/data) distribution network (e.g. emergency services dispatch connections)
- financial services network (e.g. commercial banks and their respective business continuity plans)

This catalogue of identified critical infrastructure, along with the information garnered from the community and municipal HRVA (see mitigation strategy 3.1) will support the municipality in the development of risk mitigation strategies or infrastructure assurance plans for use during crisis response or disaster relief operations. In addition, the integration of this catalogue in a common GIS-based system would provide emergency management staff a better tool from which to plan and prepare the municipality to deal with emerging crises. In the event of a crisis or disaster, the municipality would be in a better position to accurately understand the community's needs and ensure the required capabilities are provided in a timely and effective manner. Recognizing the cost factor that would be involved in this process, it is suggested the District of Oak Bay seek funding support for the development of a critical infrastructure assurance plan from the BC Government's Infrastructure Planning Grant Program (maximum of \$10,000 – Application data is 27July, 2011)¹⁷. To assist in the development and use of a GIS database for critical infrastructure information management, funding may be requested from CivicSpatial Grant Program¹⁸ (maximum \$1500, continuing application process).

¹⁷ <http://www.civicinfo.bc.ca/>

¹⁸ <http://www.icsociety.ca/civic-spatial-program/civic-spatial-grant.htm>



Essential #5

“Assess the safety of all schools and health facilities and upgrade them as necessary.”¹⁹

Assessment

Two Oak Bay schools have been seismically upgraded and a third is targeted in the near future.²⁰ There currently is a provincially sponsored effort by the BC Ministry of Education to target educational facilities, including those in Oak Bay, through the Seismic Mitigation Program in which 1.5 billion dollars have been committed to this project.²¹ The Seismic Mitigation Program will target the remaining schools within Oak Bay, though a timeline was not currently confirmed.

A new eight story Patient Care Tower at Royal Jubilee Hospital has recently been opened and designed to robust seismic standards.²² The Health Authority’s Regional Emergency Advisory Committee and the Municipality of Oak Bay are working closely together to ensure that all healthcare facilities are issued operating licences, and are conforming to basic guidelines, though greater communication between these two entities is encouraged.

Using the BC Fire Codes and the BC Building Codes, the Oak Bay Fire Department has reported that Fire and Life Safety standards are meeting or exceeding guideline requirements on school and healthcare facilities that they are inspecting.²³ Building evacuation plans, and general health and safety issues are in generally good order,²⁴ however, Emergency Response Plans specifically for public schools and healthcare facilities located within the geographical boundary of the Municipality of Oak Bay need to

¹⁹ UN ISDR <http://www.unisdr.org/english/campaigns/campaign2010-2011>

²⁰ D. Cockle, D. Marshal, & R. Thomassen, personnel communication, 6 May 2011.

²¹ BC Ministry of Education, 2011, Google, <http://www.gov.bc.ca/bced/>.

²² Patient Care Tower Opens, 2011, Google, <http://futurefacing.com/?p=816#more-816>

²³ D. Cockle, D. Marshal, & R. Thomassen, personnel communication, 6 May 2011.

²⁴ Ibid.



be reviewed.²⁵ Two private schools, Glenlyon Norfolk and St. Michael’s, have robust Emergency Response Plans that could also be used as a guiding source within the Municipality of Oak Bay.

		Criteria	
		Schools	Health Facilities
Rating	1	<ul style="list-style-type: none"> No inventory of critical facilities 	<ul style="list-style-type: none"> No inventory of critical facilities
	2	<ul style="list-style-type: none"> Safety of schools has been assessed Partnership between municipality and school board 	<ul style="list-style-type: none"> Safety of health facilities has been assessed Partnership between municipality and local health authority
	3	<ul style="list-style-type: none"> Long-term strategy including regular assessment of school safety Upgrade facilities if needed 	<ul style="list-style-type: none"> Long-term strategies including regular assessment of health facilities safety Upgrade facilities if needed
Overall rating for Essential #5: 2			

Table 15: Assessment of Essential #5

²⁵ S.Service, personnel conversation, 11 May 11.



Mitigation Strategy 5.1: Creation of a School and Health Facilities DEM Safety Profile Database for the District of Oak Bay

“Essential” Strategy Number	Title	Ease of decision making	Level of volunteer engagement	Addresses multiple Essentials	Technical expertise exists within the community
5.1	School and Health Facilities DEM Safety Profile Database	⊕	○	●	●

Table 16: Summary of mitigation strategy 5.1

Description

As the community assessment has indicated, the Oak Bay Emergency Management staff currently does not have a formal means by which to track the full disaster and emergency management (DEM) safety profiles of schools and health facilities. A School and Health Facilities DEM Safety Profile Database should be created and maintained by the Emergency Management Staff, and contain the following information:

- name and address of each school and health facility (regardless of whether it is public or privately-funded),
- key facility contact information (i.e. during normal operations and during emergency or disaster events),
- age and type of structure (including any additions to the original structure),
- indication of any upgrades to the facility (e.g. seismic upgrades),
- available information on facility licensing requirements and status,
- indication of whether the facility has an emergency management plan,
- copy of the facility emergency management plan (where applicable),
- results of recent inspections (i.e. building and fire code inspections), and
- municipal Emergency Management staff communication logs.

As safety is not limited to the physical structures alone, occupant disaster preparedness should also be assessed and recorded in the School and Health Facilities DEM Safety Profile Database. Recorded information may include:



- records of emergency management services provided by the municipality (e.g. DEM training, lectures, information brochures, etc.) to the facility occupants or operators,
- number and names of facility staff trained on DEM,
- records of participation in community safety exercises (e.g. preparedness exercises such as The Great British Columbia ShakeOut²⁶), and
- school-provided lists of high school students wishing to participate as DEM community volunteers (see mitigation strategy 1.4).

A School and Health Facility DEM Profile Database could be created in a cost-effective manner by utilizing existing municipal spreadsheet software (e.g. Microsoft Excel) or a relational database management system (e.g. Microsoft Access). The School and Health Facility DEM Profile Database should not add additional cost to the Emergency Management Program, but build upon the software and systems that are already in use (and technically understood) by the District of Oak Bay staff.

For the public facilities, the Vancouver Island Health Authority (VIHA) and the Greater Victoria School District No. 61 will need to be engaged in order to obtain (and maintain) the data required for the School and Health Facility DEM Profile Database. For private schools and health facilities, the Emergency Management staff will need to outreach to each individual facility to obtain the relevant information. In general, the District of Oak Bay Emergency Management staff will be needed to administer and deliver on this strategy. Over the long term, maintenance of this database could be transitioned to a trained volunteer.

²⁶ *The Great British Columbia ShakeOut*. (2011). Retrieved from <http://www.shakeoutbc.ca/>



Mitigation Strategy 5.2: Establish a School Emergency Planning Mentorship Program

“Essential” Strategy Number	Title	Ease of decision making	Level of volunteer engagement	Addresses multiple Essentials	Technical expertise exists within the community
5.2	School Emergency Planning Mentorship Program	⊕	⊕	●	●

Table 17: Summary of mitigation strategy 5.2

Description

As the community assessment has indicated, the two private schools within Oak Bay (Glenlyon Norfolk and St. Michael’s) have robust disaster and emergency management (DEM) plans. Oak Bay Emergency Management staff can outreach to Glenlyon Norfolk and St. Michael’s administrators to mentor and guide the public school administrators in the development of their emergency plans. This can be accomplished through various approaches including, but not limited to:

- having the schools work together on a one-on-one basis through a DEM Sister School Program to enhance planning and preparedness in local academic settings, or
- organizing and facilitating a DEM Planning Mentorship Workshop.

Regardless of approach, as schools face similar DEM challenges (in different contexts), they have a great opportunity to learn from one another and support each other in becoming safer and more resilient. Building these relationships up front will also pay off during an actual emergency event (e.g. being able to offer each other mutual aid, such as human resource support or material resource support).

For the public school facilities, the Greater Victoria School District No. 61 should be engaged; at a minimum, the administrators of each public school facility should be approached to gauge their interest in receiving planning assistance. However, in order for this strategy to succeed, the private school administrators will need to agree to lend a guiding hand to their public school counterparts. In general, the District of Oak Bay



Emergency Management Program will be needed to administer and deliver on this strategy, using the expertise already available in existing staff. Costs are anticipated to be minimal (i.e. if a workshop approach is selected, then this can be hosted at a municipal facility or at one of the school locations, with hospitality expenses minimized).

Essential #6

“Apply and enforce realistic, risk-compliant building regulations and land-use planning principles. Identify safe land for low-income citizens and develop upgrading of informal settlements, wherever feasible.”²⁷

Assessment

Overall the Municipality of Oak Bay possesses and enforces excellent land-use planning and Building Code By-laws. Oak Bay maintains a well designed land-use information and education capability in which the public website is easy to find and navigate.²⁸ Oak Bay By-Law 3531 governs land usage and zoning, as well BC Fire Codes, and the BC Building Codes are used to provide enforcement guidance, for example, Section 7.1.4(10) specifically outlines the duration, and time-line in which temporary lodging is permitted to personnel due to a disaster that has rendered occupants homeless.²⁹

In general Oak Bay has very restrictive land-use and zoning laws, and there is no informal settlement or construction within the community.³⁰ Primary land-use or development emergency planning concerns are the man-made Oak Bay Marina, due to potential ground instability during a seismic event, and the low lying land at Windsor

²⁷ UN ISDR <http://www.unisdr.org/english/campaigns/campaign2010-2011>

²⁸ <http://www.oakbaybc.org/residents/residentsguide.html#land>

²⁹ <http://www.oakbaybc.org/bylaws/3531.pdf>

³⁰ Conversation with DFC May 11



Park, due to potential flooding³¹; however, all beach areas are restricted for building as outlined in the Oak Bay Community Plan.³²

Community groups, such as the Heritage Oak Bay Foundation, play important roles in impacting land-use and infrastructure building and restoration efforts.³³ Furthermore, the general public is encouraged to participate on a very regular basis through bi-monthly opportunities of attending council meetings and directly engage council on land-use issues or concerns. Additionally, the Oak Bay council maintains a very proactive hands-on approach to all land-use legal issues through, such as the issuance of building permits, Oak Bay By-Law 3531.³⁴

³¹ Ibid

³² Oak Bay Community Plan

³³ [http://www.heritageoakbay.ca/pages/about_heritage_oak_bay/who_we_are.ht](http://www.heritageoakbay.ca/pages/about_heritage_oak_bay/who_we_are.html)

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³⁴ <http://www.oakbaybc.org/residents/residentsguide.html#land>



		Criteria	
		Land-use Planning	Building Codes
Rating	1	<ul style="list-style-type: none"> No planning for land use Development in hazardous areas 	<ul style="list-style-type: none"> No illicit/informal construction
	2	<ul style="list-style-type: none"> Land-use regulation in effect Enforced land-use regulations 	<ul style="list-style-type: none"> Building code in place Enforcement of building code
	3	<ul style="list-style-type: none"> Community involvement strategies Public information and education 	<ul style="list-style-type: none"> Legal recourse available Community involvement strategies Public information and education
Overall rating for Essential #6: 3			

Table 18: Assessment of Essential #6

Mitigation Strategy 6.1: Educate the Community about the habitation risks of their surroundings, such as unreinforced concrete masonry buildings and/or waterfront property.

“Essential” Strategy Number	Title	Ease of decision making	Level of volunteer engagement	Addresses multiple Essentials	Technical expertise exists within the community
6.1	Educate the community about the risks of habitation	●	⊕	●	●

Table 19: Summary of mitigation strategy 6.1

Description

Educating a community about the risks associated with living where they do is a good risk reduction strategy. This way, it is the individuals themselves who decide what level of risk they are prepared to tolerate and what they will do to manage the risks they are now aware of. Discussions and visual representation of the risks associated with living



in a particular area or type of dwelling will help the community take responsibility for its own risk. For example, discuss structural reinforcement with property owners that have unreinforced concrete masonry, making them aware of the risks, risk mitigation procedures, the expertise required and the costs. The municipality could organize an information session that seismic specialists, structural engineers, planning and emergency management staff all participate, working with the public to educate them and create risk reductions strategies that are feasible.

Mitigation Strategy 6.2: Identify Critical Infrastructure buildings and buildings of historical significance that require seismic upgrade and create a plan to reduce associated risks

“Essential” Strategy Number	Title	Ease of decision making	Level of volunteer engagement	Addresses multiple Essentials	Technical expertise exists within the community
6.2	Identify CI & Heritage Buildings requiring seismic upgrade	●	⊕	⊕	⊕

Table 20: Summary of mitigation strategy 6.2

Description

Identify all critical infrastructure buildings and structures that require upgrading. Also identify, in partnership with the Heritage Oak Bay Foundation³⁵, all buildings of historical importance that require upgrading. To maintain existing structures and support risk reduction, the Heritage Oak Bay Foundation could work with municipal staff and officials to create community guidelines for the maintenance and potential upgrade of existing heritage structures and to find creative solutions to protecting and preserving historical buildings.

³⁵ Heritage Oak Bay: <http://www.heritageoakbay.ca>



Mitigation Strategy 6.3: Introduce building regulations and incentives that promote the upgrade of existing, unreinforced concrete masonry buildings.

“Essential” Strategy Number	Title	Ease of decision making	Level of volunteer engagement	Addresses multiple Essentials	Technical expertise exists within the community
6.3	Building regulations & incentives to upgrade unreinforced concrete masonry	●	⊕	⊕	●

Table 21: Summary of mitigation strategy 6.3

Description

The District of Oak Bay could introduce building regulations and incentives that would support the upgrade of unreinforced concrete masonry buildings, such as, one-time property tax breaks to owners who have undertaken infrastructure or property safety improvements that reduce the risk to them and to the community. For heritage buildings, partnerships could be explored with Heritage BC and Heritage Canada that would provide allowances and tax breaks for heritage building owners who wish to upgrade their structures to reduce risk. One-time provincial or federal tax credits for infrastructure safety improvements could also be explored. Funding from the Heritage Legacy Fund of British Columbia³⁶ (continuous application process) or a Private/Public Partnership between building owners and the District of Oak Bay, funded by Private/Public Partnerships Canada³⁷ (applications for next funding cycle are due 30 June, 2011) could support these initiatives.

³⁶ http://www.heritagelegacyfund.ca/images/HLF_Program_Guidelines.pdf

³⁷ <http://www.p3canada.ca/home.php>



Essential # 7

“Ensure that education programs and training on disaster risk reduction are in place in schools and local communities.”³⁸

Assessment

The municipality of Oak Bay has a thriving and robust energy for community and school education training programs that embrace disaster risk reduction. Utilizing educational program initiatives that are delivered by the Red Cross, community volunteers, and parent advisory committees, Oak Bay is a leader in delivering age appropriate education to pre- school, and grades three to five students. Additionally, these students are encouraged to bring home the disaster risk reduction kits, and share with their families, which embrace the community spirit embossed in the United Nations international Strategy for Risk Reduction (UNISDR). Parent council’s work tirelessly to maintain disaster prepared schools by supplying disaster supplies in accordance with the *Government of Canada’s 72-hour preparedness* message. Eighty percent of Oak Bay’s schools maintain a shipping sea container that hold enough food, water and supplies for all children and staff in case disaster strikes. This enormous venture is the catalyst for developing and creating lasting dialogue between students, teachers, and the community.

Oak Bay reaches its senior citizens, faith-based organizations, and local community by delivering pertinent disaster risk reduction education by means of community meetings, open houses, and engaging seniors’ residences. One Oak Bay senior’s facility mandates that all residents must have a grab and go bag ready at their door in the event they need to evacuate. Seniors are engaged, respected, and valued as part of the disaster risk solution. Oak Bay delivers community outreach disaster risk education by hosting outreach booths in front of local businesses that informs and engages the general public in a warm and friendly manner.

One of the brightest stars in the Oak Bay plan is its people. Oak Bay employs civil servants and professionals that have embraced the message of disaster preparedness, and truly foster a spirit of collaboration that empowers and connects all departments to

³⁸ UN ISDR <http://www.unisdr.org/english/campaigns/campaign2010-2011>



the community and its people. It is truly evident that the municipality of Oak Bay has a very strong connection to the citizens and cares deeply about their safety.



		Criteria	
		Training	Public Education
Rating	1	<ul style="list-style-type: none"> No identification of any school or community training or programs for the purpose of risk reduction. 	<ul style="list-style-type: none"> No identification of public education programs in community
	2	<ul style="list-style-type: none"> Seek to engage and inform different age groups so as to build sustained understanding across generations for risk reduction purposes. Promote activities that enable school-aged children to influence parents. 	<ul style="list-style-type: none"> Engage respected local officials, religious and community leaders, and other special interest groups, in order to disseminate information and encourage participation. Organize workshops, forums and educational activities for communities.
	3	<ul style="list-style-type: none"> Provide training for teachers and school officials regarding disaster risk education. Identify women's and community groups and professional associations or trade organizations that could contribute to or benefit from training. 	<ul style="list-style-type: none"> Target all sections of society. Design and implement programs with a clear understanding of local perspectives and requirements.
Overall rating for Essential #7: 3			

Table 22: Assessment of Essential #7

Mitigation Strategy 7.1: Continue toward utilizing social networking sites (SNS) as part of overall communications.

“Essential” Strategy Number	Title	Ease of decision making	Level of volunteer engagement	Addresses multiple Essentials	Technical expertise exists within the community
7.1	Utilize social networking sites as part of overall communications strategy	●	●	●	⊕



Table 23: Summary of mitigation strategy 7.1

Description

The community assessment provided within this report reveals that some opportunities may exist to improve the disaster resilience of the District of Oak Bay in regards to disaster risk reduction (DRR) education and training in the community. One example would be to continue towards the use of social networking sites (SNS) as a communication strategy. The use of SNS in all stages of emergency management is accepted and is considered a viable solution to the problem of information distribution and communications³⁹. In the Oak Bay District there are many senior citizen residents, and this may present a challenge if they are not be familiar with social networking or do not have the equipment required to access it. To overcome this minor obstacle, volunteers from the district and amateur radio group could teach the senior population how to use SNS. They could also assist in the choice of a cell phone or computer that incorporates features like a large keypad, large display and low-cost plan. Involvement of high school students as per mitigation strategy 1.4 could also facilitate the implementation of this strategy.

This strategy is attractive, as it does not require other government involvement, can be volunteer administered and delivered, and is appealing to the emergency management staff because of its simplicity. Technological requirements are minor other than the initial set-up of the district's social network, and that can be managed by the current webmaster.

³⁹ White, Plotnick, Kushma, Hiltz, & Turoff, 2009



Mitigation Strategy 7.2: Include video clips on website to provide education regarding specific hazards.

“Essential” Strategy Number	Title	Ease of decision making	Level of volunteer engagement	Addresses multiple Essentials	Technical expertise exists within the community
7.2	Include video clips on website to provide education regarding specific hazards	●	⊕	●	⊕

Table 24: Summary of mitigation strategy 7.2

Description

The community assessment demonstrated that a variety of education tools are used to inform the population on DRR. Opportunities exist to improve the existing tools. The second strategy for the District of Oak Bay is to expand the Oak Bay emergency program website to include video clips. The video clips could provide training, advice, and information on known hazards. For example, a video could be used to train community members to drop, cover and hold on during an earthquake. Research in education has shown that video is more effective as a teaching tool than text⁴⁰. This strategy follows naturally from the first strategy presented and eventually would result in the website expanding to include the addition of Hazard Risk and Vulnerability Analysis (HRVA) information in combination with Geographic Information System (GIS) mapping, as presented in mitigation strategy 3.1. This technology, in the future, would give the population highly specific information about the hazards risks and vulnerabilities that exist in their neighborhoods and around their homes.

This strategy does not require any outside government involvement, can be volunteer administered and delivered. It is an idea that is supported by the emergency management staff and volunteers and requires no new technology. The volunteers who

⁴⁰ Frosch, Kaplan, & Felitti, 2003



are part of the emergency program in conjunction with the Oak Bay staff could make these short videos using a cell phone and posting them on the district website resulting in the message reaching many more people in the community than they would have otherwise.

Essential #8

“Protect ecosystems and natural buffers to mitigate floods, storm surges and other hazards to which your city may be vulnerable. Adapt to climate change by building on good risk reduction practices.”⁴¹

Assessment

Oak Bay was named after the exceptional Garry Oaks that are found across the municipality and the green spaces are a source of pride for the community. The importance of nature conservation is addressed in the Community Plan, but the importance of ecosystem protection for disaster risk reduction is not officially acknowledged.

At the municipal level, the responsibility for protecting natural areas and maintaining them in their natural state is given to Parks Services. In addition, many environmental preservation initiatives arise from the community. For example, the Oak Bay Green Committee protects mature and aging trees, and their involvement resulted in the adoption of the Tree Protection bylaw. The municipality of Oak Bay also participates in Capital Regional District initiatives, such as sensitive ecosystem mapping. The Bowker Creek Initiative highlights Oak Bay working with surrounding communities and stakeholders (local governments, community groups, schools, etc.) to restore and protect an important watershed.

Despite these local initiatives, few natural spaces are officially protected in Oak Bay. Trial Island is fully protected, with Ecological Reserve status, but Mary Todd Island is

⁴¹ UN ISDR <http://www.unisdr.org/english/campaigns/campaign2010-2011>



not. However building erection on Mary Todd Island is prohibited and this provides informal protection against development. As for municipal green spaces and parks, the Land Use bylaw allows a certain range of activities and modifications to the land. The community recognizes that this level of protection is insufficient for the conservation of critical ecosystems, and has recently formed a new association to advocate for sensitive Garry Oak ecosystem protection in Uplands Park.

Another important natural feature of Oak Bay is its vast waterfront. Public beach access is a community priority and must be maintained despite the high level of development along the coastline. The protection of natural coastal buffers and their effect on disaster risk reduction are limited by private land ownership and a lack of coordinated protection or restoration initiatives. Climate change awareness, resulting from the work of the Oak Bay Climate Change Task Force, is directed towards greenhouse gas emission reduction, and has not yet incorporated into adaptive actions that would reduce disaster risk, such as coastal buffers.

		Criteria		
		Critical Ecosystems	Natural Coastal Buffers	Climate Change Adaptation
Rating	1	<ul style="list-style-type: none"> Unknown 	<ul style="list-style-type: none"> Absent 	<ul style="list-style-type: none"> Climate change is not considered in disaster risk reduction practices
	2	<ul style="list-style-type: none"> Critical ecosystems are identified 	<ul style="list-style-type: none"> Only a small proportion of the shoreline is in a natural state 	<ul style="list-style-type: none"> Likely impacts of climate change are identified
	3	<ul style="list-style-type: none"> Critical ecosystems are protected 	<ul style="list-style-type: none"> A significant proportion of the shoreline is in a natural state Natural coastal buffers are protected 	<ul style="list-style-type: none"> Impacts of climate change are taken into account in disaster risk reduction practices
Overall rating for Essential #8: 2				

Table 25: Assessment of Essential #8



Mitigation Strategy 8.1: Provide explicit protection in municipal by-laws for existing ecosystems and natural buffers, including those with potential for restoration.

“Essential” Strategy Number	Title	Ease of decision making	Level of volunteer engagement	Addresses multiple Essentials	Technical expertise exists within the community
8.1	Explicit by-law protection for natural spaces	●	⊕	●	●

Table 26: Summary of mitigation strategy 8.1

Description

Opportunities exist for increasing the protection of ecosystems and natural buffers in the District of Oak Bay. A healthy environment not only provides urban populations with vital spaces for economic and social activities, but is also a prerequisite for ensuring the competitiveness of a municipality⁴². It is recommended that the municipality create specific and explicit protections for existing ecosystems and natural buffers, including those with potential for restoration, through amendment to municipal by-laws addressing protection of recreational spaces. Such an amendment would set the stage for better integration of public and private natural spaces protection and restoration efforts. In addition, it would leverage the efforts of environmental protection advocacy groups already working in the community.

The ease of implementing this strategy is high as no other government involvement is required (i.e. regional, provincial, federal), and the city staff possess the expertise required to implement the recommendation. By creating a platform for existing community interest and advocacy efforts, this staff administered strategy also leverages the strong volunteering spirit present in the community and in adjoining municipalities.

⁴² OECD (2010), Cities and Climate Change, OECD Publishing.
<http://dx.doi.org/10.1787/9789264091375-en>



Finally, implementation of this strategy aligns strongly with opportunities identified during the community assessment phase of this project.

Mitigation Strategy 8.2: Conduct an assessment of climate change impacts specific to the community of Oak Bay to inform disaster risk reduction practices.

“Essential” Strategy Number	Title	Ease of decision making	Level of volunteer engagement	Addresses multiple Essentials	Technical expertise exists within the community
8.2	Conduct climate change impact assessment	●	⊕	●	●

Table 27: Assessment summary for mitigation strategy 8.2

Description

Climate change impacts have been identified within the community of Oak Bay, but solely from regional and provincial perspectives that may not identify all local impacts. Climate change impacts, such as temperature extremes, sea level rise and intensive rainfall may require more frequent maintenance and replacement of critical infrastructure components. Folding such challenges into existing critical infrastructure development, land-use planning, building code development and other longer-term disaster risk reduction activities may help to mitigate this requirement⁴³. Planning in these areas, e.g. land-use planning, may often represent decades-long community development, further heightening the need to obtain high quality, relevant, community specific information on climate change impacts as early as possible.

It is suggested that the District of Oak Bay undertake an assessment of climate change impacts specific to the community to inform disaster risk reduction practices. Such a strategy will allow for the disaster risk reduction decisions of today to address the climate change impacts to be experienced tomorrow. For example, critical infrastructure

⁴³ OECD (2010), Cities and Climate Change, OECD Publishing.
<http://dx.doi.org/10.1787/9789264091375-en>



that is built to accommodate the pressures of a changed climate will better protect residents during emergency events and may also extend the life of the infrastructure investment. As well, through land-use planning that uses knowledge about local climate change impacts, the community of Oak Bay may adapt to those impacts over time at a pace that may be more acceptable to residents and cause less acute economic hardship.

Implementation of this strategy requires no involvement from other governments (i.e. municipal, provincial, federal), and strongly aligns with opportunities for improvement identified through the community assessment. However, implementation would require technical expertise in the development of such an assessment that may not currently be available from municipal staff. This requirement may be offset through exploring partnerships with organizations such as the Pacific Institute for Climate Solutions (University of Victoria), examination of climate change impact assessments completed by other municipalities such as the municipality of Saanich⁴⁴ and the City of Fredericton⁴⁵ and through alignment with related efforts by the Capital Regional District. Community engagement should be considered essential in the development of a climate change impact assessment along with project administration from municipal staff.

⁴⁴ Draft Saanich Climate Change Adaptation Plan (2010), District of Saanich. http://www.saanich.ca/living/climate/pdf/draft_saanichadaptationplan_oct18.pdf

⁴⁵ Dalton, S., Riley, M., Richards, W., and Leblanc, G. (2008). *Climate Change Adaptation Strategy City of Fredericton: Stakeholder Input*. Environment and Sustainable Resource Development Centre. <http://www.resourcesnorth.org/downloads/Fredericton-report.pdf>



Essential #9

“Install early warning systems and emergency management capacities in your city and hold regular public preparedness drills.”⁴⁶

Assessment

Oak Bay has comprehensive public information and emergency management capacities as identified through community consultation, and review of the District of Oak Bay Emergency Response and Recovery Plan. Oak Bay utilizes a three phase approach to public information that, depending on the hazard, can activate several notification processes. Phase one is to liaise with provincial and federal partners to receive and disseminate warnings and threats if a hazard is imminent (EMBC tsunami warning or watch). Simultaneously, Oak Bay, on the notification or discovery of a hazard will open its Emergency Operation Centre. As outlined in the OB-ERRP, all 16 identified hazards list public information as a priority in initial operational stages. Under the Incident command system (ICS), Oak Bay will establish a public information officer responsible for media, public notification, public inquiry, and messaging, warning, and evacuations will be established as per protocols outlined. The use of radio, television, Oak Bay website, and door to door notification, and the activation of established municipal aid agreements with neighboring municipalities create an effective warning system that informs the public and meets the community’s needs.

Through consultation with The Municipality of Oak Bay, and a review of the current District of Oak Bay Emergency Response and Recovery Plan (OB-ERRP), it has been determined that no current early warning systems for the identified 16 hazards have been established. However, warnings are effectively relayed to the population through existing communication systems. Oak Bay is considered low risk for tsunami by hazard analysis from Emergency Management British Columbia (EMBC), due to its’ topography. EMBC is the governing body that activates tsunami warnings for Oak Bay and surrounding regional municipal areas.

⁴⁶ UN ISDR <http://www.unisdr.org/english/campaigns/campaign2010-2011>



Geographically, Oak Bay will probably be affected if a large scale disaster strikes Vancouver Island. The observed information sharing between regional neighbouring municipalities creates a strong level of continuity and strengthens the community. Oak Bay has Municipal Disaster Mutual Aide Agreements with 11 surrounding municipal partners and participated in the biggest earthquake preparedness drill on record in Canada called The Great British Columbia Shakeout. On January 26th, 2011, over 470,000 people participated in an earthquake preparedness drill that taught people how to “drop, cover, and hold on” Oak Bay officials were leaders in developing and organizing this initiative.



		Criteria	
		Warning Systems	Emergency Public Information & Public Preparedness Drills
Rating	1	<ul style="list-style-type: none"> No identified warning systems in place 	<ul style="list-style-type: none"> No identified public information system or preparedness drills in place.
	2	<ul style="list-style-type: none"> Has technical equipment suited to local conditions and circumstances, run by personnel who are trained in its use and maintenance? Generates and disseminates warnings in a timely manner and in a format suited to user needs. 	<ul style="list-style-type: none"> Identify the various organizations and agencies and other stakeholders involved in communication and warning dissemination, and invite them to participate in the process. Use multiple communication mediums to disseminate warning (e.g. both mass media and informal communication). Hold public preparedness drills
	3	<ul style="list-style-type: none"> Have fail-safe systems in place, such as power backup, equipment redundancy and on-call personnel. 	<ul style="list-style-type: none"> Ensure that the communication technologies reach the entire population, including seasonal populations and remote locations. Disseminate recognizable and consistent warning alerts over time and include follow-up actions when required.
Overall rating for Essential #9: 2			

Table 28: Assessment of Essential #9



Mitigation Strategy 9.1: Registration of the District of Oak Bay with the Multi-Agency Situational Awareness Systems (MASAS) initiative

“Essential” Strategy Number	Title	Ease of decision making	Level of volunteer engagement	Addresses multiple Essentials	Technical expertise exists within the community
9.1	MASAS registration	●	○	●	●

Table 29: Summary of mitigation strategy 9.1

Description

The federal Ministry of Defense through Defense Research and Development Canada has oversight of a nationwide model for alerting and providing awareness of developing situations. This system is currently available at no cost by registering via the website and supports emergency management staff with alerts and situational awareness notifications⁴⁷. As this system is relatively new, there may also be an opportunity to volunteer to be a pilot or model community for any enhancements or system changes that may require testing, thus allowing the municipality to have input into how a federal warning system can be made more effective at the municipal or community level.

⁴⁷ www.masas.ca



Mitigation Strategy 9.2: Registration of the District of Oak Bay with the Common Alerting Protocol - Canadian Profile (CAP – CP)

“Essential” Strategy Number	Title	Ease of decision making	Level of volunteer engagement	Addresses multiple Essentials	Technical expertise exists within the community
9.2	CAP – CP registration	●	○	●	●

Table 30: Summary of mitigation strategy 9.2

Description

The Common Alerting Protocol is an internationally approved method for collecting and automatically relaying all types of hazard warnings and reports locally, regionally and nationally into multiple dissemination systems very quickly. A working group of public alerting practitioners and government agencies developed a CAP - Canadian Profile (CAP-CP) that is customized to meet the needs of Canadian stakeholders, such as bilingualism, and Canadian geocoding. The Canadian government has adopted CAP-CP for its National Public Alerting System (NPAS). The District of Oak Bay may register to be a part of this project at \$1.00 per day and will then have an opportunity to customize the information content that will be distributed to those groups that the District has identified⁴⁸. As this system is in the early stages, there is an opportunity to contribute suggestions, such as the type of information included on the templates. This gives the municipality an opportunity to increase the effectiveness of this early warning system initiative at the municipal or community level.

⁴⁸ <http://capan.ca/index.php/en/join-capan>



Mitigation Strategy 9.3: On-line Preparedness Drills for Staff & Public

“Essential” Strategy Number	Title	Ease of decision making	Level of volunteer engagement	Addresses multiple Essentials	Technical expertise exists within the community
9.3	On-line preparedness drills for staff & public	●	○	●	●

Table 31: Summary of mitigation strategy 9.3

Description

On line educational models and preparedness drills are increasingly available via the internet. The District of Oak Bay could access low cost or free training modules and educational tools via the internet. While this delivery model may not be suitable for all demographic populations, it will provide training and education for those most able to assist with the identified vulnerable populations in Oak Bay.

Mitigation Strategy 9.4: Enhance & Build Social Media Expertise of Staff within Emergency Management

“Essential” Strategy Number	Title	Ease of decision making	Level of volunteer engagement	Addresses multiple Essentials	Technical expertise exists within the community
9.4	Enhance social media expertise	●	⊕	●	●

Table 32: Summary of mitigation strategy 9.4

Description

Cultivate and build social media capacity within the municipality, for use in emergency management activities and public education. The New York Office of



Emergency Management uses social media very effectively, utilizing twitter², Facebook² and YouTube²⁴⁹.

Social media can be an inexpensive way to educate, train and notify your community of best practices, potential risks and hazards and any alerts that need to be transmitted. The development of staff expertise in social media forms and formats, combined with emergency management training, will maximize the potential of this powerful and flexible new communication realm for lower cost than conventional, local early warning systems.

Essential #10

“After any disaster, ensure that the needs of the survivors are placed at the centre of reconstruction with support for them and their community organizations to design and help implement responses, including rebuilding homes and livelihoods.”⁵⁰

Assessment

In the past four years, the District of Oak Bay’s emergency management program has developed from meeting provincial requirements to a more comprehensive program focused on community resiliency and disaster risk reduction. Oak Bay has developed a comprehensive Emergency Response and Recovery Plan (ERRP), based upon community participation, using an all hazards approach and engaging several community based organizations; this plan was last updated in 2011 to reflect the District of Oak Bay’s current level of readiness. The District of Oak Bay, through partnerships with local Emergency Social Service and Community Disaster Assistance Teams, has clearly defined the roles and responsibilities for the resources needed at the three different activation levels during the response and relief phases. The clarity of the plan would allow someone

⁴⁹ <http://www.nyc.gov/html/oem/html>

⁵⁰ UN ISDR <http://www.unisdr.org/english/campaigns/campaign2010-2011>



from outside the District of Oak Bay to retrieve the plan and competently manage the basic needs of the community through reception and/or evacuation centres and operations, without any prior knowledge of the District of Oak Bay ERRP. This is designed to happen in partnership with identified community based organizations. The District of Oak Bay hosts an annual exercise and participates regularly in exercises with neighbouring municipalities or community partners, consistent with their commitment to disaster risk reduction and emergency preparedness. The exercise scenarios vary and are executed at different levels of response, relief or recovery.

Oak Bay has trained select volunteers and staff to conduct rapid damage assessments; the recovery phase begins at the moment of impact and includes critical infrastructure. The District of Oak Bay's recovery plan is in the early stages of development, and the emergency program staff acknowledges that it is a living document that needs to be upon prior to a disaster occurring.

Oak Bay is aware that EMBC is producing a recovery plan template, expected in June 2011, which will provide a provincial framework for planning consistency. At the time of this assessment, the plan identifies that the Emergency Operations Centre (EOC) will call upon a recovery director as needed and will provide the required recovery until a coordinated effort ceases to be effective. Formal discussions have commenced with the local branch of the Canadian Red Cross for a Memorandum of Understanding to coordinate recovery operations in collaboration with a wide range of agencies, depending on the expertise and services required. The recovery plan activation is the responsibility of the planning section chief.



		Criteria	
		Response/Relief Plan	Recovery
Rating	1	<ul style="list-style-type: none"> No Relief/Response Plan in Place or Basic Relief/Response Plan Awareness of community based organizations, but no engagement 	<ul style="list-style-type: none"> No Recovery Plan in Place No Community Based Organization engagement
	2	<ul style="list-style-type: none"> Adoption of Relief/Response Plan Identify community relief/response agencies In the process of establishing agreements with community agencies for relief/response 	<ul style="list-style-type: none"> Recovery Plan In Development Awareness of agencies who can implement the recovery plan No signed Memorandums of Understanding with partnering agencies
	3	<ul style="list-style-type: none"> Relief/Response Plan with identified reception/evacuation centre operation plans Agreements with community relief/response agencies signed Relief/Response agencies roles identified Annual Exercises with partnering relief/response agencies, other municipalities 	<ul style="list-style-type: none"> Adoption of Recovery Plan Bylaw Signed Memorandum of Agreements with agencies for recovery Annual training and exercising of recovery plan
Overall rating for Essential #10: 3			

Table 33: Assessment of Essential #10

Mitigation strategy 10.1: Develop a recovery plan.

“Essential” Strategy Number	Title	Ease of decision making	Level of volunteer engagement	Addresses multiple Essentials	Technical expertise exists within the community
10.1	Develop a Recovery Plan	⊕	●	●	●

Table 34: Summary of mitigation strategy 10.1



Description

To build upon the current progress in Oak Bay's emergency planning forums, the following options are suggested to support the development of a solid recovery plan. First, further develop the recovery aspects of the Emergency Response and Recovery Plan (ERRP) by:

- Engaging the local business community and incorporating, where possible, aspects of business continuity plans that may impact on the ability of the municipality to assure essential community services;
- Engaging the commercial banks and lending sectors in order to ensure that modalities for continuation of financial services at the municipal and personal level during times of disaster are in place and understood;
- Engaging local grocers and produce retailers with regards to the provision of emergency food supplies (short-term period) following a declaration of a municipal disaster;
- Incorporating into the ERRP the information gathered in the previous points.

The local recovery plan can be enhanced by engaging other CRD municipalities in determining options for regional recovery support. Issues that could be addressed regionally are: delivery of essential services (e.g. electrical generation, water pumps, etc.), foodstuffs, and shared accommodation in the event of insufficient space remaining within a given community. Again, this information would be incorporated to the recovery plan. The CRD and EMBC could design and facilitate a discussion at the municipal staff level (including emergency managers) on the processes and protocols that would be used in recovery operations. This exercise could be a first step in the confirmation of municipal and provincial recovery plans. Finally, a thorough evaluation of the new Emergency Response Recovery Plan could be conducted through a table-top exercise (facilitated discussion), a functional exercise (possibly in conjunction with core CRD municipalities or the province), or a full-scale exercise focusing on immediate response to a major disaster with an end-state of transitioning from response to recovery operations.

The initial planning aspects of this mitigation strategy are capable of being undertaken by existing staff and volunteers with minimal resource impacts. Exercise development and delivery is both time consuming and expensive. It may be possible to



engage such agencies as the Canadian Foundation for Innovation⁵¹, or obtain support from local academic institutions (e.g. University of Victoria, Royal Roads University or University of British Columbia) in the design of the various exercise levels. Exercise delivery, depending on the scope, magnitude and chosen scenario(s), could receive financial support from EMBC or Public Safety's National Exercise Division through a JEPP grant.⁵²

⁵¹ <http://www.innovation.ca/en/programs/cfi-policy-and-program-guide>

⁵² <http://www.pep.bc.ca/jepp/jepp.html>



Conclusion

The District of Oak Bay has shown tremendous leadership and commitment with the disaster and emergency management programs and initiatives. The community assessment conducted for this report revealed that Oak Bay has a robust training and educational component, extensive community outreach and liaison, and a strong volunteer network – all of which would make a significant contribution in the event of a disaster or emergency. The District of Oak Bay is getting ready and is making its community a safer place to live.

Based on their current activities and those they have planned for the future, we recommend that the District of Oak Bay apply to become a role model city under the United Nations International Strategy for Disaster Reduction's (UNISDR) campaign "Making Cities Resilient: My City is Getting Ready 2010-2011". Congratulations.



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Appendix A - Completed “Nomination Form for Cities and Local Governments to Participate in the Campaign”

City / Local Government (Please indicate the year the numbers were provided.)	
City name	District of Oak Bay
Location (short description)	The District of Oak Bay is located on the southern end of Vancouver Island, British Columbia, Canada. Oak Bay Municipal Hall: 2167 Oak Bay Avenue Victoria, BC V8R 1G2 (Latitude: 48° 25' 35" N / Longitude: 123° 19' 22" W)
Size (year)	10.38 km ² (2008)
Population (year)	18,459 (2008)
GDP	\$45,103 (BC GDP/capita - 2008)
Hazard type(s)	Earthquakes, Severe Winter Storms, Fire, Pandemic, Tsunami, Marine Transport Incident
Name of Mayor / Commissioner / Governor / Community leader	
Christopher Causton	
Which part of the city administration will be the focal point for the Campaign?	
District of Oak Bay Fire Department	
Contact details Focal Point	
Name	Dave Cockle
Function	Deputy Fire Chief
Address	1703 Monterey Avenue Victoria, BC V8R 5V6
Email	dcockle@oakbay.ca
Telephone	(250) 592-9121 office / (250) 883-0624 cell



Fax	(250) 598-2749	
Which local institutions will be engaged in the Campaign? (In addition to the local government.)		
Royal Roads University - Master of Arts in Disaster and Emergency Management Program		
Major Disaster Risks (Please indicate major disasters that have occurred, prevailing hazards and vulnerable conditions.)		
<p>The District of Oak Bay rests within a zone of medium to high amplification of ground motion hazard if an earthquake were to hit the area. Several key buildings including the municipal hall; police, fire, Monterey Recreation Centre and public works yard are located within this zone. Most of these buildings are lacking the reinforcement required to sustain the impact of an earthquake.</p> <p>Additionally, the demographic makeup of the community shows an aging population which is at-risk sector in disaster and emergency situations. Many of these residents reside in older homes which may not meet the seismic upgrades requirements to withstand even a moderate earthquake.</p>		
Achievements and plans in relation to the ten essentials areas <i>A - Make an estimation of the status per essential as follows:</i> 1 - poor/nothing in place, 2 - some progress in place, 3 - in place, well functioning, or N/A <i>B - Please describe main areas of progress and achievements.</i> <i>C - Please identify activities and plans your city will pay special attention to improve the current situation during the campaign and beyond. Additionally, feel free to propose special events or activities your city would like undertake to raise awareness on disaster resilience. Please select the respective Essential(s).</i>		
Essential 1 – Risk reducing organization and coordination in place	Status - 3	
<p>Progress and achievements –</p> <p>The District of Oak Bay residents are actively involved in different organizations including the Oak Bay Emergency Program (OBEP), Emergency Social Services (ESS), and Emergency Communications. OBEP played an important role in the production of the Emergency Program Strategic Plan, which presents an objective-based work plan for disaster risk reduction. There is an impressive network of volunteers who will soon benefit from a computer-based volunteer management system that will ease communication and permit better coordination of local volunteer capacity. This network of volunteers is a gateway to out-of-community resources. For example, the Emergency Communications group does a cross-municipality communication test every Wednesday and represents an impressive network of resources. Volunteers also take advantage of opportunities to network with volunteers from other municipalities. This was recently the case when a delegation of OBEP volunteers participated in the Vancouver Island Emergency Preparedness Conference.</p> <p>The District of Oak Bay municipal council is also very supportive of disaster risk reduction initiatives including the "Making Cities Resilient" program for which this report was produced. The involvement of department heads in the Emergency Planning Policy Committee also demonstrates how municipal resources are engaged in disaster risk reduction and preparedness.</p>		



<p>Plans -</p> <p>1.1 Formation of the District of Oak Bay Emergency Planning Partners Group: This would engage community organizations, schools and local businesses and provide them with an active voice and a better understanding of the emergency management needs and activities that may impact their respective organizations.</p> <p>1.2 Development of a Comprehensive Oak Bay Volunteer Management System (VMS): This would allow for the recording and tracking of activities related to volunteers as well as equipment and materials.</p> <p>1.3 Formation of Block Watch Strengthening Preparedness Amongst Neighbours (SPAN) Teams (including Citizen and Business SPAN Teams): This will empower residents to organize and obtain training on key disaster and emergency management (DEM) topics such as rapid damage assessment, first aid, reception centre operations, search and rescue and gathering local disaster impact intelligence.</p> <p>1.4 Build Alliances with Local Schools to Provide Disaster and Emergency Management (DEM) Volunteer Opportunities to Students: These students would be extremely valuable volunteers across the entire District of Oak Bay Emergency Management Program and would have an opportunity to learn about DEM, while improving their community’s preparedness for disaster.</p>	
<p>Essential 2 – Budget assigned</p>	<p>Status - 2</p>
<p>Progress and achievements –</p> <p>The District of Oak Bay has dedicated funds for the Emergency Program. In so doing , they have identified the requirement for the funding of disaster risk reduction strategies. For example, the municipal budget identifies funds for program initiatives such as the School Preparedness Program. Funds allocated for Emergency Social Services also support local programs including the Community Emergency Preparedness Outreach Team. Additionally, the District of Oak Bay has prioritized expenditures to address local vulnerabilities by applying for and obtaining funds under the Joint Emergency Preparedness Program (JEPP) as well as a grant for the Oak Bay Senior’s Mitigation and Preparedness Project.</p> <p>The District of Oak Bay has enacted a provincially mandated Emergency Management by-law, which identifies the structure of the Emergency Management organization and the key personnel, involved. The by-law also provides the authority for the Emergency Management Coordinator and Committee to function and conduct planning. This structure has been exercised at the municipal level and appears to be functioning well. The municipal council is receptive to emergency management initiatives and works closely with the Emergency Program staff to support new and ongoing initiatives.</p>	
<p>Plans -</p> <p>2.1 Provide incentives for homeowners to enter home risk reduction renovation projects, i.e. seismic upgrading: The incentives for making the improvements include waiving or reducing building permit fees when starting the project, and one-time property tax reductions for completed projects. This program has the advantage of being developed locally, allowing for community input</p>	



<p>and heritage preservation. Also, incentive programs for volunteers to cover cost of training and professional development. The activities supported by this program can range from courses taught by experts from within or outside of the community, as is presently done, to assistance for those already enrolled in college or university programs with tuition or textbooks costs.</p>	
<p>Essential 3 – Risk assessment prepared</p>	<p>Status - 3</p>
<p>Progress and achievements –</p> <p>The District of Oak Bay has identified local hazards in accordance with the provincial framework through the completion of a Hazard, Risk and Vulnerability Assessment (HRVA) in 2004. This document identifies and prioritizes hazards, examines the impact of these hazards on the community and conducts a risk assessment. The Capital Regional District (CRD) of Vancouver Island, which includes the District of Oak Bay, conducted a risk assessment and identified risks that could impact the 13 municipalities associated to a variety of disaster / emergency events. This document has been made available to all communities but is presently only a draft document.</p> <p>The District of Oak Bay has also identified local vulnerabilities and has paid particular attention to the at-risk demographic in the area. One example of this the development of a vulnerability map utilizing a geographical information system (GIS) interface, which identifies senior’s residences in the area. Using the vulnerability map, the Oak Bay Emergency Program has developed strategies to address the needs of this at-risk population in times of an emergency such as the Oak Bay Senior’s Mitigation and Preparedness Project. Additionally, the District of Oak Bay has identified another vulnerability within their schools. In order to reduce the risk in this population, the Oak Bay Emergency Program is working closely with the schools through the School Preparedness Program.</p>	
<p>Plans -</p> <p>3.1 Complete a Hazard, Vulnerability and Risk Assessment (HVRA): This action would increase the public’s awareness of the hazards and risks facing their community.</p>	
<p>Essential 4 – Investment in risk reducing infrastructure</p>	<p>Status - 2</p>
<p>Progress and achievements –</p> <p>The District of Oak Bay has identified limited Critical Infrastructure (CI) capacity as defined by the National Strategy for Critical Infrastructure (NSCI). The Oak Bay Fire Hall, Police Station and new water distribution lines are examples of key CI that have been successfully identified by Oak Bay community planners. Information pertaining to other Oak Bay CI, such as transportation, communication, energy and utilities currently exist as separate, independent, sources of information, which makes it more difficult to prioritize investment and develop long-term strategies.</p> <p>Concrete steps have been taken to improve resiliency, replacement, and redundancy/backup in select CI. This was recently accomplished by the procurement of mobile generators that will provide a degree of power generation options in the event of an emergency. Yet another excellent example of redundant capabilities within Oak Bay was the establishment of a back-up Emergency Operations Centre within the Municipal Hall. Furthermore, the recognized need to upgrade the community sewage system; including the lift station adjacent to Windsor Park are excellent examples of how Oak Bay is improving resiliency, and replacement of select CI.</p>	



<p>Plans -</p> <p>4.1 Develop Critical Infrastructure assurance: This includes a catalogue of infrastructure that is critical to the continuity of the community and essential social services such as temporary accommodation facilities (e.g. recreation centres, schools), potential infant care centres, medical clinics and potential life-saving centres and sources for potable water, food and fuel, police & fire services/facilities, emergency medical transport/facilities, pharmaceutical facilities, communications (voice/data) distribution network (e.g. emergency services dispatch connections) and financial services network (e.g. commercial banks and their respective business continuity plans).</p>	
<p>Essential 5 – Safe schools and health facilities</p>	<p>Status - 2</p>
<p>Progress and achievements –</p> <p>The District of Oak Bay is not directly responsible for schools and health facilities within their area. However, a provincially sponsored effort, the Seismic Mitigation Program, of the British Columbia Ministry of Education has targeted educational facilities, including those within the District of Oak Bay. Thus far two schools have been seismically upgraded and a third is scheduled for upgrade in the near future.</p> <p>A new eight story Patient Care Tower at Royal Jubilee Hospital has recently been opened and designed to robust seismic standards. The District of Oak Bay and the Regional Health Authority Emergency Advisory Committee are working closely together to ensure that all healthcare facilities are issued operating licences, and are conforming to basic guidelines.</p> <p>The Oak Bay Fire Department, utilizing the British Columbia Fire and Building Codes, has reported that Fire and Life Safety standards are meeting or exceeding guideline requirements on school and healthcare facilities that they are inspecting. Building evacuation plans, and general health and safety issues are in good order. Additionally, two private schools, Glenlyon Norfolk and St. Michael's, have robust Emergency Response Plans that could also be used as a guiding source within the District of Oak Bay.</p>	
<p>Plans -</p> <p>5.1 Creation of a School and Health Facilities DEM Safety Profile Database for the District of Oak Bay: This database would build on existing technology and store both personal data and structural information that could be retrieved before or during a disaster event.</p> <p>5.2 Establish a School Emergency Planning Mentorship Program: This program would mentor and guide the public school administrators in the development of their emergency plans.</p>	
<p>Essential 6 – Risk-compliant building regulation and land use applied</p>	<p>Status - 3</p>
<p>Progress and achievements –</p> <p>The District of Oak Bay possesses and enforces excellent land-use planning and Building Code By-laws. They maintain a well designed land-use information and education capability in which the public website is easy to find and navigate. In general, the District of Oak Bay has very restrictive land-use and zoning laws, and there is no informal settlement or construction within the community.</p>	



Community groups, such as the Heritage Oak Bay Foundation, play important roles in impacting land-use and infrastructure building and restoration efforts. Furthermore, the general public is encouraged to participate on a very regular basis through bi-monthly opportunities of attending council meetings and directly engage council on land-use issues or concerns. Additionally, the Oak Bay council maintains a very proactive hands-on approach to all land-use legal issues through, such as the issuance of building permits, Oak Bay By-Law 3531.

Plans -

6.1 Educate the Community about the habitation risks of their surroundings, such as unreinforced concrete masonry buildings and/or waterfront property: With this knowledge, individuals are able to decide what level of risk they are prepared to tolerate and what they will do to manage the risks that they have been made aware of.

6.2 Identify Critical Infrastructure buildings and buildings of historical significance that require seismic upgrade and create a plan to reduce associated risks: To maintain existing structures and support risk reduction, the Heritage Oak Bay Foundation could work with municipal staff and officials to create community guidelines for the maintenance and potential upgrade of existing heritage structures and to find creative solutions to protecting and preserving historical buildings.

6.3 Introduce building regulations and incentives that promote the upgrade of existing, unreinforced concrete masonry buildings: This includes a one-time property tax breaks to owners who have undertaken infrastructure or property safety improvements that reduce the risk to themselves and to the community. For heritage buildings, partnerships could be explored with Heritage BC and Heritage Canada that would provide allowances and tax breaks for heritage building owners who wish to upgrade their structures to reduce risk.

Essential 7 – Education programs and training in place

Status - 3

Progress and achievements –

The District of Oak Bay has a thriving and robust energy for community and school education training programs that embrace disaster risk reduction. Utilizing educational program initiatives that are delivered by the Red Cross, community volunteers, and parent advisory committees, Oak Bay is a leader in delivering age appropriate education to pre-school, and grade three to five students. Additionally, these students are encouraged to bring home the disaster risk reduction kits, and share them with their families. Eighty percent of the schools in Oak Bay maintain a shipping sea container that hold enough food, water and supplies for all children and staff in case disaster strikes. This enormous venture is the catalyst for developing and creating lasting dialogue between students, teachers, and the community.

The District of Oak Bay reaches its senior citizens, faith bases organizations, and local community by delivering pertinent disaster risk reduction education through community meetings, open houses, and engaging nursing homes. One Oak Bay senior’s facility mandates that all residents must have a grab and go bag established to maintain occupancy.

The District of Oak Bay employs civil servants and professionals who have embraced the message of disaster preparedness, and truly foster a spirit of collaboration that empowers and connects all



<p>departments to the community and its people.</p>	
<p>Plans -</p> <p>7.1 Continue toward utilizing social networking sites (SNS) as part of overall communications: The use of SNS in all stages of emergency management is accepted and is considered a viable solution to the problem of information distribution and communications.</p> <p>7.2 Include video clips on website to provide education regarding specific hazards: The video clips could provide training, advice, and information on known hazards. For example, a video could be used to train community members to drop, cover and hold on during an earthquake.</p>	
<p>Essential 8 – Ecosystems and natural buffers protected</p>	<p>Status - 2</p>
<p>Progress and achievements –</p> <p>The District of Oak Bay values their green space and have demonstrated the importance of nature conservation by addressing it in the Community Plan. At the municipal level, the responsibility for protecting natural areas and maintaining them in their natural state is given to Parks Services. In addition, many environmental preservation initiatives stem from the community. For example, the Oak Bay Green Committee came together to protect mature and aging trees, and their actions resulted in the adoption of the Tree Protection bylaw. The District of Oak Bay also participates in initiatives that were started by the Capital Regional District, such as sensitive ecosystem mapping. The Bowker Creek Initiative is an example of how the District of Oak Bay works with surrounding communities to bring different stakeholders together for the purpose of restoring and protecting this important watershed. The Land Use bylaw allows a certain range of activities and modifications to the land. The community recognizes that this level of protection is not sufficient to ensure the conservation of critical ecosystems, and has recently come together in a new association to advocate for the protection of the sensitive Garry Oak ecosystem of Uplands Park.</p>	
<p>Plans -</p> <p>8.1 Create specific and explicit protections for existing ecosystems and natural buffers: These protections include those with potential for restoration, through amendment to municipal by-laws addressing protection of recreational spaces.</p> <p>8.2 Assess climate change impacts specific to the community: This assessment could be used in disaster risk reduction planning and practices, such as informed land-use planning, or critical infrastructure built to accommodate climate change and to extend the life of the infrastructure.</p>	
<p>Essential 9 – Early warning systems installed</p>	<p>Status - 2</p>
<p>Progress and achievements –</p> <p>The District of Oak Bay has a comprehensive public information and emergency management capacity as identified through community consultation, and review of the District of Oak Bay Emergency Response and Recovery Plan (ERRP). A three phase approach to public information is utilized that depending on the hazard can activate several notification processes. As outlined in the ERRP, all 16 identified hazards list public information as a priority in initial stages of operations. The usage of radio, television, Oak Bay website, door to door notification, and established municipal aid agreements with neighbouring municipalities creates an effective system for informing the public that meets the needs of the community.</p>	



The District of Oak Bay has signed Municipal Disaster Mutual Aide Agreements with 11 surrounding municipal partners and has participated in the biggest earthquake preparedness drill on record in Canada called The great British Columbia Shake Out – where on January 26th, 2011 over 470,000 participants participated in an earthquake preparedness drill that taught people how to “ Drop, cover, and hold on.” The District of Oak Bay officials were leaders in developing and this initiative.

Plans -

9.1 Register with Multi Agency Situational Awareness Systems MASAS: The federal Ministry of Defence through Defense Research and Development Canada has oversight of a nation wide model for alerting and situational awareness. This is currently available at no cost by registering via the website and supports emergency management staff with alerts and situational awareness notifications.

9.2 Register with Common Alerting Protocol - Canadian Profile (CAP-CP) and fill in templates with information that they wish the media to receive: The Common Alerting Protocol is an internationally approved method for collecting and automatically relaying all types of hazard warnings and reports locally, regionally and nationally into multiple dissemination systems very quickly.

9.3 On line preparedness drills for staff & public: On line educational models and preparedness drills are increasingly available via the internet. The District of Oak Bay could access low cost or free training modules and educational tools via the internet.

9.4 Enhance & Build Social Media Expertise of Staff within Emergency Management: Cultivate and build social media capacity within the municipality for use in emergency management activities and public education.

Essential 10 – Needs-based (survivors) reconstruction

Status - 2

Progress and achievements –

The District of Oak Bay has developed the Emergency Management Program from simply meeting provincial compliancy to a more comprehensive program focusing on community resiliency and disaster risk reduction. They have developed a comprehensive Emergency Response and Recovery Plan (ERRP) based upon community participation, using an all-hazards approach through the engagement of several community based organizations; this plan was last updated in 2011 to reflect the current level of readiness in the District of Oak Bay.

The District of Oak Bay, in partnership with the local Emergency Social Service and Community Disaster Assistance Teams, have clearly identified the resources (human/material) that are needed at the three different levels of activation during the response and relief phases. The clarity of the ERRP allows for someone from outside the District of Oak Bay to competently manage the basic needs of the community through the operation of a reception and/or evacuation centre as required, in partnership with identified community based organizations, and without any prior knowledge of the ERRP. District of Oak Bay hosts an annual exercise and participates regularly in exercises with



neighbouring municipalities or community partners. The exercise scenarios vary and are exercised at any level of response, relief or recovery.

Plans -

10.1 Develop a recovery plan: Engage with community stakeholders and Capital Regional District partners in developing a comprehensive recovery plan.



Appendix B - Short Bios and Pictures of Team Members

BUSSIERES, CHRISTINE



Christine Bussieres has been working in forest firefighting for five years and currently acts as a Regional Fire Center Officer in Baie-Comeau, Quebec. She holds a B.A.Sc. in Forest Management and Environment. Christine has also been volunteering with the Red Cross for over 10 years in disaster response and first aid services.

DUNNING, RICK



As a member of the Canadian Forces, Rick Dunning has taken part in many disaster response operations, such as Operation Persistence (Swiss Air disaster) and Operation Hestia (Haitian earthquake). Rick is a graduate from Royal Military College with a Bachelor of Military Arts and Sciences. Currently, he and his wife are posted to Winnipeg, where he is the Air Force Fire Marshal.



FOUGERE, MELISSA



Melissa Fougere currently resides in Kingston, Ontario, where she is the Disaster Management Coordinator for South-eastern Ontario, for the Canadian Red Cross Society. She has a double major of Bachelor of Arts in Community Studies and Psychology; a Diploma in Social Work, Addictions Counselling, Human Services and Adult Education. She is also a current volunteer with the Canadian Red Cross Society as a Disaster Management Instructor.

FOUNTAIN, REG



Reg Fountain is a retired Army officer with a B.A. in Economics and Political Science and is a graduate of the United States Air Force Command and Staff College. He lives in Ottawa where he is the Public Safety Canada Lead for the development of Federal and Bi-National Emergency Management Plans regarding Chemical, Biological, Radiological, Nuclear and Explosives (CBRNE) events/incidents.



KIRCHGATTER, STEPHAN



Stephan Kirchgatter currently resides in Maple Bay, British Columbia, with his lovely wife, Diane, and two dogs. He has a B.Sc. degree in Nursing with 23 years experience in both critical care and outpost nursing. At present, Stephan is working in the cardiovascular ICU at the Royal Jubilee Hospital in Victoria.

MCALLISTER, ADAM



Adam McAllister is a provincial emergency management advisor for the Ontario government with experience in business continuity and natural hazards management, including specialized skills in zoonotic disease control and research. He currently resides in Peterborough, Ontario, with his wife and their baby daughter. Adam holds a B.Sc. Forestry and has been certified as an Associate Business Continuity Professional by Disaster Recovery Institute Canada.



NAIPAUL, MARK



Mark Naipaul is a member of the Royal Canadian Mounted Police posted to Surrey, British Columbia. He has 10 years of police experience and is currently working as a Major Crime Investigator. Mark has also served with the Canadian Forces as a platoon commander in Afghanistan, and as the Operations Officer of his unit in the planning for the 2010 Vancouver Olympics and in the CF response to flooding in both Manitoba and British Columbia.

NEVRAUMONT, REBECCA



Rebecca Nevraumont has expertise in project management and business analysis/business process improvement. She has a B.Sc., Biological Sciences and B.A. in International Relations, specializing in international economy and development. Rebecca graduated from Oak Bay High and has family and many friends in the community so she is delighted to have an opportunity to contribute.



SELLAR, CANDACE



Candace Sellar is a Project Manager with the Canadian Standards. Prior to CSA, she held several positions with Environment Canada, including Environmental Emergencies Officer, and Head of the Pollution Prevention Program for Ontario Region. Candace has an Honours B.A. in Physical Geography and Environmental Studies, and a post-diploma in Environmental Management and Consulting. She currently resides in Toronto, Ontario, with her husband David.

SHAW, JAY



Jay Shaw lives in Winnipeg and is a firefighter/paramedic with the Winnipeg Fire Department. He has 3 kids, a great wife, and over 15 years of active emergency services experience. Jay holds a diploma in Orthopaedic Technology, and is currently the Director of Fire Training for SMART group in Winnipeg. He enjoys freelance writing and working for Firefighting in Canada magazine.



Appendix C – Glossary

- Building codes:** Ordinances and regulations controlling the design, construction, materials, alteration and occupancy of any structure to ensure human safety and welfare. Building codes include both technical and functional standards. (Source: UN/ISDR Terminology).
- Capacity:** A combination of all the strengths and resources available within a community, society or organization that can reduce the level of risk, or the effects of a disaster. Capacity may include physical, institutional, social or economic means as well as skilled personal or collective attributes such as leadership and management. Capacity may also be described as capability. (Source: UN/ISDR Terminology)
- Capacity-building:** Efforts aimed to develop human skills or societal infrastructure within a community or organization needed to reduce the level of risk. Capacity-building also includes development of institutional, financial, political and other resources, such as technology at different levels and sectors of the society. (Source: UN/ISDR Terminology)
- Coping capacity:** The means by which people or organizations use available resources and abilities to face adverse consequences that could lead to a disaster. In general, this involves managing resources, both in normal times as well as during crises or adverse conditions. The strengthening of coping capacities usually builds resilience to withstand the effects of natural and human-induced hazards. (Source: UN/ISDR Terminology).
- Critical facilities/emergency services:** Those facilities (such as hospitals, power stations, lifelines) and services (such as Police, Fire Service, Ambulance, Red Cross and Red Crescent, and voluntary agencies) that have specific responsibilities and objectives in serving and protecting people and property in disaster situations.



Critical infrastructure: Refers to processes, systems, facilities, technologies, networks, assets and services essential to the health, safety, security or economic well-being of Canadians and the effective functioning of government. Critical infrastructure can be stand-alone or interconnected and interdependent within and across provinces, territories and national borders. Disruptions of critical infrastructure could result in catastrophic loss of life, adverse economic effects, and significant harm to public confidence. (Source: Canadian Nation Strategy for Infrastructure).

Development planning processes: Proactive actions that allows to national, sectoral, regional or local government and its partners to support and engage the intellectual, physical, and economic resources to chart a course toward a desired future of development related on each level. (Source: UN/ISDR Terminology)

Disaster risk reduction plans: Documents that set out planning authorities' policies and proposals for disaster risk reduction, which should be considered in the respective development plan and development actions. Due to the different geographical scales applicable at different levels, disaster risk reduction plans are specific to each level of government.

Early warning system: The provision of timely and effective information, through identified institutions, that allows individuals exposed to a hazard to take action to avoid or reduce their risk and prepare for effective response. Early warning systems include a chain of concerns, namely: understanding and mapping the hazard, monitoring and forecasting impending events, processing and disseminating understandable warnings to political authorities and the population, and undertaking appropriate and timely actions in response to the warnings. (Source: UN/ISDR Terminology)

Ecosystem: A complex set of relationships of living organisms functioning as a unit and interacting with their physical environment. The boundaries of what could be called an ecosystem are somewhat arbitrary, depending on the focus of interest or study. Thus the extent of an ecosystem may range from very small spatial scales to, ultimately, the entire Earth. (Source: UN/ISDR Terminology)



- Elements at risk:** The elements at risk include anything that can be damaged - people, infrastructure, crops, boats, vehicles, etc. (Source: *UN/ISDR Terminology*).
- Environmental degradation:** The reduction of the capacity of the environment to meet social and ecological objectives and needs. Potential effects are varied and may contribute to an increase in vulnerability and the frequency and intensity of natural hazards. Some examples: land degradation, deforestation, desertification, wildland fires, loss of biodiversity, land, water and air pollution, climate change, sea-level rise and ozone depletion. (Source: *UN/ISDR Terminology*)
- Emergency management:** The organization and management of resources and responsibilities for dealing with all aspects of emergencies, in particularly preparedness, response and rehabilitation. Emergency management involves plans, structures and arrangements established to engage the normal endeavours of government, voluntary and private agencies in a comprehensive and coordinated way to respond to the whole spectrum of emergency needs. This is also known as disaster management. (Source: *UN/ISDR Terminology*)
- Hazard analysis:** Identification, studies and monitoring of any hazard to determine its potential, origin, characteristics and behaviour. (Source: *UN/ISDR Terminology*)
- Land-use planning:** Branch of physical and socio-economic planning that determines the means and assesses the values or limitations of various options in which land is to be utilized, with the corresponding effects on different segments of the population or interests of a community taken into account in resulting decisions. Land-use planning involves studies and mapping, analysis of environmental and hazard data, formulation of alternative land-use decisions and design of a long range plan for different geographical and administrative scales. (Source: *UN/ISDR Terminology*)
- Mitigation:** Structural and non-structural measures undertaken to limit the adverse impact of natural hazards, environmental degradation and technological hazards. (Examples of structural measures are engineering works and hazard-resistant construction, while non-



structural measures include awareness-raising, knowledge development, policies on land use and resource management, and facilities' operating practices). (Source: Adapted from UN/ISDR Terminology)

Risk: The probability of harmful consequences, or expected losses (deaths, injuries, property, livelihoods, economic activity disrupted or environment damaged) resulting from interactions between natural or human induced hazards and vulnerable conditions. (Source: UN/ISDR Terminology)

Risk assessment/analysis: A methodology to determine the nature and extent of risk by analyzing potential hazards and evaluating existing conditions of vulnerability that could pose a potential threat or harm to people, property, livelihoods and the environment on which they depend. (Source: UN/ISDR Terminology).

Prevention: Activities to provide outright avoidance of the adverse impact of hazards and means to minimize related environmental, technological and biological disasters. Depending on social and technical feasibility and cost-benefit considerations, investing in preventive measures is justified in areas frequently affected by disasters. In the context of public awareness and education related to disaster risk reduction, changing attitudes and behaviour contribute to promoting a "culture of prevention". (Source: UN/ISDR Terminology)

Preparedness: Pre-disaster activities that are undertaken within the context of disaster risk management and are based on sound risk analysis. This includes the development/enhancement of an overall preparedness strategy, policy, institutional structure, warning and forecasting capabilities, and plans that define measures geared to helping at-risk communities safeguard their lives and assets by being alert to hazards and taking appropriate action in the face of an imminent threat or an actual disaster. (Source: OCHA)



- Public awareness:** The processes of informing the general population, increasing levels of consciousness about risks and how people can act to reduce their exposure to hazards. This is particularly important for public officials in fulfilling their responsibilities to save lives and property in the event of a disaster. Public awareness activities foster changes in behaviour leading towards a culture of risk reduction. This involves public information, dissemination, education, radio or television broadcasts and use of printed media, as well as the establishment of information centres and networks and community and participation actions. *(Source: UN/ISDR Terminology).*
- Public-private partnership:** A voluntary association of both state and non-state actors or organizational entities typically drawn from government, business, professional and/or academic institutions and other elements of civil society to address commonly held objectives through shared resources, skills and abilities. Partnerships typically involve some form of joint decision-making and sharing of responsibilities, opportunities and risks in recognition that the combined value of their respective attributes provides greater potential for accomplishment than would be possible through individual efforts. *(Source: Microcredit Summit Campaign)*
- Recovery:** Decisions and actions taken after a disaster with a view to restoring or improving the predisaster living conditions of the stricken community, while encouraging and facilitating necessary adjustments to reduce disaster risk. Recovery (rehabilitation and reconstruction) affords an opportunity to develop and apply disaster risk reduction measures. *(Source: UN/ISDR Terminology)*
- Relief/response:** The provision of assistance or intervention during or immediately after a disaster to meet the life preservation and basic subsistence needs of those people affected. It can be of an immediate, short-term, or protracted duration. *(Source: UN/ISDR Terminology).*
- Resilience:** The capacity of a system, community or society potentially exposed to hazards to adapt, by resisting or changing in order to reach and maintain an acceptable level of functioning and



structure. This is determined by the degree to which the social system is capable of organizing itself to increase its capacity for learning from past disasters for better future protection and to improve risk reduction measures. (Source: UN/ISDR Terminology).

Retrofitting:

Reinforcement of structures to become more resistant and resilient to the forces of natural hazards. Retrofitting involves consideration of changes in the mass, stiffness, damping, load path and ductility of materials, as well as radical changes such as the introduction of energy-absorbing dampers and base isolation systems. (Source: UN/ISDR Terminology).

Risk mitigation:

Uses corporate expertise and investments to identify and retrofit lifeline facilities such as hospitals and oil depots which are situated in hazardous areas and which, if damaged, could interrupt normal operations of businesses and communities. The same approach is applied to lifeline facility networks (like power lines, communications networks and water supply and sanitation). Risk mitigation also involves encouraging corporate partners to pool resources: building, for example, a reliable corporate power generation facility for a community of businesses in the same municipality, rather than relying on individual standby generators for each enterprise. Governments could also co-invest in increasing the reliability of municipal utilities, so that they will stay operational during expected hazardous conditions.

Vulnerability:

The conditions determined by physical, social, economic and environmental factors or processes, which increase the susceptibility of a community to the impact of hazards. (Source: UN/ISDR Terminology).

