Transportation Association of Canada

Environmental Management Systems User Guide for Transportation Practitioners

Part I - Application

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Abstract

This document is intended as a user guide for Canadian jurisdictions when making decisions on Environmental Management System (EMS) framework planning, design, implementation, maintenance and related costs (including operations and maintenance implications). EMS is comprised of a set of management procedures that allows an organization to analyze, control and reduce the environmental impact of its activities, products and services, and operate with greater efficiency and control. The report includes discussion of EMS best practices, various success stories and lessons learned.
The Guide is divided into two parts:
- Part I, entitled Application, provides a “how-to” for developing an EMS in an organization, and consists of four chapters and appendices.
- Part II, Examples and Case Studies, provides practical experience from agencies in developing and implementing an EMS, and consists of two chapters and appendices.
This two-part structure was created to assist readers in locating information easily. Various symbols and tables were used to emphasize points, help focus information and provide examples, tools and advice without interrupting the guidance narrative.

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KEYS TO SUCCESSFULLY IMPLEMENTING AN ENVIRONMENTAL MANAGEMENT SYSTEM (EMS)

There are several keys that should be considered before moving forward into the details of developing and implementing an EMS.

MANAGEMENT COMMITMENT

Senior Management support: The continued support of an agency's top management is critical to the successful development and implementation of an EMS. Not only does senior management commitment ensure that resources are provided, this commitment also tells managers and employees throughout your agency that this "change in culture" is here to stay.

MAKE YOUR EMS

Make the EMS fit your agency: Developing an EMS does NOT mean committing to ISO 14001 registration. Your agency may choose to use / adapt the relevant parts of the ISO 14001 Standard (or other EMS models) that suit your agency's needs. Only do what makes sense for your agency.

Don't reinvent the wheel: Identify, build upon, incorporate and / or enhance existing useful processes, procedures, report structures, etc. that will help you implement the EMS.

EMS FOCUS

Don't try and fix everything at once: Start small and seek to add to the EMS through "continuous improvement".

Focus the EMS on what you control: A desired outcome of an EMS may be to change the perceptions and behaviours of others. It is important to recognize that this is not always possible and to focus your organizational efforts on those things under your control.

Include functions that make sense: An EMS can be as specific (addressing certain activities or small groups of employees) or as all-encompassing (addressing entire units or departments with hundreds of employees) as deemed necessary and appropriate for your agency. The key is to do what works for your agency.

MEASURE EMS PERFORMANCE AND SUCCESS

Identifying achievable and relevant expectations and measures: This helps by:

- keeping employees committed as they can see the value of their efforts and focuse on the actions needed to achieve the expected results; and
- maintaining senior management commitment, even if there is a change of administration.

Get early success: Use "low hanging fruit" opportunities to your advantage by building interest, participation, and commitment throughout the workforce–from senior management to front-line workers.

GET AND KEEP EMPLOYEE BUY-IN

Staff involvement: EMS development and implementation require the participation of a wide-range of agency skills. Without staff support, the EMS will not be effective or efficient and will eventually be unsustainable.

Training ensures success: A thriving EMS requires an agency to address the day-to-day training and operational procedural needs of all employees involved in the EMS.

1.0 INTRODUCTION

1.1 THE NEED FOR ENVIRONMENTAL MANAGEMENT SYSTEMS IN THE TRANSPORTATION SECTOR

Transportation Agencies[1] (hereafter referred to as simply "agencies"), by definition, have responsibility for transportation infrastructure, including, but not limited to, highways, airports, ferries, and associated facilities. In general, agencies have the mandate of providing safe, efficient and sustainable transportation.

Meeting such a mandate in an efficient, environmentally sustainable manner in Canada is very challenging. First, there is a myriad of environmental regulation. In a recent study by the Ministry of Transportation of Ontario, over 60 applicable environmental statutes and policy were identified. Additionally there may be other agency commitments that impact specific transportation initiatives: the fit of project / program delivery within larger government "greening" initiatives; the extensive bureaucracy of some agencies; and the use of third-party consultants and contractors. There is often more to consider, but all are underwritten by the constant constraints of fiscal realities.

Agencies across Canada were surveyed to determine the status of EMS in the Transportation Sector. A description of the survey and the results are included in Appendix D. Their responses provide insight into the rationale behind considering, developing or implementing an EMS. Some of these include:

Almost half of the Canadian Transport Agencies surveyed said that they are currently developing or are considering developing an EMS.

- Reduced Liability / Compliance / Due Diligence
    - Improved management of environmental risks in a third party delivery environment.
    - Reduced environmental liabilities.
    - Improved compliance with environmental requirements.
    - Improved due diligence.
- Sustainability
    - Improved implementation of sustainable development.
    - Improved environmental stewardship.
- Reduced Costs
    - Reduced cost of remediation with more responsible environmental actions and controls.
    - Improved levels of efficiency / accountability.

[1] Transportation Agencies include government organizations at the federal, provincial / territorial, regional and municipal levels – primarily road authorities.

1.2 BACKGROUND

Since the early 1990s, the Transportation Association of Canada (TAC) has considered the subject of Environmental Management Systems (EMS). In 1992, the association published its first Environmental Policy and Environmental Code of Ethics. This was updated in 2007 by TAC's Statement of Environmental Principles and Practices. This document, endorsed by the TAC Board of Directors, outlined the need to promote sustainable development and environmental stewardship, and encouraged TAC members to adopt the same position.

In 1996, the association widely distributed its *Guide to Integrating Environmental Management Principles into Operating Codes of Practice*. The objective of this document was to provide insight about how to move towards developing codes of practice and guidelines that would integrate the concept of environmental responsibility into operational methodologies.

The concept of environmental management and environmental stewardship has been addressed at many TAC annual conferences, but a 2004 Annual Conference workshop was dedicated entirely to the elaboration and implementation of these systems.

1.3 PURPOSE AND SCOPE OF THIS GUIDE

From the TAC annual conference, participants discovered that the level of familiarity and use of EMS varies within the transportation community. Some agencies are very familiar with EMS, while others may not know what it is and what it can do. In addition, some agencies have implemented environmental management systems without necessarily identifying them as such. There is a need for documentation outlining a flexible approach to planning, implementing and maintaining an EMS from a transportation perspective.

In response to the identified need, the Environmental Issues Management Standing Committee of the Environment Council of the TAC determined to develop a document that would synthesize practices for Environmental Management Systems (EMS) from the transportation perspective. The objective was to deliver a synthesis of environmental management system practices that would feature an inventory of TAC members' experiences in developing, implementing and maintaining their EMS from a transportation perspective. The synthesis document would include discussion of EMS best practices, various success stories and lessons learned. The intention was to create a document for use by Canadian jurisdictions when making decisions on EMS framework planning, design, implementation and related costs (including operations and maintenance implications). This *User Guide* is the culmination of those intentions.

1.4 LAYOUT OF THIS GUIDE

The Guide is divided into two parts:

- Part I, entitled Application, provides a "how-to" for developing an EMS in an organization, and consists of:
    - Chapters 1 to 4
    - Appendices A and B: Tools and References, and the EMS Glossary
- Part II – Examples and Case Studies, provides, under a separate cover, practical experience from agencies in developing and implementing an EMS, and consists of:
    - Chapter 5 Examples

      - Two examples: salt management EMS and a project specific EMS.
    - Chapter 6 Case Studies

      - Two case studies: a provincial transportation agency and a municipal transportation agency
    - Appendices

      - C – Case Study Supporting Documents

      - D – TAC Member Survey - State of EMS in the Public Transportation Sector in Canada; and

      - E – TAC Member EMS Contact Information

This two-part structure was created to assist readers in locating information easily. Further to this approach, chapters, and to some extent sections, are stand-alone. While this improves the usefulness of the Guide, it does result in some repetition. Symbols (see below) and tables have been used to help focus information and provide examples, tools and advice without interrupting the guidance narrative.

Symbols Used

To emphasize important points, tools or tips from agencies with EMS experience, the following symbols have been used:

	**Important point** – used for emphasis.
	**Iterative** – used to show an iterative process involving previous or additional steps.
	**Buy-In Opportunity** – used to show opportunity to get buy-in from staff and / or senior management.
	**Helpful tip** – identifies comments from people who have developed an EMS within their agency. Direct quotes are noted by quotation marks while blended or summarized tips are not noted.
	**Key to Success** –denotes the Keys listed at the beginning of the document.
	**Tools** –techniques and approaches used by the agencies identified in Appendix A.
	**Real Life** – indicates a reference to “real life” examples.
	**An EMS that fits** – reminds you to make the EMS fit your organization, rather than make your agency fit an EMS.
	**EMS training opportunity.**

2.0 EMS OVERVIEW

This section provides an overview of EMS for the transportation sector, and includes a discussion of the concept of the basic EMS framework. The information is based on Alberta Infrastructure and Transportation's *Environmental Management System Manual* (v.4).

An EMS is an organized and formal approach to managing environmental issues with the goal of making environmental considerations part of daily activities. The purpose of the EMS is to identify and responsibly manage the potential environmental impacts of the agency's activities and projects. In practical terms, it involves:

- setting environmental policy;
- planning to ensure the success of the policy;
- implementing practices, programs and procedures;
- monitoring and measuring to evaluate environmental performance;
- checking for and correcting identified problems; and
- periodically reviewing the entire system at a top management level.

Agencies are not alone in their need for EMS. Organizations of all kinds are increasingly concerned with achieving and demonstrating sound environmental performance by controlling the impacts of their activities, products, and services on the environment, in a manner that is consistent with their environmental policy and objectives. In response to this need, International Standards covering environmental management were developed. The Standards are intended to provide organizations with the elements of an effective environmental management system (EMS) that can be integrated with other management requirements and help organizations achieve environmental and economic goals.

2.1 WHAT IS AN ENVIRONMENTAL MANAGEMENT SYSTEM (EMS)?

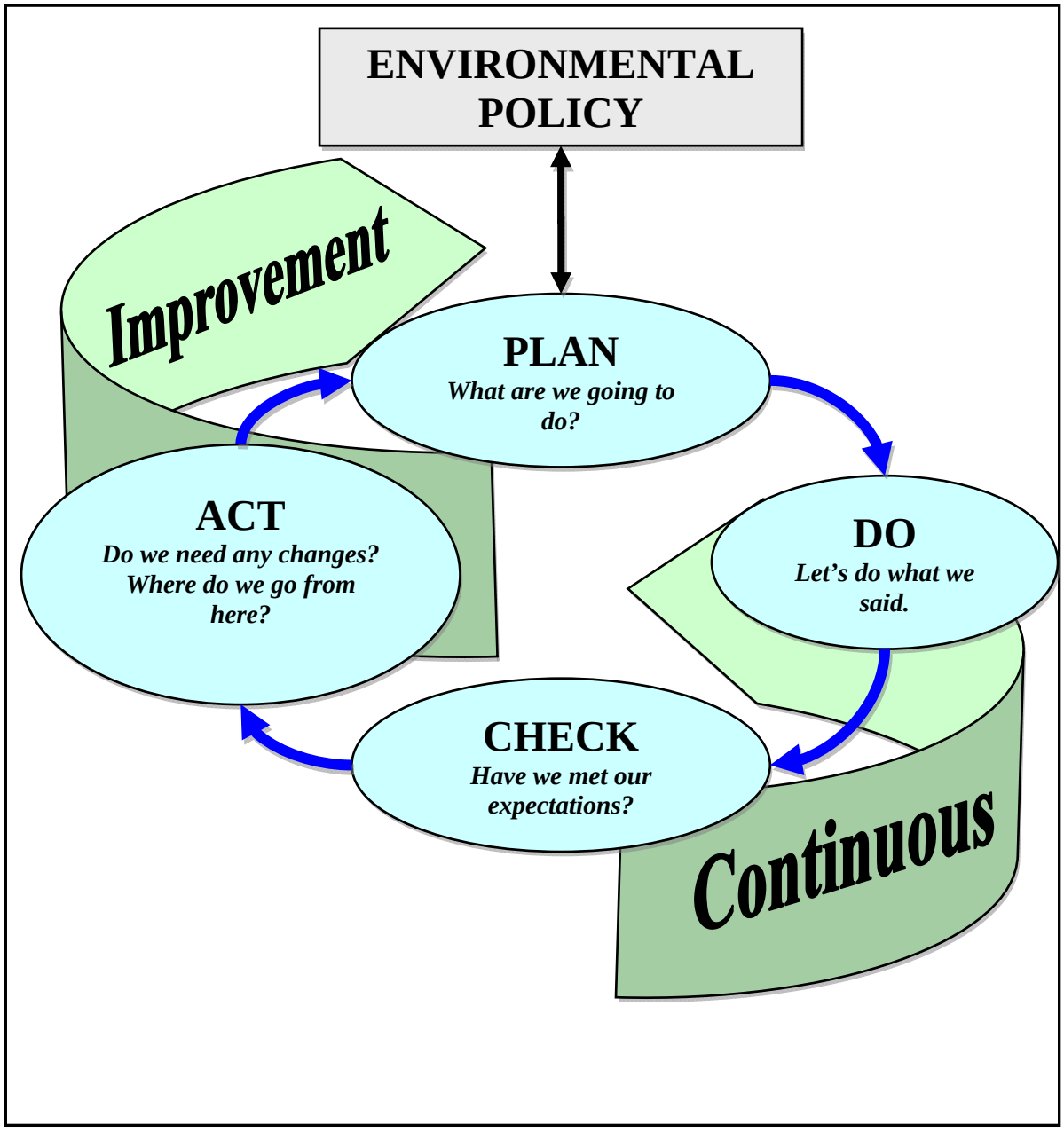
An EMS is part of an organization's systematic approach to developing and implementing its environmental policy and to managing its environmental effects. It is comprised of a set of management procedures that allows an organization to analyze, control and reduce the environmental impact of its activities, products and services, and operate with greater efficiency and control. An EMS has been applied to all kinds of organizations of varying sizes in both the public and private sectors.

Transport Canada defines an EMS as a systematic approach for organizations to bring environmental considerations into decision making and day-to-day operations. It also establishes a system for tracking evaluating and communicating environmental performance. An EMS helps ensure that major environmental risks and liabilities are identified, minimized and managed. (Transport Canada Glossary: http: / / www.tc.gc.ca / programs / environment / SD / strategy0103 / glossary.htm)

The international standard ISO 14001:2004, *Environmental Management Systems* has been selected as the EMS standard. The ISO 14001 EMS is a standard within the ISO 14000 series that specifies the requirements of an environmental management system. It is based on a Plan-Do-Check-Act framework (Figure 2.1) and is designed to help an organization systematically identify, control

and monitor its environmental issues. The overall aim of ISO 14001 is to support environmental protection and prevention of pollution in balance with socio-economic needs.

Figure 2.1 Plan-Do-Check-Act Framework



An EMS enables an organization to accomplish many tasks that are otherwise very difficult:

- Establish an environmental policy appropriate to the agency's needs and goals;
- Identify the environmental aspects arising from past, existing or planned activities, products or services, in order to determine which might have significant impacts on the environment (i.e., significant environmental aspects);
- Identify specifically relevant legislative and regulatory requirements;
- Identify organizational priorities and set appropriate environmental objectives and targets to achieve them;
- Establish a structure and program(s) to implement the policy and achieve objectives and targets;
- Facilitate planning, control, monitoring, corrective action, auditing and review activities that will ensure, both, that the policy is complied with and that the environmental management system remains appropriate; and
- Accommodate necessary adaptation to changing circumstances.

For more information see *EMS, A Bridge for Organizational Coordination and Communication. EMS Implementation Handy Guide Number Two* (2004) – see Appendix A for website address.

The ISO 14001 EMS standard is made up of the 18 elements shown in Table 2.1.

Table 2.1 – A Brief Description of the Elements of ISO 14001 EMS Standard*

Element	Brief Description	Reference to Standard
General Requirement	Define and document the scope of your environmental management system.	Section 4.1
Environmental Policy	Define environmental policy (usually a top management function) - a statement of the organization's overall intentions and direction relative to environmental performance. It provides the framework for environmental planning and action.	Section 4.2
Environmental aspects	Set* procedures and processes, first, to identify environmental aspects of your organization's activities, products and services, and second, to determine the significance of their impact(s) on the environment.	Section 4.3.1
Legal and other requirements	Establish, implement and maintain procedures to identify and access applicable legal and other requirements (e.g. government initiatives) and to determine (and document) how the requirements apply to the organization's environmental impacts.	Section 4.3.2
Objectives, targets and programs	Set and document measureable environmental objectives and targets that are consistent with the organization's environmental policy and the legal / other requirements. Then, set work program(s) for achieving them that include responsibility, timeframes and means.	Section 4.3.3
Roles, resources and responsibility	Define, document and communicate roles, responsibilities and authorities. This also necessitates ensuring the availability of resources to establish, implement and maintain the system.	Section 4.4.1
Competence, training and awareness	Ensure appropriate environmental training by, first, identifying training needs, second, setting training procedures, and third, maintaining associated records.	Section 4.4.2
Communication	Set procedures for internal communication (e.g. group meetings, newsletters, bulletin boards and intranet sites) and set procedures for receiving, documenting and responding to communication from external parties.	Section 4.4.3
Documentation	Develop and maintain specific documents including: • environmental policy • objectives • targets • description of the scope of your organization's EMS • description of the main elements of the EMS and references to related documents • other necessary records	Section 4.4.4
Control of documents	Set procedures for document control that include: • approval process • review, update and re-approval process • identifying changes, • making documents available at point of use • making documents readily identifiable • controlling important external documents • preventing the use of obsolete documents.	Section 4.4.5

Element	Brief Description	Reference to Standard
Operational control	Establish, implement and maintain documented procedures that are needed to reach objectives and / or targets. Ensure that applicable procedures are communicated to suppliers, including contractors.	Section 4.4.6
Emergency preparedness and response	Set procedures to identify potential emergencies and / or accidents that can have an impact on the environment. Specify appropriate response actions.	Section 4.4.7
Monitoring and measurement	Establish, implement and maintain procedures to monitor and measure key characteristics of the organization that can have a significant environmental impact.	Section 4.5.1.
Non-conformance and corrective and preventive action	Set procedures for dealing with actual and potential non-conformances and for taking corrective and preventive action.	Section 4.5.3
Evaluation of compliance	Establish, implement and maintain procedures for periodically evaluating compliance with applicable legal or other requirements. These procedures should include a consideration of the documented results of such evaluations.	Sections 4.5.2.1 and 4.5.2.2
Control of records	Maintain records to demonstrate conformity to the ISO 14001 Standard requirements. Also, set procedures to identify, store, protect, retrieve, retain and dispose of records.	Section 4.5.4
Internal audit	Set audit programs and procedures and conduct internal audits at planned intervals to evaluate various dimensions of the effectiveness of the EMS.	Section 4.5.5
Management review	Review the EMS (usually a top management function) at planned intervals to assess any opportunities for improvement and the need for changes to the EMS.	Section 4.6

**Set* has been used in this table interchangeably with *establish, implement and maintain* in order to help readability. The latter are the terms used in the ISO 14001 EMS Standard.

3.0 PLANNING YOUR EMS

3.1 PURPOSE OF THIS CHAPTER

This chapter describes a general process that an agency can follow while making EMS-related decisions:

- whether or not EMS implementation should be pursued;
- what type of EMS would be most appropriate;
- what the EMS should include to be relevant and useful to the organization; and
- how will Senior Management commitment to the EMS be obtained.

Figure 3.1 provides a flowchart to depict the tasks springing from these decisions.

Each task in the process is described under the following headings:

- Purpose
- Outcomes
- Who Does This Task
- ISO 14001 EMS Reference
- Implementing the Task

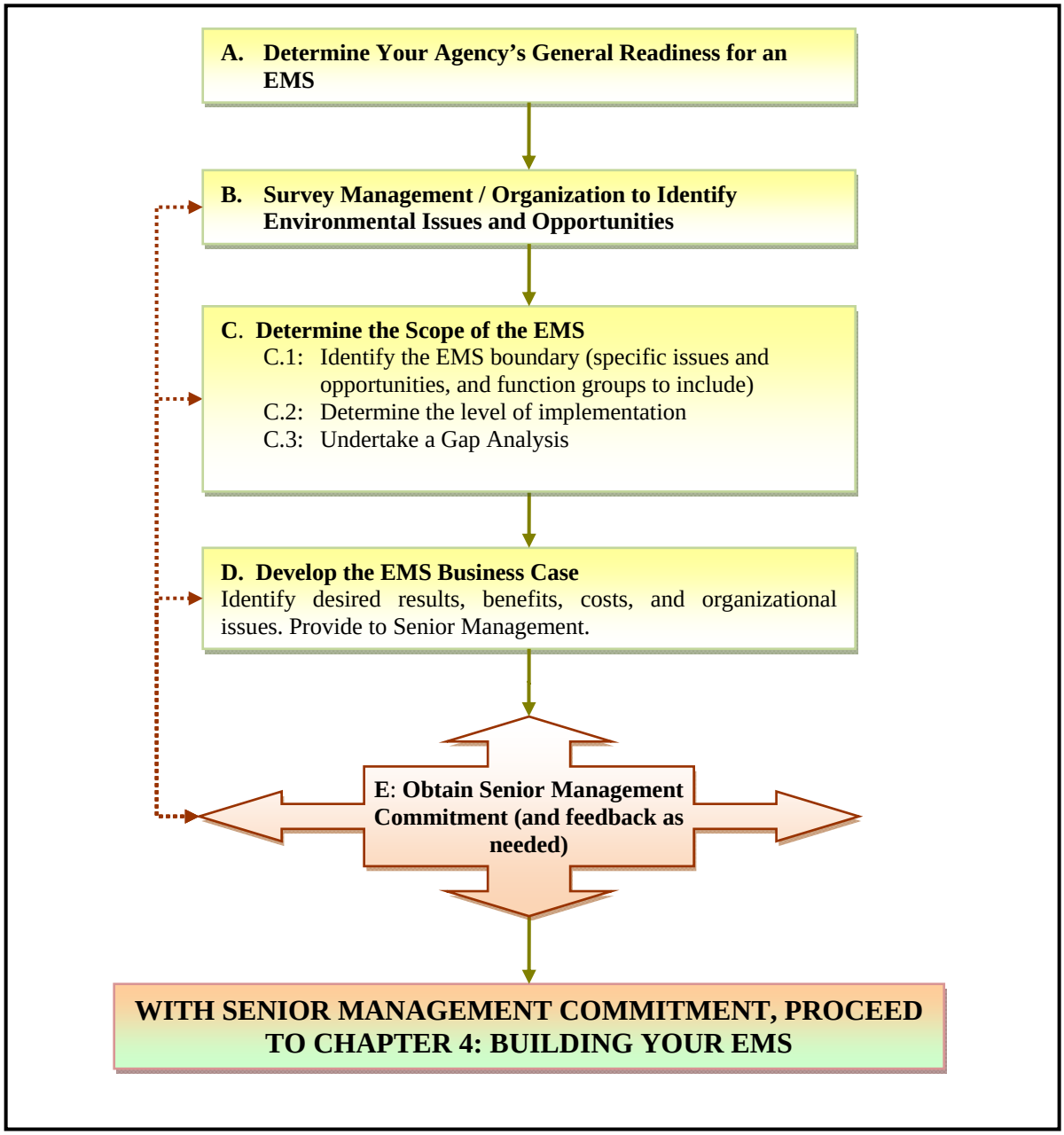
In describing how to implement the task, a set of sub-tasks (steps) are described in a two-column table. In one column, guidance is given; in the other, advice, examples and tools are provided.

In Part II of this Guide, Chapter 5, includes two examples of implemented EMSs (one is program-related, while the other is project-specific) to illustrate the tasks discussed in the following section.

If your Senior Management has provided the initial directive to pursue EMS development, tasks A through F should be reviewed to provide the focus and structure for an EMS to help ensure effectiveness and success.

The tasks shown in Figure 3.1 are shown in a logical order to facilitate discussion. You should undertake only the tasks that best meet your needs, in the order that makes sense for your agency. For example, you may need to develop a Business Case before undertaking the Gap Analysis.

Figure 3.1 General Process for Planning Your EMS



3.2 TASK A: DETERMINE YOUR AGENCY'S GENERAL READINESS FOR AN EMS

Purpose

The purpose of Task A is to determine your agency's readiness for an EMS. For example, will the development of an EMS encounter resistance from staff, functional areas, regional offices and / or, middle and senior management?

The intent is to identify the drivers for an EMS and determine whether or not the corporate culture is supportive of EMS implementation. In other words, is an EMS something you should spend your time pursuing? Do you have a reasonable chance of success?

Outcome

Clear direction from your Senior Management to either pursue an EMS or not.

Who Does This Task

Typically, the Environmental Unit / Specialist complete the questionnaire with input from other functional groups.

ISO 14001 EMS Reference

Not Applicable

Implementing the Task

As a first step in the process illustrated in Figure 3.1, the questionnaire provided in Table 3.1 can help you to understand the key issues as well as identify areas where you may need more information.

Table 3.1 *Are You Ready for an EMS*? Questionnaire

Questions		Yes	No	Unknown
1	Have key internal / external stakeholders of your agency required or requested that you develop an EMS? Key stakeholders can include internal senior management, regulators, auditors, judiciary, political superiors or the public.			
2	Could your agency benefit from establishing a process to prioritize and incorporate stakeholder requirements into operations?			
3	Do you see value in developing a system and procedures to identify and address environmental risks, liabilities and potential impacts?			
4	Do you see value in developing a system and procedures to ensure regulatory compliance?			
5	Could your agency benefit from establishing a procedure to monitor its operations, track its performance and evaluate compliance with environmental legislation?			
6	Are other counterpart agencies (transportation agencies, other municipalities, other government agencies, etc.) pursuing an EMS?			
7	Do you feel your agency has sufficient resources available, in terms of personnel and funds, to pursue an EMS?			
8	Is external perception of, and acceptance by, regulators, the public, local businesses, etc. of importance to your agency? In other words, would it be valuable for your agency to announce that you have an EMS and then be seen to implement it?			

Answering "Yes" indicates that possible drivers for EMS implementation are in place or that support may exist for an effort to do so. Answering "No" to most of these questions can indicate that an EMS may not be appropriate for your agency at this time, or alternately, might identify potential barriers to implementation. Any "Unknowns" indicate areas where more information is needed to help you decide on the merits of an EMS for your organization.

Talking to key decision-makers within your agency can provide important insights into the opportunities for and potential challenges of EMS implementation. It can also provide you with an opportunity to discuss the benefits of an EMS in order to align these key individuals with your efforts.

Talking to managers from other agencies who have already implemented an EMS can also help you gather additional information about benefits, drivers, challenges and success factors. In preparing this Guide we have tried to shorten this process for you by drawing on the experiences of EMS practitioners. In addition, contact information for the agencies participating in the survey Synthesis is included in Appendix E. A number of additional EMS information sources are also provided in Appendix A.

3.3 TASK B: SURVEY MANAGEMENT / ORGANIZATION TO IDENTIFY ENVIRONMENTAL ISSUES AND OPPORTUNITIES

Purpose

The purpose of Task B is to identify environmental issues and opportunities that can be addressed by the EMS along with their internal drivers.

Outcome

The outcome is a list of prioritized environmental issues and opportunities that could be addressed by the EMS.

Who Does This Task?

Typically, the Environmental Unit / Specialist undertake compiling and prioritizing the issues and opportunities with significant input from other functional groups.

ISO 14001 EMS Reference

Not Applicable

Implementing the Task

Sub-Tasks	Advice, Examples and Tools [2]
B.1 Determine Issues	
Gather and prioritize environmental information: list problems, prior formal notifications and informal concerns from regulatory agencies, complaints from the public, associated environmental issues. This information may include recent compliance problems, increased potential for charges or complaints, lack of employee familiarity with relevant requirements, changing conditions etc..	
B.2 Determine Opportunities	
List relevant environmental opportunities: due diligence, cost savings, cost avoidance, increased productivity, enhanced environmental performance, public perception, etc..  Look for larger government initiatives (e.g. programs, action plans or policies) as well. Your EMS can be the way to implement broader strategies.	 Transport Canada has aligned their operational EMS with the broader government Sustainable Development initiatives.  MTQ is looking to use the EMS to contribute to the implementation of the Ministry's 2008-2011 Strategic Plan, the

[2] See Appendix A Tools and References for details

Sub-Tasks	Advice, Examples and Tools [2]
	Governmental Strategy of Sustainable Development, the Ministerial Strategy of Sustainable Development, the Strategy on Biological Diversity and the Action Plan 2006-2012 on climate change and the Energy Strategy of Quebec 2006-2015.
B.3 Prioritize	
Determine which issues and opportunities are the most important to your agency. Also, identify issues or opportunities that can be quickly realized. Considerations may include: • level of compliance with legislation and polices; • resources needed to address the issues and opportunities; • time required to develop and implement corrective actions; • value: the relative magnitude of environmental effect from fulfilling the issue or opportunity versus effort; • relative acceptance / acknowledgement by public and regulators that environmental performance is being improved; • ability to get and affect employee "buy-in"; and • management interest or belief that a particular environmental issue is a "problem" for the agency.	 Record your process for prioritizing issues and opportunities, as you may need to defend your choices or use it later in work planning.

3.4 TASK C: DETERMINE THE SCOPE OF THE EMS

Purpose

The purpose of Task C is to set the boundaries of what will be included in the EMS and what work has to be done to implement the EMS. The idea is to capture the important issues and opportunities, as well as some "easy wins", while not letting the EMS get too big and cumbersome. This is also the time to determine the level of implementation desired (registered, full or partial EMS[3]), what your agency has in place already, and what needs to be developed.

Outcome

The outcomes are:

- a condensed list of environmental issues and opportunities to be included in the EMS;
- a list of functional groups that would be involved in the EMS;
- to decision on the level of EMS implementation (registered, full or partial); and
- completed Gap Analysis.

Who Does This Task?

Typically, the Environmental Unit / Specialist set the boundaries for the EMS with significant input from other functional groups and Senior Management. The level of EMS implementation will likely be determined by Senior Management because of the organizational implications.

ISO 14001 EMS Standard Reference

Section 4.1 - General Requirement: Define and document the scope of your environmental management system.

[3] Registered EMS is one audited by an accredited third-party registrar to confirm the organization's EMS meets the ISO 14001 EMS Standard – See Section 2.

Implementing the Task

Sub-Tasks	Advice, Examples and Tools [4]
C.1 Identify the EMS boundary	
Select the specific issues and opportunities from those found during Task B that will be included in the initial EMS. Then identify the functional groups within your agency which are likely to be impacted by the selected issues and opportunities to be included in your agency's EMS.  Ensure your agency has direct control over the issues and opportunities that you include. There is a danger of including issues over which you (or the departments, etc.) have no direct control.  A smaller EMS is much more likely to be successful. Many EMS's have failed because of over-ambitious scopes.	 "Don't overwhelm your staff, keep the EMS simple. You don't have to have everything under the EMS."  "Include 'easy wins' (also known as low-hanging-fruit) in your EMS. These can build confidence for staff and management in an EMS."  Pilot Project – You may wish to start with a smaller discrete area such as a maintenance yard or functional unit (such as salt management) to keep the EMS development effort manageable at the beginning.  "Leave room for continual improvement, a cornerstone of any EMS. You can, and should, be prepared to add to the EMS in the future."  The EMS information in Appendix D of Part II include the EMS scope of several agencies. Below is a summary of some of the agencies: • Highway planning, design, construction and maintenance activities • Engineering Design and Planning; and Policy and Program Development • All operational and office activities associated with the Unit. • City-Wide - incorporate environmental considerations into daily management activities and provide a tool to meet environmental performance objectives.

[4] See Appendix A Tools and References for details

Sub-Tasks	Advice, Examples and Tools [4]
C.2 Determine the level of EMS implementation	
Three levels of EMS implementation exist for an agency: • Registered: An EMS that has all of the elements of the ISO 14001 standard as verified by an accredited third-party registrar. • Full: An EMS that has all of the elements of the ISO 14001 standard, but is not registered. • Partial: An EMS that has only selected elements of a full EMS. Choosing the appropriate level of EMS implementation (registered, full or partial) will be based upon your agency's culture and existing practices (and may be predicted by the results of the EMS readiness questionnaire). Strong external drivers (e.g. regulatory agency pressure or negative media coverage) to implement an EMS will typically be the primary determinant of whether a full EMS gains support in most agencies. The decision to register your EMS will reflect the same strong external drivers. Registration may be important to establishing credibility with skeptical agencies or stakeholders. If the drivers are primarily internal, or if the external drivers can be satisfied without implementing a full EMS, it may make sense for your agency to implement a partial EMS.	 The key rationale for EMS certification identified in the agency survey referred to regulatory agency pressure and improved environmental performance. *Environmental Management Systems: An Implementation Guide for Small and Medium-Sized Organizations* (2001) listed: • Improve relationships with regulators and / or the surrounding community; and • Protect the investment your organization has made in your EMS. Knowing that you will be audited regularly by an outside party helps to keep management's attention on the EMS and ensure that it has the resources it needs to improve over time.

Sub-Tasks	Advice, Examples and Tools [4]
C.3 Conduct a Gap Analysis	
To find out where you are and where you have to go, your agency should begin with a Gap Analysis (also called Gap Assessment or Environmental Review) to compare existing systems to a standard (generally ISO 14001). Whether this is an informal analysis or a formal comprehensive audit, it is the essential first step. Even if you never plan to have a registered ISO 14001 EMS, a comparison with the standard provides an identifying benchmark. For example, the Gap Analysis may find that: • Your agency's document control system for quality can easily be tweaked to handle environmental documents, or • Your agency lacks a document control system, and one will have to be developed.  The Gap Analysis is a critical step in the EMS. It allows you to know what you have and on what you need to focus.	 Links to Gap Analysis checklists are found in Appendix A, including: • ISO 14001 Environmental Management System Self-Assessment Checklist (2000) • Environmental Management Systems Tools: A Reference Guide (Environmental Protection Agency, Washington DC) • ISO 14001 Environmental Management System Self-Assessment Checklist (GMI) • Various Gap Analysis Check Lists (PEER)  The City of Edmonton's *Environmental Management System Handbook* (2005) includes an example of a questionnaire that was used by the Core Team when it conducted a GAP analysis.  While consultants can be retained to do the Gap Analysis, it is recommended that Environmental Staff perform this task. It is useful for them to hear what people are saying; learn what environmental policies, documents, procedures, etc. work and do not work; get to know the issues; and see what agency initiatives are moving forward (agency drivers). For instance, one of the emerging drivers could turn out to include initiatives like Climate Change.  When using consultants, Environmental Staff should be involved to learn how the ISO 14001 sections are interpreted and get an independent view of any deficiencies in the agency.

3.5 TASK D: DEVELOP THE EMS BUSINESS CASE

Purpose

The purpose of Task D is to prepare the Business Case to get Senior Management commitment. Business Cases are common organizational approaches to presenting the pros and cons of an idea to those who control resources (staff, funding, etc.). Even if your organization does not use a business case approach, you should consider the following issues before you go forward.

Senior Management Support: To support an EMS, Senior Management may want answers to these questions:

1. What are our short- and long-term goals (environmental / organizational benefits)?
2. What will it take to get there: time, people, and money (estimate resources)?
3. "What's in it for those who are being asked to buy in" (identify associated business benefits)?
4. How long will it take (estimate schedule)?
5. How will we measure progress (management review)?

In addition, you need to know the formal and informal organizational mechanisms / protocols for engaging Senior Management in order to obtain and maintain their support.

Outcome

The outcome is a Business Case that will get Senior Management support.

Who Does This Task?

Typically, the Environmental Unit / Specialist develop the business case with input from other functional groups and Senior Management.

ISO 14001 EMS Reference

Not Applicable

Implementing the Task

Sub-Tasks	Advice, Examples and Tools [5]
D.1 Environmental benefits	
List environmental benefits in the short- and long-term that can be expected (to the extent practical). These may include improved regulatory relationships, reduced violations or incidents prevented (based on recent history) such as contaminated property, or others of a similar nature.  The EMS can help avoid regulatory delays, charges and/or fines.	 SNC-Lavalin Environnement, 1997, Profil environnemental des activités du ministère des Transports du Québec en vue de l'implantation d'un système de gestion environnementale : rapport final, report prepared by Transports Quebec Ministry, multiple pagination. This document is available in the Ministry documentation centres with the reference number CANQ SNCL 103  Some of the EMS benefits listed by Agencies include: Compliance / Due Diligence • Improved compliance with applicable legislation. • Evidence of due diligence in the event of a negative incident. • Improved overall environmental performance through formal written operating procedures, etc.. Reducing Impacts • Decrease in environmental impacts. • Integration into the daily work of the agency of mitigating mechanisms for various environmental concerns. This can include waste production, energy consumption, air pollution, etc.. Environment Awareness • Increased environmental awareness among staff. • Provision to consultants / contractors of the tools to understand and fulfill environmental obligations.

[5] See Appendix A Tools and References for details

Sub-Tasks	Advice, Examples and Tools [5]
D.2 Identify business benefits	
Identify business benefits (including those related to the noted environmental benefits) that can also be measured, including funding saved; costs avoided; person-hours saved or available as a result of avoiding incidents or violations; savings associated with reduced monitoring or regulatory review; and time saved (along with associated hours, money, and schedule advancement) as a result of improved regulatory relationships / enhanced review process.  The EMS can help keep projects on track and avoid costly delays.	 Some of the business benefits listed by Agencies include: Compliance / Due Diligence • See D.1 Environmental Benefits Reducing Costs • "Efficient use of resources through use of a management framework that includes formal written operating procedures, training and regular management reviews." Leader / Public Image • "Improve public confidence that we are an environmentally responsible organization." • "Establish ourselves as a leader in the environmental field."
D.3 Estimate resources	
Estimate the resources (personnel, financial, consultants, etc.) needed to develop and implement the EMS. Identify the position that will manage the EMS effort and the positions that will play key roles (i.e. whose functional units will be expected to have roles).  A dedicated EMS Coordinator is crucial to the successful development of the EMS.	 Costs and Staff Time Estimates from the Transportation Agency Survey are included in Section 5 (Table 5.9). The large budget range ($50,000 to $500,000) was likely a result of: • the various scopes of the EMSs; • the various sizes of the agencies; and • a lack of specificity in the survey for what to include or exclude in the estimate. However, the number of person-days to maintain an EMS is generally consistent at around 1 FTE. The document *A Guidebook for Improving Energy and Environmental Performance in Local Governments (2004)* reported an average implementation cost of $1,441 per employee based on 83 facilities.  To reduce new resource needs, assign existing staff to address gaps.  Ensure there is sufficient budget allocation to hire staff.  If quick EMS implementation is needed, consider an Administrative Assistant to help in managing the paperwork and follow-up

Sub-Tasks	Advice, Examples and Tools [5]
	activities of your EMS.
D.4 Estimate schedule	
Determine the schedule for EMS development and implementation.  Be cautious using schedules from other agencies or organizations. What took weeks in those cases may take you months, and vice versa.  Know your agency so that you can move forward at the correct pace.	 "Be conservative. Realistic schedules can provide the early confidence required by staff and management in an EMS".  The document *A Guidebook for Improving Energy and Environmental Performance in Local Governments (2004)* estimated the bulk of the work to implement an EMS for a municipality in Pennsylvania, U.S.A. would require 1 year. While some Canadian Transportation Agencies have found longer timelines, some are consistent with this estimate.
D.5 Conduct Management review	
You may wish to include an explanation of the "Check and Act" components of the EMS such as in Chapter 2 for Senior Management's consideration.	
D.6 Complete business case template / follow process	
Many organizations have templates for developing a Business Case and processes for providing these to Senior Management. It is important to comply with your corporate standard for Business Cases.  The business case should emphasize that the EMS can help avoid and solve Senior Managers' problems by keeping projects moving, and avoiding regulatory delays, charges and/or fines.	 A link to the Province of British Columbia's Business Case template (*Guidelines for Preparing MoT Business Cases*, 2004) is provided in Appendix A.

3.6 TASK E: OBTAIN SENIOR MANAGEMENT COMMITMENT

Purpose

The purpose of this task is to get Senior Management commitment and authorization to proceed with the development and implementation of an EMS. Once that commitment is obtained, it needs to be publicized in order to show staff that the EMS and corporate commitment are "real".

Senior Management support is critical to the successful development and implementation of an EMS. Not only does it ensure that resources are provided, but it also tells managers and employees throughout the agency that this "change in culture" is here to stay.

Senior Management should be involved from the beginning of the process so that at the end you can get their commitment.

Outcome

The outcome is to have the Senior Management commitment to the EMS. Several mechanisms can be used to facilitate the process and safeguard the commitment once it has been secured:

- obtain meaningful senior level feedback throughout the process of developing and implementing the EMS;
- ensure that the EMS meets identified expectations;
- maintain senior level engagement; and
- ensure that there will be no surprises as the EMS is developed.

Who Does This Task?

Senior Management

ISO 14001 EMS Reference

Not Applicable

Implementing the Task

Sub-Tasks	Advice, Examples and Tools [6]
E.1 Solicit Senior Management feedback	
The input of Senior Management is important for Tasks A to D, but in some agencies, it is essential for success or even progress. In general, it is wise to seek Senior Management input before making decisions that are difficult to change. It is important to know your Senior Management and to what extent they want to be involved.	"Have Senior Management review the draft Business Case at 50% completion so there are no surprises." "Use Presentations and workshops to provide information on the benefits of EMS." "Ensure regular updates even if they don't ask for them."
E.2 Obtain Senior Management commitment	
Senior Management support: THE IMPORTANCE OF HAVING THEIR COMMITMENT CANNOT BE OVER-EMPHASIZED. Most implementation problems are a result of a lack of commitment, and can be addressed by improving upper echelon commitment to the EMS.	A lack of Senior Management commitment has had the following real-life consequences: • no dedicated funding or support; • significant delays in implementing the EMS; and • higher potential for the EMS to be abandoned.

[6] See Appendix A Tools and References for details

4.0 BUILDING YOUR EMS

4.1 PURPOSE OF THIS CHAPTER

This chapter describes the tasks that can be undertaken in the development and implementation of an EMS. This chapter includes key strategies for success, advice, examples, tips, techniques, tools and references from Canadian transportation agencies augmented with experience from other transportation and non-transportation sectors. Throughout this chapter, reference is made to Part II – Lessons Learned in order to ground the tasks in the real world.

4.2 TASKS IN BUILDING YOUR EMS

The EMS Tasks are shown in Figure 4.1. Each task is described under the following headings

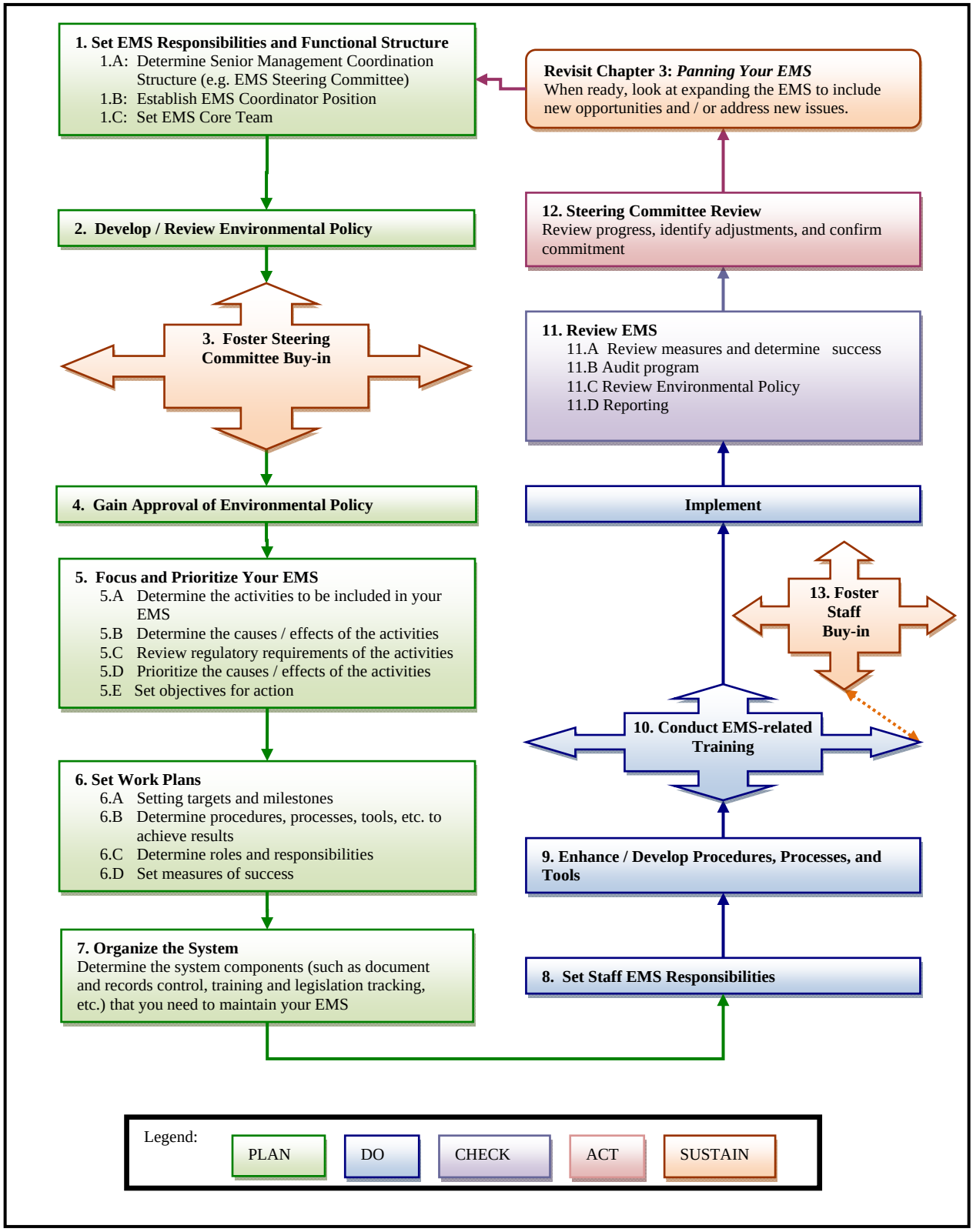
- Purpose
- Goals
- Who Does This Task
- ISO 14001 EMS Reference
- Implementing the Task
- Considerations for Outsourcing

In describing how to implement the task, a set of sub-tasks (steps) are described in a two-column table. In one column, guidance is given; in the other, advice, examples and tools are provided.

Part II of this guide includes two examples (salt management, and project-specific EMS) that are included to illustrate the EMS tasks of this section.

The tasks described in this Chapter are shown in a logical order to facilitate discussion. You should undertake only the tasks that best meet your needs, in the order that makes sense for your agency.

Figure 4.1 Tasks in the Development and Continued Implementation of an EMS



4.3 TASK 1 – SET EMS RESPONSIBILITIES AND FUNCTIONAL STRUCTURE

Purpose

The purpose of Task 1 is to set up the organizational structure to develop and implement an EMS. For the purposes of this document, the following structure has been assumed:

- An EMS Steering Committee comprised of Senior Management representatives
- An EMS Coordinator
- An EMS Core Team comprised of representatives from the various functional areas.

This structure may not suit your organization. However, all Advice, Examples and Tools provided in this section may help you in developing your agency specific structure.

Outcome

The outcome is an effective organizational structure to develop and implement an EMS including:

- a functioning EMS Steering Committee (SComm);
- staffing of the EMS Coordinator position; and
- establishing the EMS Core Team.

Who Does This Task

Typically, the Environmental Unit in conjunction with functional groups and Senior Management select candidates.

ISO 14001 EMS Reference

Section 4.4.1 - Roles, resources and responsibility: Define, document and communicate roles, responsibilities and authorities and ensure the availability of resources to establish, implement and maintain the system.

Implementing the Task

Sub-Tasks	Advice, Examples and Tools [7]
1.A Determine Senior Management coordination structure	
Steering Committee (SComm): Represents Senior Management and ensures three requirements are met: resources are available when needed; functional units coordinate with and support the EMS effort; and employees throughout the agency recognize the commitment of Senior Management. The SComm needs to be able to clarify management's specific goals for the EMS and may include directors, branch managers and general managers (or their equivalents, in your organization).  The SComm needs to be visibly committed to the EMS and involved.  **Senior Management support:** Most EMS implementation problems are a result of a lack of support, and can be addressed by improving the Senior management commitment to the EMS.	 The SComm model may not be right for your agency. Your agency may have existing management processes into which EMS responsibilities can be incorporated. However, you should identify the senior management position that will serve as the leader (i.e., management "champion"). This leader would ensure that resources are available when needed, other functional units coordinate with and support the EMS effort, and employees throughout the agency recognize the commitment of Senior Management.  Your SComm should help you overcome these real life barriers to effective EMS implementation: • Lack of buy-in from the agency leads to no dedicated funding or support. • Lack of dedicated staff leads to significant delays in implementing the EMS. • Lack of commitment leads to the EMS being abandoned.
1.B Establish an EMS Coordinator position	
The EMS Coordinator is the project leader for the EMS and is essential to successful implementation as the key EMS promoter and communicator. In addition to typical project manger responsibilities, the EMS Coordinator will: • Build and lead the EMS Core Team; • Plan the EMS project and implementation schedule; • Gather, organize, and disseminate information; • Delegate tasks and establish deadlines; • Facilitate top management visibility and involvement; • Obtain cross-functional support and buy-in; and • Regularly meet and communicate with top management about the benefits and status of	 "A dedicated EMS coordinator is essential to the success of the EMS".  EMS Training – ensure the EMS Coordinator has the training she / he needs – see Task 10 EMS Training for more information on EMS training.

[7] See Appendix A Tools and References for details

Sub-Tasks	Advice, Examples and Tools [7]
implementation.	
1.C Set EMS Core Team	
The Core Team plays an important leadership role in planning the EMS project, delegating the tasks, establishing deadlines, collecting and evaluating work, and providing training, guidance and assistance as needed.  The Core Team and its members are the agency's EMS experts and champions. The Core Team is drawn together from the various functional groups (departments, divisions, etc.). It is the group that will implement the EMS.  The Core Team should include cross-functional (e.g. engineering, finance, human resources, and operations.) representation and include members from top to bottom of the organization (i.e. management to frontline). Members can even be pulled in from operations outside the EMS boundary. A cross-functional team can help to ensure that procedures are practical and effective and can build commitment to and ownership of the EMS.	 "When selecting members of the Core Team, look for three key characteristics: • availability – do they have time to commit; • interest – are they environmentally minded; and • opportunity to influence – can they influence others in their functional group."  EMS Training – ensure the EMS Core Team members have the training they need – see Task 10 EMS Training for more information on EMS training.  "Over time, rotate the members of the Core team with other staff from their functional group. This will build EMS expertise and buy-in within the functional groups." This will also prevent individual members of the Core team from feeling overwhelmed or over-tasked, since 'extra duties' arising from membership will be of finite duration.  Appendix A includes an example of a Core Team Agenda

Considerations for Outsourcing

When working in an outsourced environment, it is important that the Core Team include team members who are familiar with contractual procedures so that the relevant EMS provisions can be incorporated into contracts using appropriate language.

4.4 TASK 2 – DEVELOP / REVIEW ENVIRONMENTAL POLICY

Purpose

The purpose of Task 2 is to develop the Environmental Policy and determine how it will be publicized. The Environmental Policy is your agency's formal statement defining its intentions and principles in relation to its overall environmental performance. It provides the basis for all subsequent EMS planning and action. Over time, the Environmental Policy should be reviewed for appropriateness to your agency's evolving roles and responsibilities.

Outcome

The outcome is an Environmental Policy that can be adopted by your agency.

Who Does This Task

The Core Team develops the Environmental Policy with input from the SComm.

ISO 14001 EMS Reference

Section 4.2 - Environmental Policy: Top management defines the environmental policy, which is a statement of the organization's overall intentions and direction relative to environmental performance. It provides the framework for environmental planning and action.

Implementing the Task

Sub-Tasks	Advice, Examples and Tools [8]
2.A Develop Environmental Policy	
The Environmental Policy provides the foundation and direction for the rest of the EMS. The policy should be drafted before the development of other EMS elements.  Do not undervalue the Environmental Policy. It formalizes / institutionalizes for both your agency and external stakeholders, including the public, your organization's commitment to environmental stewardship and an EMS.  Do not underestimate the time commitment associated with developing the Environmental Policy. Ensuring the policy is adequately reviewed and endorsed so that it realistically reflects the commitments of your agency to environmental management and addresses external stakeholder concerns (as needed) can take anywhere from several months to over a year, especially if you plan to make it public. (See Sub-task E-3 for more details).	 "The Environmental Policy is the cornerstone of an EMS."  References to Environmental Policy from Transportation Agencies are included in Appendix A including: City of Calgary, Nova Scotia Transportation and Infrastructure Renewal and City of Hamilton.  CSA publication PLUS 1113 First *Steps to Environmentally Responsible Management: A Comprehensive Workbook for Environmental Policy Development.*  Get input from management and from employees. It is important that your policy reflects your organizational culture and that it is appropriate to all levels of your operation and services.
2.B Check Environmental Policy against ISO 14001 standard	
Reviewing your agency's Environmental Policy against the ISO standard is recommended. If your agency has chosen to seek registration or to implement a full EMS, then the review is required to determine compliance. For partial implementation, you may wish to know how your policy compares to the international standard, and what, if any, improvements can be made to your policy.	 **Make the EMS fit your agency**: Your Environmental Policy does not have to completely comply with the ISO 14001 standard. Only use / adapt the parts that make sense for you and your agency.

[8] See Appendix A Tools and References for details

Sub-Tasks	Advice, Examples and Tools [8]
2.C Set internal communication program for Environmental Policy	
Publicize to all employees the management's commitment to EMS. Management commitment is the foundation of an EMS. Without a published commitment, the resource, staff buy-in, etc. will not likely follow, regardless of how much planning effort is invested.	Methods used to internally communicate environmental policies may include several strategies: • specific Senior Management letter to all staff stating the importance of the policy to the organization; • posting the policy at various sites throughout the workplace (such as on lunchroom bulletin boards) so there is a visual reminder of the statement and its importance; • using paycheque stuffers, identification badges, wallet cards, etc., so that employees can carry the environmental policy with them; • incorporating the policy into training / orientation classes and materials; • referring to the policy at staff meetings; and • posting the environmental policy on the intranet.
2.D Setting a public Environmental Policy	
A full EMS requires that agencies make their Environmental Policy "available to the public". Some agencies (such as municipalities) may wish to consider the views and opinions of stakeholders and community groups when developing an Environmental Policy - be it specific to the transportation function or for the municipality as a whole.	Consider a schedule for announcing the initial commitment to the public.

Considerations for Outsourcing

Your agency may wish to communicate the management's commitment to EMS to consultants and contractors. Without such communication, the consultants and contractors may be reluctant to invest effort in conforming to the EMS.

4.5 TASK 3 – FOSTER STEERING COMMITTEE (SCOMM) BUY-IN

Purpose

The purpose of Task 3 is to solicit / allow for SComm involvement from the beginning of and throughout the process so that it remains engaged and committed.

Outcome

The outcome is buy-in of the SComm.

Who Does This Task

The SComm as engaged by the EMS Coordinator / Core Group.

ISO 14001 EMS Reference

Not Applicable

Implementing the Task

Sub-Tasks	Advice, Examples and Tools [9]
3.A Seeking Input	
It is beneficial to have SComm input at various planning steps. The challenge for the EMS Coordinator and Core Group is to determine in which tasks the SComm should be involved. In general, it is wise to seek SComm input before making decisions that are difficult to change. However, most importantly, know your SComm and how the members want to be involved.	 "Have one-on-one meetings at least yearly with members of the committee to address issues (like work planning) related to their functional group. This ensures they are on board so there are "no surprises."  "Make every meeting valuable – be prepared and engage the committee".  "Become part of the process - make the EMS part of their regular routine".  "Use workshops to provide information on the EMS – not everything has to be a presentation".

[9] See Appendix A Tools and References for details

	 "Provide regular updates even if they don't ask for them."
3.A Tying the EMS to Other Initiative	
Roll EMS under the protection of larger government initiatives (e.g. programs, action plans or policies) to secure and keep resources and senior management buy-in. This protects the EMS through waning interest, which will likely happen.	 Transport Canada has aligned their operational EMS with the broader government Sustainable Development initiatives.  An EMS is the way to implement (operational tool) broader government strategies.

Considerations for Outsourcing

None

4.6 TASK 4 – APPROVAL OF ENVIRONMENTAL POLICY

Purpose

The purpose of Task 4 is to have the SComm approve and publicize the Environmental Policy so that all employees (and others, as appropriate) know that management has made a real commitment to the environment.

Outcome

The outcome is an approved Environmental Policy of which staff is aware. An agency may have the additional outcome of having the Environmental Policy publicly available.

Who Does This Task

The SComm

ISO 14001 EMS Reference

Section 4.2 - Environmental Policy: Top management defines the environmental policy: a statement of the organization's overall intentions and direction relative to environmental performance. It provides the framework for environmental planning and action.

Implementing the Task

The SComm may wish to have the agency head (minister, mayor, etc.) sign the Environmental Policy and formally launch the EMS / Environmental Policy.

Considerations for Outsourcing

None

4.7 TASK 5 – FOCUS AND PRIORITIZE

Purpose

The purpose of Task 5 is to focus the planning you did in Chapter 3. In order to set clear, effective objectives for action (the Work Plans in Task 6), you need to have a comprehensive understanding of the environmental effects your activities cause and the priority in which to address them.

Outcome

The outcomes should be:

- a comprehensive list of activities that are to be included in the EMS;
- a table listing the environmental effects of the agency's activities have and their causes (hereafter referred to as causes / effects);
- a list of your legal requirements with respect to your causes / effects; and
- a prioritized list of objectives to address the causes / effects (that include meeting legal requirements).

Who Does This Task

The Core Team with input from the SComm.

ISO 14001 EMS Reference

Section 4.3.1 - Environmental aspects: Set procedures and processes to identify environmental aspects of your organization's activities, products and services, and to determine the significance of their impact(s) on the environment.

Section 4.3.2 - Legal and other requirements: Set procedures to identify and access the applicable legal and other requirements (e.g. government initiatives) and determine (and document) how the requirements apply to the organization's environmental aspects.

Section 4.3.3 - Objectives, targets and programs: Set and document measurable environmental objectives and targets that is consistent with the Environmental Policy and the legal / other requirements, and set work program(s) for achieving them that include responsibility, timeframes and means.

Implementing the Task

Sub-Tasks	Advice, Examples and Tools [10]
5.A Identify the activities to be included in your EMS	
Develop a list of the operations (e.g. roadway maintenance) and associated activities (e.g. materials handling and storage at stockpiles; storm water control during roadway maintenance; and ditch cleaning). They should be related to the issues and opportunities identified in Chapter 3. The list should be as complete as possible; you can choose not to include certain activities if they are not a high priority.  Be absolutely clear about what operations and supporting activities will be the focus of your EMS efforts. Although your Core Team could probably brainstorm a good list, you should ensure that nothing slips through the cracks.  Now that you have selected operations and supporting activities that will be the initial focus of your efforts, you need to confirm they are within your EMS boundary (defined in Chapter 2). If not, you either have to redefine your EMS boundary or select other operations and activities.	 You should ask yourself: what activities are needed to address the issue or realize the opportunity?  **Activities can include:** Waste, chemicals, water, energy, salt and sand, sewage, erosion & sediment control, emissions to air, vegetation, liquid bulk containment, emergency response. **An example** Activity List is included in Appendix A (*Task 5 Example Activity List and Cause / Effect Ranking*).  Record the process you went through to identify your agency's activities.  Getting feedback on the activities list is a good way to involve staff outside of the Core Team. Consider having an invitational review of listed activities by operational staff, supervisors, etc.  Process Flow Diagrams. To understand your activities, it helps to understand the inputs / processes / outputs that are part of the operations. Begin by identifying the many outputs (services delivered) of the agency. Then, for each output, work backwards and develop a Process Flow Diagram that identifies inputs and the sequence of activities involved in the production of the particular output. See Integrated *Environmental Management Systems Implementation Guide* (2007) for an example.

[10] See Appendix A Tools and References for details

Sub-Tasks	Advice, Examples and Tools [10]
5.B Determine the causes / effects of these activities	
Create a list, matrix, etc. of your activities, their, environmental effects, and their causes. Remember: You cannot expect to manage environmental issues outside your influence or control. As you develop your list, your focus should be on the impacts of your own operations and services within the EMS boundary that you defined.	 Get together with the employees from different functional areas to brainstorm and work together on your cause / effect list. The most common approach to showing clear relationships between activities and impacts is by developing a matrix for each of your activities to organize relevant information in a manageable manner.  An example of an impact matrix is included in Appendix A (*Task 5 Example Activity List and Cause / Effect Ranking*). You may not have to break down all activities by effects. You may be able to group activities with similar causes. For example, earth disturbing activities (e.g. grubbing, and grading) can be a group as these all cause increased risks of soil erosion and sedimentation. Detailed guidance on identifying environmental impacts is provided in: *PLUS 1145 A Guide to Identifying Significant Environmental Aspects* (1999)

Sub-Tasks	Advice, Examples and Tools [10]
5.C Undertake a regulatory review	
A Regulatory Review is the process for identifying the regulatory and policy requirements of each cause / effect. The regulatory review includes an examination of federal and provincial / territorial legislation, applicable municipal bylaws, and other requirements. In theory, linking agency requirements to the identified causes / effects establishes a clear relationship between the activities and the requirements. In reality, the complex, overlapping and ever-changing nature of legislation and policy requirements makes direct linkage to activities difficult to develop and even more difficult to maintain.	 Examples of regulatory reviews include: • Environmental Protection Requirements for Transportation Planning and Highway Design, Construction, Operation and Maintenance (Ministry of Transportation, Ontario). • Examples provide with the Provincial Case Study in Chapter 6 of Part II. • Anonymous Example of a Table of Concordance  It can be very difficult to develop a list of legislation that applies to each activity's cause and effect. Also, it is difficult to maintain such a list given that activities and legislation change consistently. Therefore, you may wish to group causes / effects (working near water, waste generation, etc) and then relate legislation to those groups.  Detailed guidance on regulatory review is provided in: *PLUS 1145 A Guide to Identifying Significant Environmental Aspects (1999).*
5.D Prioritize the causes / effects	
Develop a "ranking system" for prioritizing causes / effects. Factoring in the ranking system can include: severity of penalties, greatest risk to agency, severity / extent of impacts. This system should be tailored to you agency and be clear and repeatable. The ranking system should include a "cut-off" to remove causes / effects that are not significant.  Be certain of your ranking system; you may need to defend it. Regulatory requirements and Senior Management priorities are key consideration when developing a defensible ranking system.	 An example of ranking is included Appendix A: *Task 5 Example Activity List and Cause / Effect Ranking*.  Detailed guidance on prioritizing causes / effects impacts is provided in: *PLUS 1145 A Guide to Identifying Significant Environmental Aspects* (1999). Other references include: • Analysis of Environmental Impact Estimation Methods for Railway Environmental Management System (2004) • Aspect and Impact Identification and Ranking Workshop Environmental Stewardship in Transportation Through Waste Management, Materials Reuse (2005)

Sub-Tasks	Advice, Examples and Tools [10]
5.E Set objectives for action	
For your significant causes / effects, identify an objective to provide a focus for action. For example, the objective could be to reduce incidents of notices of violation or reduce the use of road salt.  Do not try and fix everything at once. Keep the list as short as practical and be realistic in what you can accomplish; too many objectives can lead to confusion, loss of focus, and an effort that is difficult to manage.	 Examples of objectives are included in the City of Calgary's *Environmental Action Plan* (March 2007)  "Many EMSs fail by trying to achieve everything at once. By developing a manageable list of objectives, you show the SComm and staff that the EMS works. Continual improvement is a cornerstone of an EMS. Start small and get bigger when you can."

Considerations for Outsourcing

When identifying the activities to be included in your EMS, you may need to include the actions of your agency's agents in order to address certain issues or realize opportunities. For example, contractors' fuel handling procedures may need to be included in the EMS in order to reduce the risk of soil contamination or non-compliance with the *Fisheries Act*.

The ISO 14001 Standard requires that an EMS identify all causes / effects within its boundaries over which an organization can exercise control or influence. Outsourcing permits an agency widely varying degrees of influence and control over consultants and contractors.

4.8 TASK 6 – SET WORK PLANS

Purpose

In Task 5, objectives were developed from a comprehensive understanding of the environmental effects your activities cause and the priority in which you chose to address them.

The purpose of this task is to develop work plans that will reach the objectives set in Task 5.

Outcome

A reasonable set of clear realistic work plans for functional units to implement. The work plans should include:

- actions to be taken;
- clearly defined roles and responsibilities; and
- strategies to communicate those responsibilities to staff.

Who Does This Task

This is a combined effort of the Core Team members in consultation with their functional group and the Environmental Coordinator.

The specific lead for the work will depend on the objective, agency and functional groups involved. Using the objective of reducing road salt as example, the most likely lead would come from either maintenance or the road safety functional group.

ISO 14001 EMS Reference

Section 4.3.3 - Objectives, targets and programs: Set and document measurable environmental objectives and targets that is consistent with Environmental Policy and legal / other requirements. Set work program(s) for achieving them that specify responsibility, timeframes and means.

Section 4.4.1 - Roles, resources and responsibility: Define, document and communicate roles, responsibilities and authorities. Ensure the availability of resources to establish, implement and maintain the system.

Section 4.4.6 - Operational control: Set documented procedures to reach objectives and / or targets. Ensure applicable procedures are communicated to suppliers, including contractors.

Section 4.4.7 - Emergency preparedness and response: Set procedures to identify potential emergency situations and accidents that can have an impact on the environment. Establish appropriate response actions.

Section 4.5.1 - Monitoring and measurement: Set procedures to monitor and measure key characteristics of your activities that can have a significant environmental impact.

Implementing the Task

Sub-Tasks	Advice, Examples and Tools [11]
6.A Setting targets and milestones	
The target (results) you are trying to achieve should be realistic and measurable, but should challenge an organization to improve. Realistic targets help to ensure success and, thus, build buy-in for future EMS efforts that may present a greater challenge. The result could be: • Provide training to 95% of the workforce on the Environmental Policy (within 2 years). • Reduce the average time for a Fisheries Act Authorization by 5 to 10% (within 3 years).  Setting realistic measurable targets is not simple. Generally the experience of seeking different targets and seeing the results leads to better target setting. You should consider how you will gather the information needed to measure success when defining results (see sub-task 6.E).	 If your targets turn out to be unrealistic and / or not measurable, then refine your targets and continue. **THE EMS IS NOT A TEST!** It is a systematic process of continual improvement.  Examples of targets are included in the City of Calgary's *Environmental Action Plan* (March 2007).
6.B Determine procedures, processes, tools, etc. to achieve results	
First, identify existing programs, procedures, processes, and tools relevant to the EMS. Second, identify existing programs, procedures, processes, or tools that can be enhanced to fulfill the targets.  **Don't reinvent the wheel**: Identify, build upon, and incorporate existing successes. Use what you have. Third, consider entirely new initiatives. **Example:** **Target:** Within 2 years, have all maintenance yards comply with upcoming waste water discharge criteria. **Initiative:** Install oil / water separators at all maintenance yards that require it. **Actions under this initiative:** 1) Characterize the maintenance yard effluent in order to determine compliance and select the appropriate oil / water separator. 2) Prepare Request-for-Quotation to install oil / water separators. 3) Assess, select and order oil / water separators.	 The Gap Analysis should have identified some systems that are currently in place.  The functional group will help identify existing procedures, processes, and tools, as well as what is needed for improvement.  Build on Existing: One agency "piggy-backed" EMS training onto its Health and Safety training.

[11] See Appendix A Tools and References for details

Sub-Tasks	Advice, Examples and Tools [11]
4) Install oil / water separators. 5) Prepare handbook for facility to monitor oil / water separator. 6) Conduct training. Keep in mind the EMS's necessary attributes: • consistency; • repeatability; • adaptability and flexibility • integrated with existing actions; and • easily understood by the user. **Keep to a minimum the number of initiatives (enhanced or new procedures, processes, and tools developed). Too many changes, coming too closely together, can lead to confusion, loss of focus, and an effort that is difficult to manage.** **Consider a step-by-step approach:** You may be able to break up an initiative into immediate, mid-, and long-range actions to make it seem less daunting. **Get early success:** Include some initiatives that are easy to develop and implement and that have clear benefits. Such "low hanging fruit" are opportunities to build morale and confidence in the EMS. **Make the EMS fit your agency:** Build upon the existing processes of your agency. For example, don't set-up a system that interacts via email if your remote offices don't have access. **Staff Involvement:** The development and implementation of an EMS requires staff with a wide-range of skills within your agency.	Examples of initiatives, programs, procedures, processes, and tools for EMSs are included in many of the general references and websites, such as: • The City of Calgary's Environmental Action Plan (March 2007). • Integrated Environmental Management Systems Implementation Guide (2007). • Environmental Management Systems for Municipal Infrastructure (Nov-05).
Emergency Preparedness Uncontrolled incidents (like a large spill of toxic chemical) often have significant environmental consequences. Due to this, ISO 14001 specifically requires that emergency preparedness be considered and provided for.	Emergency preparedness examples include Fuel Spill Response Procedure and Environmental Incident Report from P.E.I. Department of Transportation & Public Works.

Sub-Tasks	Advice, Examples and Tools [11]
6.C Determine roles and responsibilities	
• Identify the position(s) that would be responsible for each of the initiatives and meeting the targets. • Develop BRIEF responsibility statements for the identified personnel. The responsibility statements should be related to the actions required to develop and implement the initiatives. • Identify the means by which these responsibilities will be communicated. • Establish a schedule for communicating the environmental responsibilities. • Determine who will communicate the responsibilities (Note: Lines of communication may be based on existing organizational practices or protocols).  **Staff Involvement:** Successful EMS implementation requires addressing the day-to-day operational procedural needs of all employees involved in the EMS's focus activities or facilities.  These activities may proceed concurrently with Step 7.	 Unionized agencies may wish to consider seeking union endorsement of the EMS. For one agency, union members recognized the value to them in having clearly assigned responsibilities.  The *Integrated Environmental Management Systems Implementation Guide* (2007) has work sheets for helping determine responsibilities.  The provincial Case Study in Chapter 6 of Part II includes responsibly statements.
6.D Set measures of success	
Determine how success will be measured. You will need to identify the criteria, process and schedule to be used to assess the EMS's progress and performance on an ongoing basis. This could include several monitoring activities: (a) periodic sampling and analysis of air, water, soil, etc. (e.g. contaminated soil at maintenance yards, storm water management ponds); (b) inspections during construction / maintenance; (c) surveys and questionnaires of staff, consultants and contractors; (d) review of records to extract relevant information (e.g. review of contracts to ensure revised operational constraints have been included); and (e) environmental compliance audits (e.g. by your agency or by regulatory agencies). You need to consider how you will gather and store the information for analysis and reporting. See Task 7: Set the System for details about information management.  **Don't reinvent the wheel:** Identify existing processes and schedules that can be used or adapted to assess your EMS's progress and performance.	 The Ontario Ministry of Transportation (MTO) has an environmental monitoring program to review the effectiveness of and compliance with its Class Environmental Assessment process. To help evaluate and ultimately improve MTO's Class EA process, a series of *Class Environmental Assessment Monitoring Questionnaires* (see Appendix A for link) have been developed to solicit information from various stakeholders. The results are compiled into an annual summary report.  CSA Standards and Guides: • *PLUS 1144 Evaluating Environmental Performance: Indicators and Measures* (1998) • *ISO 14031 Environmental Management - Environmental Performance Evaluation - Guidelines* (1999) • *ISO / TR 14032 Environmental Management - Examples of Environmental Performance Evaluation* (1999)

Considerations for Outsourcing

Some targets that aim to modify consultants' and contractors' work may be as simple as changes to requests–for–proposals or standard contract documentation. For example, this may look like the following:

- Target: Modify the general condition of contracts to include new procedure within 2 years.
- Work plan: Use existing contract review procedures to update provisions.
- Roles and responsibilities: Contract Review Committee.
- Communication: Presentation at the road association annual meeting by Manager of Construction Office.
- Measures of successes: In contract yes / no.

Other targets may not be so simple.

For example, the target may be for contractors to be responsible for all the causes / effects in their control via contractor-developed environmental management plans. This may be a new approach for managing environmental causes / effects. See the Provincial Case Study in Chapter 6 of Part II.

4.9 TASK 7 –ORGANIZE THE SYSTEM

Purpose

The purpose is to identify and develop the information management and feedback systems that you need to maintain the EMS. It must suit your agency.

Start with EMS software: "If we had to start over again, we would purchase an EMS software system right at the start. It is awesome! The upfront cost is easily recovered in reduced effort". This agency has a registered EMS.

Outcome

The outcome is a realistic work plan to implement an information management and feedback systems that meets the desired outcomes for your organization within the timelines you define. The order of preference is:

- use existing systems
- enhance existing systems
- develop new systems.

The information management and feedback components of the EMS are often seen as "bureaucratic" or unnecessary. However, information management and feedback are needed to ensure that the EMS is moving forward and working effectively. These systems can include procedures to record that targets are met, training is done, and communication is maintained, as well as to ensure that documents are updated. Your system can include:

A. An EMS Manual
B. Internal communication procedures
C. External communication procedures
D. Document control procedures
E. Record keeping procedures
F. Procedures for determining / reporting non-conformances, and for preventative and corrective actions
G. EMS maintenance procedures
    - Updating legal and other requirements
    - Updating other EMS aspects:
        - issues and opportunities
        - causes / effects
        - objectives
        - targets
    - Maintaining staff awareness and training

To develop a realistic work plan for the components of your system, follow Task 6 to Set Work Plans for each system component.

"The information and feedback management system of the EMS has had benefits outside the EMS. The procedures for external communications have been adopted agency-wide when the effectiveness of the standardized approach was understood by Senior Management."

Who Does This Task

The Core Team

ISO 14001 EMS Reference

Section 4.4.3 - Communication: Set procedures for internal communication (e.g. group meetings, newsletters, bulletin boards and intranet sites) and for receiving, documenting and responding to communication from external parties.

Section 4.4.4 - Documentation: Develop and maintain specific documents:

- environmental policy
- objectives
- targets
- description of the scope of your organization's EMS
- description of the main elements of the EMS and references to related documents
- other necessary records.

Section 4.4.5 - Control of documents: Set procedures for document control:

- approval process
- review, update and re-approval process
- identifying changes
- making documents available at point of use
- making documents readily identifiable
- controlling important external documents
- preventing the use of obsolete documents

Section 4.4.6 - Operational control: Set documented procedures to reach objectives and / or targets and ensure applicable procedures are communicated to suppliers, including contractors.

Section 4.5.3 - Non-conformance and corrective and preventive action: Set procedures for dealing with actual and potential non-conformance and for taking corrective and preventive action.

Section 4.5.4 - Control of records: Maintain records to demonstrate conformity to the ISO 14001 Standard requirements. Also, set procedures to identify, store, protect, retrieve, retain and dispose of records.

Implementing the Task

Links to the following two general guides are included in Appendix A:

- Environmental Information Management and Decision Support System-Implementation Handbook, NCHRP Report No. 481 Transportation (2003)
- WEBCAST: Environmental Information Management and Decision Support System for Transportation: The Results of NCHRP 25-23 (2004)

Sub-Tasks	Advice, Examples and Tools [12]
7.A EMS Manual	
An EMS manual contains all of the policy, procedures, etc., relevant to the EMS. Typically, it includes such things as: • The Environmental Policy • Environmental causes / effects • Legal and other requirements • Objectives and targets • Environmental management programs • Organizational structure and associated responsibilities • Training programs and schedules • Internal and external communication procedures • EMS documentation • Document control procedures • Operational control procedures • Emergency preparedness and response plans • Monitoring and measurement mechanisms • Non-conformance responses and corrective action plans • Records • EMS audits  EMS manuals often reference existing documents instead of including them physically in the manual. For example, a website address is provided in the EMS Manual for the Environmental Policy.	 The following EMS manuals are available on-line from these agencies websites: • Alberta Transportation \ Ministry of Infrastructure • City of Calgary • City of Edmonton These manuals outline the various procedures these agencies use. Additional recourses have been included for each procedure listed below.  Sample EMS Manual: Environmental Management System Model Manual

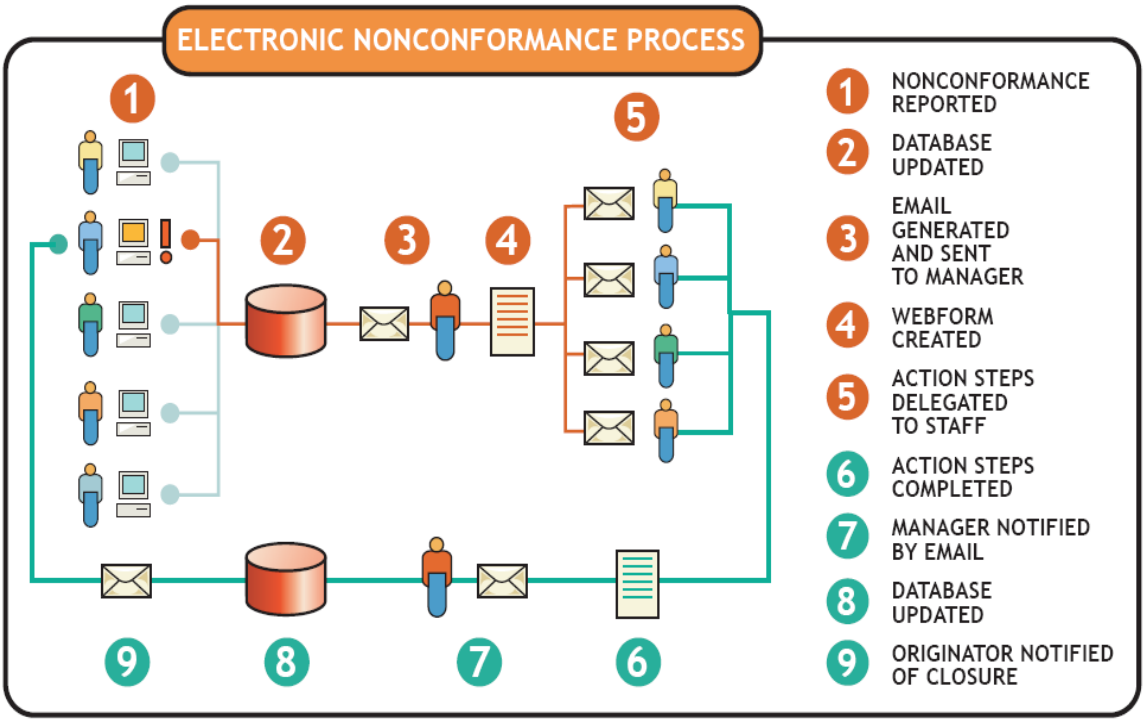
[12] See Appendix A Tools and References for details

Sub-Tasks	Advice, Examples and Tools [12]
7.B Internal communications procedures	
Internal communication channels are needed to provide appropriate information to individuals with environmental responsibilities. The methods of communication are as varied as the types of information. You may wish to use formal communication procedures which follow existing organizational charts or bypass them if it improves efficiency. **Identify, build upon, and incorporate existing successes**: Use what you have - do not reinvent the wheel. **Know your organization**. Build upon the processes of your agency.	One agency uses an Environmental quiz as part of its newsletter (with a draw for a prize) to communicate EMS issues. To foster open communication, the EMS Coordinator should be available, involved, and invested: As one EMS coordinator put it: "make their problems your problems". "The management of environmental information had spin-off benefits. The information system we developed within the EMS is being used by other sections of our agency to manage their information."
7.C External communications procedures	
Establish and maintain procedures for receiving, documenting and responding to relevant communications. These can include a wide variety of exchanges: • complaint handling • community consultation • liaison with volunteers, contractors, etc. • liaison with regulatory agencies • involvement with transportation sector associations (like TAC) • public information programs	In addition to the EMS manuals listed in 7A, a link to the *Communication Procedure* for the City of San Diego is included in Appendix A
7.D Document control procedures	
Documents are basically any information and its supporting medium (including electronic manuals on a website or pictures on a Compact Disk). Establish and maintain procedures for controlling documents. The procedures should consider several tracking functions: • how to make sure relevant versions of documents are available at all locations where they are needed; • where documents should be located and media type; • when and how documents are to be reviewed, revised and if they need to be approved for adequacy by EMS SComm (or others); and • how obsolete documents are removed from use and identified as obsolete.	Documents Management Software can help with document storage, distribution and control (an ISO 14001 requirement). Software systems can also include features such as indexing to ensure controlled distribution, and archiving of revisions and revision information. In addition to the EMS manuals listed in 7A, a link to the *Procedure for Document Management* (Port of Houston Authority) is provided in Appendix A.

Sub-Tasks	Advice, Examples and Tools [12]
7.E Record keeping procedures	
Records are evidence of activities preformed (including emails confirming actions or waste manifests) and the results achieved. Develop a record-keeping procedure for maintaining environmental records: • training records • results of compliance audits or reviews • notices of non-conformance • incidents • complaints • awards • permits, approvals, and their requirements • environmental causes / effects • monitoring data • contractor information • EMS audits • management reviews	 Records Management Software lets you track the location, person responsible and review cycle for environmental records. Some will track records and provide email notifications for pending review dates. See *Prototype Software for an Environmental Information Management & Decision Support System NCHRP Research Digest No. 317*(March, 2007)  In addition to the EMS manuals listed in 7A, Appendix A includes a link *Records Management Procedure* (2001) of the City of San Diego, CA (Refuse Disposal Division)
7.F Procedures for determining / reporting non-conformances, and for preventative and corrective actions	
Non-conformity is a non-fulfillment of a requirement (such as a deviation from standard operating procedures). Non-conformances can be found through monitoring and auditing (Task 10 – Review EMS) or other evaluations. An effective EMS includes a procedure to investigate and prevent / correct non-conformances. A good non-conformance procedure should provide guidance for each stage of issue management: • document the roles and responsibility for handling and investigating non-conformances; • fix the problem (i.e. determine the actions needed to regain conformance); • prevent the problem from happening again (i.e. determine the actions needed to deal with the "root causes"); and • "close-the-loop" through action and reporting to show that the problems and root causes have been addressed. The proactive prevention of potential non-conformances can result in cost saving and lowered risk as compared to correcting actual non-conformance. It can also provide gains in credibility with regulators, and ensure the availability of a due diligence defence should it be needed.	 As shown in Figure 4.7.1, there is software to assist in electronic non-conformance reporting.  In addition to the EMS manuals listed in 7A, a link to the *Non-conformance and Corrective and Preventative Action Procedure* For the Port of Houston Authority, has been included in Appendix A.  Figure 4.7.1 shows an example of an electronic non-conformance reporting process.

Sub-Tasks	Advice, Examples and Tools [12]
7.G Procedures for maintaining your EMS	
Part of EMS maintenance is to regularly review and update your EMS planning (Tasks 1 to 6) to ensure it is current and relevant. This can include reviewing and updating several of the EMS's elements: • Environmental Policy; • legal and other requirements (e.g. protocols and policies); • issues and opportunities; and • causes / effects, objectives, and targets. EMS maintenance also includes staff training and awareness. As staff is hired or reassigned, levels of EMS awareness and training will need to be reviewed (and updated if needed) to ensure consistency between skills and duties / responsibilities. See Task 10 – Conduct EMS-related training and Task 13 Staff Buy-in, for more information.	 See Records Management Software above.  The following presents the goals activities and characteristics of ingraining the EMS as the way you do business after the City of Edmonton's *Environmental Management System Handbook* (2005) ***Years 2-5 – Deployment of EMS*** The EMS is still being refined and the focus is still on the present, not the future. Goals: • Strengthen linkages among the EMS elements and demonstrate the performance and (cost) benefit of the EMS both internally and to key stakeholders. Activities: • Integrate and align existing programs and systems: quality / health & safety. • Review / improve: resource allocations; operational controls; information and support systems; training; and communication and reporting. ***5+ years-- Maturing EMS as a Business Practice*** EMS and other environmental considerations are included in the strategic planning process and in daily business decisions. The EMS now serves as a launch pad for new environmental initiatives and the use of environmental metrics is well established. Metrics continue to improve and clearly support business goals. Goals: • Cultural change continues as the EMS becomes the way the organization does business. • Continue to define and meet stakeholder needs. • Achieve / maintain high level of environmental performance and demonstrate real business value Activities • Improve efficiency through process improvement • Consolidate documentation • Ongoing tracking of nonconformities with emphasis on prevention ("find, fix, and prevent").
 With the next task, you move from "PLAN" to "DO"	

Figure 4.2 Example of an Electronic Non-Conformance Reporting Process (from Intelex Technologies Inc.).



Considerations for Outsourcing

The Municipal Case Study in Chapter 6 of Part II includes information checklists for consultants and contractors to complete as part of the agency's information management process.

4.10 TASK 8 – SET STAFF EMS RESPONSIBILITIES

Purpose

The purpose is to set and communicate responsibilities to all staff involved in implementing the various work plans.

Outcome

The outcome is that each employee understands and undertakes the EMS responsibilities related to their duties.

Who Does this Task?

The Core Group

ISO 14001 EMS Reference

Section 4.4.1 - Roles, resources and responsibilities: Define, document and communicate roles, responsibilities and authorities. Ensure the availability of resources to establish, implement and maintain the system.

Implementing the Task

Sub-Tasks	Advice, Examples and Tools [13]
8.A Assigning responsibility	
In Sub-Task 6-C (Determine Roles and Responsibilities), brief responsibility statements were developed for position(s) charged with implementing actions and initiatives and with meeting targets. These responsibilities are now added to the formal job description. **Make the EMS fit your agency**: Make the EMS responsibilities fit with current organizational responsibilities and authorities to the extent possible. For example, if the Environmental Manager is responsible for preparing environmental specifications for contracts. The development of environmental auditing specifications could be added to this responsibility.	**Formalize Responsibility;** Responsibility statements can be incorporated into existing performance review / job description practices. **"Work with staff, management and unions to ensure everyone has clearly defined and understood environmental roles and responsibilities. Use this time to reiterate Senior Management support for the EMS and the agency's environmental goals."**

[13] See Appendix A Tools and References for details

Sub-Tasks	Advice, Examples and Tools [13]
8.B Communicate responsibilities	
Strategies for the clear communication of responsibilities to staff is critical to a successful EMS: • Identify the means by which these responsibilities will be communicated. • Establish a schedule for these communications. • Determine who will communicate the responsibilities. These tasks may be based on existing organizational practices.	 The City of Edmonton's *Environmental Management System Handbook* (2005) includes an example of EMS Employee Training Procedures which illustrates communication of responsibilities.

Considerations for Outsourcing

The City of Edmonton has the following packages that inform contractors of their responsibilities:

- Contractor's Environmental Responsibilities Packages
  - General
  - Construction and Maintenance
  - Hired Equipment Operation
- Contractor's Environmental Responsibilities Acknowledgement Form

The City of Calgary has also developed a Contractor Environmental Responsibilities Package (2008) and Contractor Environmental Acknowledgement Form (2008).

Alberta Transportation / Ministry of Infrastructure uses an ECO Plans approach for engaging constructors (discussed under Task 9).

Links to these packages are listed in Appendix A.

4.11 TASK 9 – DEVELOP AND IMPLEMENT THE ENHANCED AND NEW PROCEDURES, PROCESSES AND TOOLS

Purpose

The purpose is to develop and implement the enhanced and new procedures, processes, and tools identified in Task 6 - Set Work Plans.

Outcome

The outcome is a set of excising enhanced or new procedures, processes, and tools to be used to meet the targets that have been set. See Tasks 6 – Set Work Plans.

Who Does This Task

The functional groups

ISO 14001 EMS Reference

Section 4.4.6 - Operational control: Set documented procedures to reach objectives and / or targets and ensure applicable procedures are communicated to suppliers, including contractors.

Implementing the Task

City of Edmonton's *EMS Handbook* (2005) contains an example procedure for developing operational controls for critical activities. The procedure was developed to ensure that such controls are adequate for minimizing potential environmental impacts, in order to meet established environmental objectives and targets.

Considerations for Outsourcing

In 2005, the Alberta Ministry of Transportation / Ministry of Infrastructure developed the *Environmental Construction Operations Plan (ECO Plan) Framework*, which was intended to facilitate effective environmental management planning. Within the terms of the framework, ECO Plans are to be prepared by Contractors which consist of written procedures and drawings that address environmental protection issues relevant to the site specific activity being performed. An ECO Plan identifies several aspects of proposed activities:

- environmental issues;
- environmental protection and mitigation measures to be implemented;
- who is responsible to address the environmental issues; and
- what standards are to be met and monitored.

The development and implementation of an ECO Plan offers the Ministry increased levels of certainty:

- ensures environmental considerations are part of decision making processes;
- ensures compliance with regulatory requirements; and
- demonstrates to the stakeholders and public that there is an environmental commitment by all parties involved, both in writing and in action.

Under construction, maintenance and rehabilitation contracts, the Contractor submits the ECO Plan to the Design Consultant, who prepared the Contract package, in sufficient time prior to commencement of the work to allow the suitability of the proposed strategy to be evaluated. The Consultant then reviews the ECO Plan and addresses any concerns with the Design Contractor. The timelines for the submission and review of the ECO Plan are outlined in the Standard Specifications for Highway Construction.

The ECO Plan is flexible and responsive to situations encountered as work proceeds. Within the framework, the Contractor has the ability to adjust the ECO Plan based on site conditions. The reasons or circumstances necessitating changes made to the ECO Plan must be documented in writing. It is critical that all parties are in agreement about the procedures, signing configurations and devices to be used for the protection of the environment prior to commencement of the work.

The City of Edmonton has developed the following packages to inform contractors of their responsibilities:

- Contractor's Environmental Responsibilities Packages
  - General
  - Construction and Maintenance
  - Hired Equipment Operation
- Contractor's Environmental Responsibilities Acknowledgement Form

The City of Calgary created a Contractor Environmental Responsibilities Package (2008) and Contractor Environmental Acknowledgement Form (2008).

Links to these packages are listed in Appendix A.

The example in Chapter 5 of Part II includes an example of processes and procedures for consultants and contractors with respect to winter maintenance.

4.12 TASK 10 – CONDUCT EMS–RELATED TRAINING

Purpose

The purpose is to provide training to staff that is relevant to their function or level within the EMS so they are able to meet their responsibilities.

Outcome

The outcome is that employees understand their EMS responsibilities, and are able and willing to undertake them.

"Don't overwhelm your employees: Tailor training to the specific duties of the employees – do not rely on generic EMS training".

Who Does This Task

It depends on the training – all staff affected by the EMS may be involved. The training should be conducted by someone knowledgeable of the procedures being taught.

ISO 14001 EMS Reference

Section 4.4.2 - Competence, training and awareness: Ensure appropriate environmental training by, first, identifying training needs, second, setting training procedures, and third, maintaining associated records.

Implementing the Task

Sub-Tasks	Advice, Examples and Tools [14]
10.A Determine learning outcomes	
Prior to undertaking training, Learning Outcomes statements should be established. Learning Outcomes are clear expressions of what a trainee will be expected to know, understand and / or do as a result of a training experience. To develop Learning Outcomes, the skills and knowledge that staff will need to undertake their responsibilities must be identified. Staff, here, includes all the employees involved in implementing the EMS, from the SComm members, EMS Coordinator and Core Team members, to "front-line" personnel.	 "The Core Team should be the EMS expertise for their functional group. Therefore, determine what knowledge the team members need to fulfill their role and provide the appropriate EMS training. There are many "off-the-shelf" courses available, but be sure to find ones that suit your learning outcomes."

[14] See Appendix A Tools and References for details

Sub-Tasks	Advice, Examples and Tools [14]
10.B Develop training programs	
Addressing the needs of the intended trainees is key to achieving the Learning Outcomes. Different types and content of training will be needed (e.g. briefings for the SComm, videos for front-line workers, and tail-gate talks for contractors). When developing the training programs, consideration should be given to when and how often training should be conducted. Considerations include: • What are the indicators that training should be initiated or refreshed (e.g. changing positions, new hires, failures to comply, and / or complexity of issues)? • What kind of resources would your training program require, and is your agency realistically able to provide these resources?	 City of Edmonton developed an *Enviso Training Video* as well as included an example employee training procedure in their *EMS Handbook* (2005).  Syntheses of Best Practices for Road Salt Management, 2.0 Training (Transportation Association of Canada, 2003)
10.C Identify existing training materials, schedules, and / or programs	
The first step should be to identify any existing training materials, schedules, and / or programs that could be adapted for EMS use, perhaps by adding EMS content (e.g. spring break-up staff meeting, pre-construction meetings, pre-tender info sessions, etc.). As well, qualified trainers should be identified. This could include trainers from within the organization and those that are brought in for training purposes (consultants, other agencies, etc.).	
10.D Develop the training materials	
The training materials could be developed by: • the Core Team; • a subgroup of the Core Team (functional group); or • outside consultants.	 Some organizations have experienced trainers that can take any subject matter and prepare training programs. The functional experts will need to provide the technical expertise to ensure material accuracy.
10.E Deliver the training	
Deliver the training to the intended recipients in accordance with the established schedule. Depending on the information management approach of your agency (see Sub-Item 7.E - Record Keeping Procedures), training records may be kept (e.g. by Human Resources or in Divisional staff files).  Keeping records of who has been trained and on what topics can be beneficial if the agency needs to demonstrate due diligence.	
10.E Assess training success	
As part of the EMS maintenance (Sub-task 7.G - Procedures for Maintaining Your EMS), the success in achieving the Learning Outcomes should be assessed periodically.	

Considerations for Outsourcing

Municipal Case Studies in Chapter 6 of Part II includes an example of training for contractors.

4.13 IMPLEMENT

This is the roll-out of the enhanced or new procedures, processes, and tools by the trained staff. At this point, the enhanced or new procedures, processes, and tools become part of the EMS review and continuous improvement cycle.

4.14 TASK 11 – REVIEW EMS

Purpose

The purpose of this task is to evaluate the effectiveness of your EMS.

Outcome

The outcome is a determination whether or not you are meeting identified targets using the methods to which you committed by:

- carrying out a review of procedures, processes and tools (new and pre-existing) to determine the degree to which the initiatives have been successfully implemented; and
- conducting an audit of the EMS itself.

THE REVIEW IS NOT A TEST! It is not a pass / fail. Issues will arise that may take resources from the EMS. For example, if someone leaves, then the review will show some gaps associated with the position. The hiring and training of new staff is part of the next cycle.

THIS IS NOT A TAX AUDIT! Some people see audits as exercises to catch people making mistakes or cheating. The purpose of the EMS audit is to see if the system is working. For example, if a form is not being completed then it is a flaw with the system (is the information not available, did the staff not receive the training, etc.). To quote an EMS Coordinator, "In reality, the audit is a check on us (Core Team). It lets us know how good of a job we did in making and implementing the EMS and what needs improvement."

Who Does This Task

EMS Coordinator with the Core Team, external staff and / or consultants.

ISO 14001 EMS Reference

Section 4.5.1 - Monitoring and measurement: Set procedures to monitor and measure key characteristics of activities that can have a significant environmental impact.

Sections 4.5.2.1 and 4.5.2.2 - Evaluation of compliance: Set procedures for periodically evaluating compliance with applicable legal or other requirements. One such procedure is a review of the documented results of these evaluations.

Section 4.5.5 - Internal audit: Set audit programs and procedures. Then conduct internal audits at planned intervals to evaluate various dimensions of the effectiveness of the EMS.

Implementing the Task

Sub-Tasks	Advice, Examples and Tools [15]
11.A Review measures and determine success	
Analyze and review the measures of success set out in the Work Plan. You can use a variety of methods for collecting information: • inspections • review of records • surveys and questionnaires • environmental compliance audits (not to be confused with the program audits below – compliance audits are intended to ensure that permits and other legal requirements are being met. In general, a simple comparison of results and expectations is all that is needed to measure your success. For example, if the expectation is that the operational constraints in the contract package will be revised. It is simple to determine if they were revised or not. If, from the evaluation of results, you detect a lack of compliance, then corrective action needs to be taken (and documented) to regain compliance. See Task 7 - Set the System for details on non-compliance and corrective action.	CSA EMS Standards and Guides • *14031 Environmental Management - Environmental Performance Evaluation - Guidelines* (1999) • *14032 Environmental Management - Examples of Environmental Performance Evaluation (*1999) • *PLUS 1131 Reporting on Environmental Performance* (2001) ”In a Design / Build project, environmental compliance audits were conducted by an independent consultant and penalties were imposed for non-compliance. However, compliance was assessed strictly against the design standards and not on environmental protection results. For example, the height of silt fencing was measured but not its effectiveness. This lead to significant conflict between the owner and the contractor. This is an example of poor environmental compliance audit, the height of silt fencing is not a good measure of compliance with environmental requirements.” ”Maintain a database of all non-conformances and corrective actions to show your commitment to performance improvement and ensure you don’t repeat past mistakes when trying new corrective actions.”

[15] See Appendix A Tools and References for details

Sub-Tasks	Advice, Examples and Tools [15]
11.B Audit program	
The audit program is an integral part of the EMS as it provides the feedback needed to know if you are actually doing what you intended to do. The auditing plan should include specific planning details: • How audits will be conducted and how often • How they are to be managed • How the results are to be reported Not all aspects of the EMS need to be audited every time. The program may include functional areas or activities in rotating fashion and include areas that have numerous non-conformances or poor results from previous audits.  **Make an EMS that fits:** It is your audit program, the scope and frequency must suit your needs and resources. When developing your audit program, you should consider: how quickly your agency changes, how much feedback you need, etc.	 Example audits are included in: o City of Edmonton – Appendix A in their *EMS Handbook* (2005) o Alberta Transportation - Chapter 10 - Environmental Audit Program in their *Environmental Management System Manual* (2007) The case studies in Chapter 6 of Part II include auditing examples.  CSA EMS Standard and Guide • *ISO 19011 Guidelines for Quality and / or Environmental Management Systems Auditing* (2002) • *Z773 Environmental Compliance Auditing* (2003)  "The auditing of our contractors has rapidly improved conformance with our standards and procedures and as such regulatory compliance. The audit does not have penalties associated but corrective action is expected. This has brought contractors on-board as partners."  **Intervals for review**: The City of Edmonton, in their *EMS Handbook* (2005), provided the following advice about determining how often to conduct internal audits: "All programs and elements of your EMS should be audited every year. Audit your entire EMS at one time each year or break your review into specific elements for more frequent audits, where you would review a sampling of elements every quarter, but still audit all EMS elements within a year. To determine the…frequency of your EMS internal audits, consider the environmental importance of the activities and the results of your previous audits."

Sub-Tasks	Advice, Examples and Tools [15]
11.C Review of Environmental Policy	
Critically review the Environmental Policy for the SComm to reaffirm.	
11.D Reporting	
Reporting on the EMS review to the SComm should be an ongoing process. For example, progress reports could be provided quarterly and summary reports provided annually. **Progress reporting** • Identify changes to your agency's activities (including processes and services where relevant). • Identify problems during EMS development and implementation (audit results, environmental incidents). • Identify corrective action(s) taken • Identify resource and scheduling implications. • Identify actions that may require management's comment or action. • Provide possible solutions (either as problems occur or before they occur). **Summary reporting** • Roll-up progress reports. • Characterize lessons learned and successes. • Identify opportunities for improving upon and / or expanding EMS efforts within or beyond the current organizational unit. • Recommend future actions (perhaps opportunities identified) and show how they can be incorporated into existing EMS program cycles. Develop a standard reporting format based on feedback from the SComm.	CSA EMS Standards and Guides: • CSA *Plus 1131 Reporting on Environmental Performance (2004)* • *ISO 14031 Environmental Management - Environmental Performance Evaluation - Guidelines (1999)* • *ISO / TR 14032 Environmental Management - Examples of Environmental Performance Evaluation* (1999) "Make every meeting valuable – be prepared and engage the SComm" . "Use workshops to provide results of the EMS and seek guidance – not everything has to be a presentation of results". "Provide regular updates even if they don't ask for them". See Task 12 for more tips on working with the SComm. Public reporting documents include *EcoVision Annual Report* 2006 from the City of Edmonton. More reports are provided in Task 12.

Consideration for Outsourcing

None

4.15 TASK 12 – STEERING COMMITTEE (SCOMM) REVIEW

Purpose

The purpose is to allow the SComm to determine if the EMS is achieving the desired results and benefits, as well as whether it continues to meet the needs of the agency (i.e. is the EMS good value?).

Outcome

The outcome is the SComm continuing to provide EMS leadership:

- Re-commit to the EMS (confirm the Environmental Policy).
- Provide direction for actions to address problems identified.
- Provide direction on opportunities for improving upon and / or expanding EMS efforts within or beyond the current organizational unit.

THE REVIEW IS NOT A TEST. You should communicate to your SComm that continuous improvement is expected within an EMS and that every year the EMS will improve.

Who Does This Task

SComm

ISO 14001 EMS Reference

Section 4.6 - Management review: Top management reviews the EMS at planned intervals to identify opportunities for improvement and to assess the need for changes to the EMS.

Implementing the Task

The SComm reviews performance and sets / approves courses of action as part of its task to confirm commitments.

Consideration for Outsourcing

None

4.16 TASK 13 – STAFF BUY-IN

Purpose

The purpose is to get and maintain staff buy-in to the EMS itself, to ensure continuing participation in implementing workplans, managing documents, completing records, and to reinforce the importance of staff engagement with ongoing cycles of training, performance review, and improvement.

Outcome

The outcome is that staff makes a long term commitment to the EMS:

- accept the merits of the EMS;
- participate in the development of the EMS;
- commit to implementing the EMS;
- participate in the EMS training program; and
- participate in the continual improvement program

An agency implementing an EMS reported that "buy-in from staff / consultants / contractors were difficult as they whined and complained about additional work". Remember, not everyone is going to support the EMS right away. Be creative and persistent.

Who Does This Task

The EMS Coordinator and Core Team are primarily responsible for getting and keeping staff-buy-in. Senior Management must ensure that staff understands that the EMS is an agency priority. However, everyone involved in the EMS has a role to play in promoting the EMS within the agency.

ISO 14001 EMS Reference

Not Applicable

Implementing the Task

Getting and Maintaining Staff Buy-in at Various Tasks	Advice, Examples and Tools [16]
General Issues:  Real life barriers to obtaining buy-in: • "Fear of Change: - it is important to understand that not everyone is environmentally conscious and change is often scary." • "People need to be convinced that changes resulting from the EMS are there for good reason." • "Lack of buy-in throughout the organization resulted in delays in implementation." • "Transportation staff understands what an EMS is and even grasp its benefits, but a lack of establishing the EMS as a priority and a similar lack of resources have proved difficult to overcome".	"We are trying to convey the message to staff and management that having proper procedures in place protects everyone involved (liability wise)". "Secure and advertise support from Senior Management. It is critical that staff understand the EMS is an agency priority".
Task 1 – Set EMS Responsibilities and Functional Structure	Make participation on the Core Team a big deal in the organization. Have the members appointed by Senior Management. Publicize the membership within the organization so the members feel important and others will want to follow in their footsteps. Each Core Team member should lead a local "EMS Team" and use similar methods to encourage participation at the local level. "Rotate Core Team members with other staff from their functional group. In this way you develop multiple advocates within the functional groups".
Task 2 – Set Environmental Policy	Environmental Policy, especially if made public, is a clear message to staff from Senior Management that they are serious about the EMS.
Task 3 – SComm Feedback	The SComm needs to buy in fully to the EMS. It sets the tone for the entire agency. In order to get and maintain the SComm buy-in, ensure that the EMS meets the SComm members' stated needs and continuously show them that their needs are being met.

[16] See Appendix A Tools and References for details

Getting and Maintaining Staff Buy-in at Various Tasks	Advice, Examples and Tools [16]
	Have the SComm actively endorse the EMS to the organization. A strong motivator is to make achievement of the objectives part of the staff's personal performance contracts and to tie rewards and bonuses to compliance with the EMS.
Task 4 – Approval Of Environmental Policy	Once the Environmental Policy is set, ensure that it is broadly communicated and that everyone in your agency is aware of it. For the functional groups under the EMS, you could have each person "sign-off" that they are aware of the policy. It should be made part of the orientation package for new staff.
Task 5 – Focus And Prioritize EMS Objectives	"Have key opinion leaders in your agency participate in establishing the key objectives for the EMS. This will ensure that the EMS is directed at solving their problems – a key element to buy-in."
Task 6 – Set Work Plans	"Ensure that the responsible managers and staff participate in the development of the work plans. In this way they will take ownership of the plan and its implementation." "Become part of the process - make the EMS part of everyone's regular routine."
Task 7 – Organize The System	Again ensure that the managers responsible for the success of the system participate in its development. It is important that the EMS system is responsive to their current systems and is relatively easily implemented. By incorporating or modifying existing systems, it is more likely that the EMS will be embraced. "Become part of the process - make the EMS part of everyone's regular routine."
Task 8 – Set Staff EMS Responsibilities	Ensure that workers' responsibilities are agreed to by staff and supervisors; and that fulfilling the responsibilities is part of the performance evaluation and reward system of the organization.
Task 9 – Develop and Implement the Enhanced and New Procedures, Processes and Tools	Each functional unit should develop their relevant procedures so that they fully buy into them.
Task 10 – Conduct EMS–Related Training	The training is important for establishing a strong understanding of the merits of the EMS and the need for everyone to participate in order to make the EMS a success.

Getting and Maintaining Staff Buy-in at Various Tasks	Advice, Examples and Tools [16]
Task 11 – Review EMS	 "Our EMS Coordinator and Core Team representative sit down with the Functional Group Lead and review EMS performance. This takes a day of the Functional Group Lead's time but the Lead sees the benefits afterwards and the Lead's buy-in is greatly improved."
Task 12 – SComm Review	 The SComm schedules an annual review of the EMS and encourages participation by the Core Team. By showing a commitment to the program and recognition of the work of the Team Members, senior management builds buy-in. In our agency, the outcome of the review is a clear set of directions to the functional managers regarding required improvements. The functional managers then provide direction to the Core Team thereby taking ownership for the next round of improvements to the EMS.

Consideration for Outsourcing

None

4.17 INTEGRATION OF MANAGEMENT SYSTEMS

Some organizations found that the integration of their EMS and quality management systems (QMS) can realize significant benefits, such as streamlined operations and decision-making, simplified employee training, more efficient use of resources, and reduction in audit costs. Systems for managing health & safety and other organizational functions can be similarly integrated. The ISO 9001 QMS and ISO 14001 EMS share many common elements, since the ISO 9001 was one of the source documents used by the drafters of ISO 14001. The two standards have become even more compatible since revisions in 2004 to IS0 14001.

Organizations that choose to implement both of these standards generally find that they can use many common processes to conform. Elements in both management systems that are essentially the same or similar can often be addressed by a common procedure, although some adjustments may be needed to address the differing overall purposes of these systems. These elements include Training, Awareness & Competence, Document Control, Non-conformance, Corrective & Preventive Action, Policy, Structure and Responsibility, EMS Documentation, Operational Control, Monitoring & Measurement, Audit, Management Reviews). Unique elements are typically dealt with in separate (EMS or QMS) procedures.

The degree of system integration varies widely from organization to organization. While an EMS can be readily integrated with an existing QMS, the overall purposes of these two systems must be kept in mind.

The following are some suggestions for organizations that have an existing QMS and wish to integrate an EMS with it (from *Environmental Management Systems: an Implementation Guide for Small and Medium-Sized Organizations*):

- Understand the existing QMS, its effectiveness, and how the workforce perceives the system. Is the existing QMS documentation clear and workable? Do employees believe that the system is helping the organization to achieve desired results?
- Ensure that the scope of the two systems will be consistent (i.e., that the systems will cover the same facilities, products, activities and / or services). In particular, this will be an important issue if third-party registration will be sought.
- Establish a cross-functional team (including, at a minimum, representatives from the environmental and quality functions) to determine the optimal approach to system integration.
- As needed, manage resistance to change. Some employees and managers may be reluctant to change a system that they are already familiar with and / or in which they have important roles.
- Understand how QMS and EMS differ in purpose. While there are many common management system elements, there are elements of each system that are unique (see below). In the case of EMS, these include, for example, environmental aspects, communications, emergency preparedness and response. These differences must be acknowledged and accommodated within the integrated management system.
- Modify system documentation as required. Keep procedures simple and clear for users. Review proposed changes with affected managers and employees.

- On a procedure-by-procedure basis, consider whether to integrate procedures or keep them separate. While integration can reduce the total number of procedures or work instructions, it also can confuse the overall purpose of such procedures in some cases.
- Once the integrated system documentation has been prepared, train managers and employees on the integrated system.
- Audit the integrated system and take actions as necessary.

A few final thoughts on system integration:

- Can your organization afford to have two or more separate systems?
- Are there compelling reasons to keep these systems separate?
- What is the optimal approach from a strategic and operational standpoint?
- What approach is best suited for the organization's change and growth?

APPENDIX A

TOOLS AND REFERENCES

PART I - APPLICATION

TABLE OF CONTENTS

APPENDIX A.1

TABLE OF REFERENCES

Task(s)[1]	Title	Agency / Sponsor /Author	Date/Version	Website Address
-	**WEBSITES**			
-	Environmental Management	Alberta Ministry of Transportation \ Ministry of Infrastructure	-	http://www.infratrans.gov.ab.ca/571.htm
-	Environmental Management	City of Calgary	-	http://www.calgary.ca/portal/server.pt/gateway/PTARGS_0_0_104_0_0_35/http%3B/content.calgary.ca/CCA/City+Hall/Business+Units/Environmental+Management/index.htm
-	EcoVision	City of Edmonton	-	http://www.edmonton.ca/portal/server.pt?open=space&name=CommunityPage&id=cached&psname=CommunityPage&psid=0&in_hi_userid=2&cached=true&control=SetCommunity&CommunityID=213&PageID=0
-	Transport Canada - Environmental management System	Transport Canada	-	http://www.tc.gc.ca/programs/Environment/EMS/menu.htm
-	Transportation and Public Works - Environmental Management	Prince Edward Island	-	http://www.gov.pe.ca/tpw/lae-info/index.php3
-	Environmental Management Section	British Columbia Ministry of Transportation	-	http://www.th.gov.bc.ca/mot_org/hwyeng/environmenthome.htm
-	Environmental Services	Nova Scotia, Transportation and Infrastructure Renewal	-	http://www.gov.ns.ca/tran/enviroservices/enviromain.asp
-	The Center for Environmental Excellence	American Association of State Highway and Transportation Officials (AASHTO		http://environment.transportation.org/environmental_issues/environ_mgmt_sys/
-	Public Entity Environmental Management System Resource (PEER) Center	-	-	http://www.peercenter.net/index.cfm\
-	American Association of State Highway and Transportation Officials (AASHTO) Center for Environmental Excellence	AASHTO Center for Environmental Excellence	-	http://environment.transportation.org/environmental_issues/environ_mgmt_sys/

[1] Task letters and numbers refer to the Tasks listed in Chapter 3 and 4.

Task(s)[1]	Title	Agency / Sponsor /Author	Date/Version	Website Address
-	Canadian Centre for Pollution Prevention (C2P2)	-	-	http://www.c2p2online.com/index.php3?session=
-	EMS in Pennsylvania Your Guide to ISO 14001 and Other Environmental Management Systems	Pennsylvania Department of Environmental Protection's (DEP)	-	http://www.dep.state.pa.us/dep/deputate/pollprev/Iso14001/iso14000.htm
-	Intelex Website	-	-	http://www.intelex.com/environment/index.htm
-	Canadian Standards Association (CSA) Learning Centre	CSA		http://www.csa-intl.org/onlinestore/GetCatalogCompleteList.asp?List=6&index=All
-	PEC: Collective Environmental Plan	ADEME (Agency of the Environment and Energy Control), France		http://www2.ademe.fr/servlet/getDoc?id=11433&m=3&cid=96
-	Conseil Patronal de l'Environnement du Québec	-		www.cpeq.qc.ca/
-	Developpement Durable - Environnement	Hydro Quebec		http://www.hydroquebec.com/developpementdurable/environnement/index.html
-	LE Système de Gestion Environnementale	Ville de Genève		http://www.ville-ge.ch/agenda21/index.php?option=content&task=view&id=30&Itemid=55
-	Eco Gouvernement / Greening Government	Government of Canada		http://www.ecogouvernement.gc.ca
-	Environmental management System	City of San Diego		http://www.sandiego.gov/environmental-services/ems/partners.shtml
-	Secteur de l'environnement	Commission scolaire de Montréal		http://www.csdm.qc.ca/environnement/#
-	Système de gestion environnementale	Transport Canada		http://www.tc.gc.ca/programmes/Environnement/sge/menu.htm
-	Environmental Management	The Centre for Construction Innovation		http://www.ccinw.com/sites/env_pages.html?site_id=9&section_id=47
-	ISO – Organisation internationale de normalisation	-		http://www.iso.org/iso/fr/home.htm

Task(s)[1]	Title	Agency / Sponsor /Author	Date/Version	Website Address
-	Groupe AFNOR (Association française de normalisation)	-		http://www.afnor.org/portail.asp
-	Wikipedia	-		http://fr.wikipedia.org/wiki/ISO_14000
-	ACTU Environnement	-		http://www.actu-environnement.com/ae/dossiers/iso14000/iso14001.php4
-	CCI (chambres de commerce et d'industrie)	-		http://www.cci.fr/Groups/le_portail_de_lenvironnement/document_libre_2_fr
-	PRORECYCLAGE			http://www.prorecyclage.com/reglementation/normes.html
-	Système de gestion environnementale	Transports Canada		http://www.tc.gc.ca/programmes/environnement/sge/menu.htm
-	**GENERAL REFERENCES**			
	Using an Environmental Management System to Meet Transportation Challenges and Opportunities An Implementation Guide AASHTO Center for Environmental Excellence	AASHTO Center for Environmental Excellence	2003	http://www.environment.transportation.org/documents/ems_implementation_guide.asp
-	Environmental Information Management: Resource Paper Conference Proceedings 28	Transportation Research Board	2002	http://onlinepubs.trb.org/onlinepubs/conf/reports/cp_28.pdf
-	Planning for Long-term Urban Sustainability: A Guide to Frameworks and Tools	+30 network partners Federation of Canadian Municipalities	Mar-04	http://sustainablecommunities.fcm.ca/files/Tools/30_A_Guide_to_Frameworks_and_Tools.pdf
-	Implementing a Corporate Wide EMS - Presentation	City of Calgary		http://www.c2p2online.com/documents/HarleyHutchinson.pdf
-	EMS Brochure	City of Edmonton		http://www.edmonton.ca/portal/server.pt/gateway/PTARGS_0_0_270_0_0_35/http%3B/CMSServer/COEWeb/environment+waste+and+recycling/enviso/

Task(s)[1]	Title	Agency / Sponsor /Author	Date/Version	Website Address
-	Webcast - New Paradigms for Transportation and Environmental Management	North Carolina State University. Center for Transportation and the Environment	September 20, 2000	http://www.itre.ncsu.edu/CTE/TechTransfer/Teleconferences/webcast.asp?ID=21
-	Frequently Asked Questions about Environmental Management Systems	PEER Center		http://www.peercenter.net/index.cfm\
-	Environmental Management Systems for Municipal Infrastructure Version 1.0	National Guide to Sustainable Municipal Infrastructure (InfraGuide)	Nov-05	www.infraguide.ca
-	DEP Update - Improving Energy and Environmental Performance in Local Government	Pennsylvania Department of Environmental Protection's (DEP) Office of Energy and Technology Development (OETD)	August 2004	http://www.fivewinds.com/uploadedfiles_shared/UpdateEMSGuidebookAugust2004.pdf
-	A Guidebook for Improving Energy and Environmental Performance in Local Governments	Pennsylvania Department of Environmental Protection's (DEP) Office of Energy and Technology Development (OETD)	2004	http://www.dep.state.pa.us/dep/deputate/pollprev/Iso14001/EMSLocalGov.htm
-	Municipal Environmental Management Systems Workshop - Summary Report	Industry Canada	March 2003	
-	Environmental Management Systems - An Implementation Guide for Small and Medium-Sized Organizations	NSF International	2001	http://www.nsf.org/business/management_systems_registration/publications.asp
-	Sustainable Development Strategy 2007-2009	Transport Canada	2006	http://www.tc.gc.ca/programs/Environment/SD/sds0709/menu.htm
	PLANNING DOCUMENTS			
	General Planning Documents			
-	Making the Case for an Environmental Management System. EMS Implementation Handy Guide Number One	American Association of State Highway and Transportation Officials, Washington DC	2004	http://environment.transportation.org/documents/EMS1-1_Final.pdf

Task(s)[1]	Title	Agency / Sponsor /Author	Date/Version	Website Address
-	EMS, A Bridge for Organizational Coordination and Communication. EMS Implementation Handy Guide Number Two	American Association of State Highway and Transportation Officials, Washington DC	2004	http://environment.transportation.org/documents/EMS2-1_FINAL.pdf
-	Environmental Management Systems: Do they Improve Performance? Final Report	National Database on Environmental Management Systems, The University of North Carolina at Chapel Hill, North Carolina	Jan 30 2003	http://ndems.cas.unc.edu/
	Topic Specific Planning Documents			
C	ISO 14001 Environmental Management System Self-Assessment Checklist	Global Environmental Management Initiative (GEMI)	March 1996	http://www.gemi.org/resources/ISO_111.pdf
C	Environmental Management Systems Tools: A Reference Guide	Environmental Protection Agency, Washington DC	June 2001	http://www.epa.gov/compliance/resources/publications/incentives/ems/emstoolsmas.pdf
C	ISO 14001 Environmental Management System Self-Assessment Checklist	GMI	2000	http://www.ofee.gov/ems/training/GEMI%20Self%20Assessment%20Checklist.pdf
C	Various Gap Analysis Check Lists	PEER	-	http://www.peercenter.net/sector/transportation/emstoolbox.cfm
C	Environmental Management System Handbook	The City of Edmonton	2005	http://www.edmonton.ca/portal/server.pt/gateway/PTARGS_0_0_271_213_0_43/http%3B/CMSServer/COEWeb/environment+waste+and+recycling/enviso/EnvisoToolbox.htm
C, D	Municipal Environmental Management Systems Benchmarking Survey Results	City of Toronto	2-Sep-04	http://www.toronto.ca/teo/reports-resources.htm
D	*Profil environnemental des activités du ministère des Transports du Québec en vue de l'implantation d'un système de gestion environnementale :* La cote CANQ SNCL 103.	Le ministère des Transports du Québec	1997	http://www1.mtq.gouv.qc.ca/fr/banque_pub/index.asp

Task(s)[1]	Title	Agency / Sponsor /Author	Date/Version	Website Address
D	Consolidated Clause in Policy and Finance Committee Report 8, Costs and Benefits of Implementing an Environmental Management System in the City of Toronto City Council on October 26, 27 and 28, 2004	City of Toronto	2004	http://www.toronto.ca/teo/reports-resources.htm
D	Guidelines for Preparing MoT Business Cases	BC Ministry of Transportation	September, 2006	http://www.th.gov.bc.ca/Publications/planning/Guidelines/Business%20Case%20Guidelines/MoT_Business_Case_Guide-2006-09-19.pdf
-	**IMPLEMENTATION DOCUMENTS**			
-	**General Implementation Documents**			
-	The City of Edmonton's Environmental Management System Handbook A Step-By-Step Guide for Developing the City of Edmonton's ISO 14001 Environmental Management Systems	City of Edmonton		http://www.edmonton.ca/portal/server.pt?in_hi_userid=2&control=bannerstart&parentid=2&space=SearchResult&in_tx_query=Environmental+EMS&cached=false&parentname=SearchResult
-	Environmental Management Systems: An Implementation Guide for Small and Medium-Sized Organizations	US EPA	Second Edition	http://www.epa.gov/owm/iso14001/ems2001final.pdf
-	EMS Implementation Guide for the Shipbuilding and Ship Repair Industry	Environmental Protection Agency, Washington DC	20030700	http://www.epa.gov/sectors/shipbuilding/ems.html#ems
-	ISO 14001 Guidance Manual	Raymond Martin National Center of Environmental Decision making	1998	http://www.gdrc.org/uem/iso14001/ISO14001.pdf
-	Environmental Protection Plan New Brunswick Transportation	New Brunswick Department of Transportation	May 1998	http://www.gnb.ca/0113/envpp/dotEnvPp.PDF
-	Guide to Integrating Environmental Management Principles into Operating Codes of Practice TAC Guide	Transportation Association of Canada	1996	http://www.tac-atc.ca/english/pdf/envir-e.pdf
-	Environmental Management System Framework	Transport Canada		http://www.tc.gc.ca/programs/Environment/SD/sds0709/appendixB.htm

Task(s)[1]	Title	Agency / Sponsor /Author	Date/Version	Website Address
	Topic Specific Implementation Documents			
2	Environmental Policy	City of Calgary		http://www.calgary.ca/docgallery/bu/environmental_management/environmental_policy.pdf
2	Environmental Policy	Nova Scotia Transportation and Infrastructure Renewal		http://www.gov.ns.ca/tran/enviroservices/enviropolicy.asp
2	Corporate Environmental Policy Statement	City of Hamilton		http://www.myhamilton.ca/NR/rdonlyres/AD605F2D-2E9A-486A-BF7A-AAA79D2A50B8/0/FinalEMS.pdf
2	PLUS 1113 First Steps to Environmentally Responsible Management: A Comprehensive Workbook for Environmental Policy Development	Canada Standards Association	1996	http://www.csa-intl.org/onlinestore/GetCatalogCompleteList.asp?List=6&index=All
5	Example Activity List and Cause/Effect Ranking	Anonymous	-	**No web address. Included in Appendix A. 2**
5	Integrated Environmental Management Systems Implementation Guide	Environmental Protection Agency	2007	http://www.epa.gov/dfe/pubs/index.htm#iems
5	PLUS 1145 *A Guide to Identifying Significant Environmental Aspects*	Canada Standards Association	1999	http://www.csa-intl.org/onlinestore/GetCatalogCompleteList.asp?List=6&index=All
11	CSA Plus 1131 Reporting on Environmental Performance	Canada Standards Association	2004	http://www.csa-intl.org/onlinestore/GetCatalogCompleteList.asp?List=6&index=All
11	ISO 14031 Environmental Management - Environmental Performance Evaluation - Guidelines	Canada Standards Association	1999	http://www.csa-intl.org/onlinestore/GetCatalogCompleteList.asp?List=6&index=All
5	Environmental Protection Requirements for Transportation Planning and Highway Design, Construction, Operation and Maintenance	Ministry of Transportation Ontario	Last modified April 30, 2004	http://www.mto.gov.on.ca/english/engineering/envirostandards/epr.htm
5	Environmental Action Plan	City of Calgary	March 2007	http://www.calgary.ca/docgallery/bu/environmental_management/environmental_action_plan.pdf

Task(s)[1]	Title	Agency / Sponsor /Author	Date/Version	Website Address
5	Analysis of Environmental Impact Estimation Methods for Railway Environmental Management System Quarterly Reports Vol. 45 No.2,	Railway Technical Research Institute, Railway Technical Research Institute Japan	2004	http://www.jstage.jst.go.jp/article/rtriqr/45/2/92/_pdf
5	Environmental Protection Requirements for Transportation Planning and Highway Design, Construction, Operation and Maintenance	Ministry of Transportation Ontario	Last modified April 30, 2004	http://www.mto.gov.on.ca/english/engineering/environstandards/epr.htm
5	Example Table of Concordance	Anonymous	-	**No web address. Included in Appendix A.3**
5	Aspect and Impact Identification and Ranking Workshop	Environmental Stewardship in Transportation Through Waste Management, Materials Reuse, and EMS Conference Charlotte, NC	2005	http://www.ncdot.org/doh/preconstruct/highway/geotech/trb/download/presentations/SessionC_Beth_Graves/aspect_module-final%5B2%5D.pdf
6	Fuel Spill Response Procedure	P.E.I. Department Of Transportation & Public Works	Apr-03	http://www.gov.pe.ca/tpwpei/index.php3?number=1000518&lang=E
6	Environmental Incident Report	P.E.I. Department Of Transportation & Public Works	Apr-03	http://www.gov.pe.ca/tpwpei/index.php3?number=1000518&lang=E
6	ISO 14001 Contractors and Suppliers Environmental Performance Requirements	City of Nanaimo	Mar-06	http://www.rdn.bc.ca/cms/wpattachments/wpID1139atID1129.pdf
6	Class Environmental Assessment Monitoring Questionnaires	Ministry of Transportation Ontario	-	http://www.raqsa.mto.gov.on.ca/techpubs/eps.nsf/epswv?OpenView&Start=1&Count=30&Expand=3.8#3.8
7	Environmental Information Management and Decision Support System-Implementation Handbook, NCHRP Report No. 481	Transportation Research Board, Washington D.C.	2003	http://onlinepubs.trb.org/onlinepubs/nchrp/nchrp_rpt_481.pdf
7	WEBCAST: Environmental Information Management and Decision Support System for Transportation: The Results of NCHRP 25-23	Center for Transportation and the Environment	June 24, 2004	http://www.itre.ncsu.edu/CTE/TechTransfer/Teleconferences/webcast.asp?ID=30

Task(s)[1]	Title	Agency / Sponsor /Author	Date/Version	Website Address
7	EMS Manual	Alberta Ministry of Transportation \ Ministry of Infrastructure	-	http://www.infratrans.gov.ab.ca/571.htm
7	EMS Manual	City of Calgary	-	http://www.calgary.ca/portal/server.pt/gateway/PTARGS_0_0_104_0_0_35/http%3B/content.calgary.ca/CCA/City+Hall/Business+Units/Environmental+Management/index.htm
7	EMS Manual	City of Edmonton	-	http://www.edmonton.ca/portal/server.pt?open=space&name=CommunityPage&id=cached&psname=CommunityPage&psid=0&in_hi_userid=2&cached=true&control=SetCommunity&CommunityID=213&PageID=0
7	Sample EMS Manual: Environmental Management System Model Manual	State of Pennsylvania	-	http://164.156.71.80/VWRQ.asp?docid=0442d740780d00000000080f0000080f&context=2&backlink=WXOD.aspx%3ffs%3d0442d740780d00000800080200000802%26ft%3d1
7	Communication Procedure	City of San Diego	2001	http://www.resourcesaver.com/file/toolmanager/O73F27.pdf
7	EMS Contest	Anonymous	-	**No web address. Included in Appendix A.4**
7	Procedure for Document Management	Port of Houston Authority - Houston, TX	2001	http://www.resourcesaver.com/file/toolmanager/FileO73C10F45.pdf
7	Prototype Software for an Environmental Information Management & Decision Support System NCHRP Research Digest No. 317	Transportation Research Board, Washington D.C.	March 2007	http://onlinepubs.trb.org/onlinepubs/nchrp/nchrp_rrd_317.pdf
7	Records Management Procedure	City of San Diego, CA - Refuse Disposal Division	2001	http://www.resourcesaver.com/file/toolmanager/FileO73C10F45.pdf
7	Non-conformance and Corrective and Preventative Action Procedure	Port of Houston Authority - Houston, TX	2001	http://www.resourcesaver.com/file/toolmanager/O73F85.pdf
7	Environmental Management System Handbook	The City of Edmonton	2005	http://www.edmonton.ca/portal/server.pt/gateway/PTARGS_0_0_271_213_0_43/http%3B/CMSServer/COEWeb/environment+waste+and+recycling/enviso/EnvisoToolbox.htm

Task(s)[1]	Title	Agency / Sponsor /Author	Date/Version	Website Address
8,9	Contractor's Environmental Responsibilities Package - General	City of Edmonton	2007	http://www.edmonton.ca/portal/server.pt/gateway/PTARGS_0_2_2868277_0_0_18/
8,9	Contractor's Environmental Responsibilities Package - Construction and Maintenance	City of Edmonton	2007	http://www.edmonton.ca/Environment/enviso/Contractor%20resp%20pkg%20constrn_mar3%2008.pdf#xml=http://127.0.0.1/texis/search/pdfhi.txt?query=environmental&pr=www.edmonton.ca&prox=page&rorder=500&rprox=500&rdfreq=500&rwfreq=500&rlead=500&rdepth=0&sufs=0&order=r&mode=&opts=look&cq=&sr=-1&id=47d6c2bcc1
8,9	Contractor's Environmental Responsibilities Package - Hired Equipment Operation	City of Edmonton	2007	http://www.edmonton.ca/portal/server.pt/gateway/PTARGS_0_2_2868277_0_0_18/
8,9	Contractor's Environmental Responsibilities Acknowledgement Form	City of Edmonton	2007	http://www.edmonton.ca/portal/server.pt/gateway/PTARGS_0_2_2868277_0_0_18/
8,9	Contractor Environmental Responsibilities Package	City of Calgary	2008	http://www.calgary.ca/portal/server.pt/gateway/PTARGS_0_0_771_203_0_43/http%3B/content.calgary.ca/CCA/City+Hall/Business+Units/Environmental+Management/Contractor+Environmental+Responsibilities/Contractor+Environmental+Responsibilities+Package.htm
8,9	Contractor Environmental Acknowledgement Form	City of Calgary	2008	http://www.calgary.ca/portal/server.pt/gateway/PTARGS_0_0_771_203_0_43/http%3B/content.calgary.ca/CCA/City+Hall/Business+Units/Environmental+Management/Contractor+Environmental+Responsibilities/Contractor+Environmental+Responsibilities+Package.htm
9	Environmental Construction Operations Plan (ECO Plan) Framework (2005)	Alberta Infrastructure and Transportation	2005	http://www.infratrans.gov.ab.ca/INFTRA_Content/docType245/Production/eco5.pdf
10	Introduction to Environmental Management Systems Training - Web course	US Environmental Protection Agency	Last Updated Wednesday Feb 22, 2006	http://www.epa.gov/epaoswer/ems/ems-101/ems101.htm
10	Enviso Training Video	City of Edmonton	undated	http://www.edmonton.ca/Environment/enviso/video/EnvisoVideo.mp4

Task(s)[1]	Title	Agency / Sponsor /Author	Date/Version	Website Address
10	Environmental Management System Handbook	City of Edmonton	2005	http://www.edmonton.ca/portal/server.pt/gateway/PTARGS_0_0_271_213_0_43/http%3B/CMSServer/COEWeb/environment+waste+and+recycling/enviso/EnvisoToolbox.htm
10	Syntheses of Best Practices for Road Salt Management	Transportation Association of Canada	2003	http://www.tac-atc.ca/english/informationservices/readingroom.cfm
10	Presentation: Fleet and Facilities Central Fleet Section: ISO Registered Quality and Environment Management System	Anonymous	-	**No web address. Included in Appendix A.5**
11	Environmental Management System Handbook	City of Edmonton	2005	http://www.edmonton.ca/portal/server.pt/gateway/PTARGS_0_0_271_213_0_43/http%3B/CMSServer/COEWeb/environment+waste+and+recycling/enviso/EnvisoToolbox.htm
11	Environmental Management System	Alberta Infrastructure and Transportation	2007	http://www.infratrans.gov.ab.ca/INFTRA_Content/docType245/Production/EMSv3.pdf
11	ISO 19011 Guidelines for Quality and/or Environmental Management Systems Auditing	Canada Standards Association	2002	http://www.csa-intl.org/onlinestore/GetCatalogCompleteList.asp?List=6&index=All
11	Z773 Environmental Compliance Auditing	Canada Standards Association	2003	http://www.csa-intl.org/onlinestore/GetCatalogCompleteList.asp?List=6&index=All
11	CSA Plus 1131 Reporting on Environmental Performance	Canada Standards Association	2004	http://www.csa-intl.org/onlinestore/GetCatalogCompleteList.asp?List=6&index=All
11	ISO 14031 Environmental Management - Environmental Performance Evaluation - Guidelines	Canada Standards Association	1999	http://www.csa-intl.org/onlinestore/GetCatalogCompleteList.asp?List=6&index=All
11	ISO/TR 14032 Environmental Management - Examples of Environmental Performance Evaluation	Canada Standards Association	1999	http://www.csa-intl.org/onlinestore/GetCatalogCompleteList.asp?List=6&index=All

Task(s)[1]	Title	Agency / Sponsor /Author	Date/Version	Website Address
11	EcoVision Annual Report	The City of Edmonton	2006	http://www.edmonton.ca/portal/server.pt/gateway/PTARGS_0_0_271_213_0_43/http%3B/CMSServer/COEWeb/environment+waste+and+recycling/environment/VideosBookletsAnnualReport.htm
12	Envirosystems Annual Report	City of Calgary	-	http://www.calgary.ca/docgallery/bu/environmental_management/2006_state_of_the_environment_report.pdf
12	Transport Canada Environmental Performance Report 2004/2005	Transport Canada	2006	http://www.tc.gc.ca/programs/Environment/EMS/epr0405/docs/TP13970E%20C.pdf
	Combining Management Systems			
-	Integrated Environmental Management Systems: Implementation Guide	US Environmental Protection Agency	October 2000	http://www.epa.gov/opptintr/dfe/pubs/iems/iems_guide/index.htm
-	Health, Safety and Environment (HSE) Program, Volume 3 - Best Environmental Practices	Nova Scotia Transportation and infrastucture Renewal	-	http://www.gov.ns.ca/tran/enviroservices/enviroEMS.asp
-	Combining Audits on Quality & Environmental Management Systems	ISO Bulletin December 2002 Vol. 11 No. 5	December 2002	http://www.iso.ch/iso/en/commcentre/isobulletin/articles/2002/pdf/audits02-12.pdf

APPENDIX A.2

EXAMPLE ACTIVITY LIST AND CAUSE/EFFECT RANKING FOR TASK 5

.

Activity	Sub-Activity	Environmental Aspect	Impact	Legislation	Operational Controls	Env. Effect	Business Significance	Legislation Regulation Policy	Public Acceptance	Prob.	Rank	Significant (High ≥12)
Use of vehicles and equipment	Operation of fleet vehicles	Air emissions (COx, NOx)	Impact on air quality Nuisance to the public	Idling Policy Climate Change Plan	Use of hybrid vehicles Automatic shut off on vehicles Education & Awareness Idle-Free Zone signage Vehicle inspection forms	2	1	4	2	4	13	**HIGH**
Alternative transportation	Encourage employees to use alternative transportation to and from work	Reduced vehicle emissions by using alternative transportation to work	Reduced air emissions	None	Shuttle service Bike racks Car pool parking Shower facilities	1	2	0	0	4	7	
Administrative and field operations	Procurement of equipment, materials, products, supplies, and food/drink	Purchasing of items that are not environmentally preferred	Resource consumption	None	Following the policies where practicable	1	1	1	1	5	10	
Administrative activities	Use of office equipment	Consumption of electricity	Generation of GHGs	Climate Change Plan	Employee awareness (paycheck mailout) 75% of electricity obtained from wind generation	1	1	3	1	4	10	
Summer roads maintenance	Storing treated wood	Leaching of treated wood poles	Contamination of soil, surface water or groundwater	None	Limited quantities stored Covered storage Storage off the ground	1	1	1	1	2	6	

Activity	Sub-Activity	Environmental Aspect	Impact	Legislation	Operational Controls	Env. Effect	Business Significance	Legislation Regulation Policy	Public Acceptance	Prob.	Rank	Significant (High ≥12)
Street cleaning	Management of street sweepings	Improper disposal of street sweepings	Contamination of soil, surface water or groundwater	EPA Drinking Water Act	Disposed of to landfill	1	1	4	1	0	7	
	Back flushing	Release of gravel and debris to the storm water system	Impact to water and aquatic habitat	EPA ESC Policy Drinking Water Act	Use of catch basin socks Drainage permit Training/awareness	2	1	4	1	1	9	
	Removal of sanding materials, dirt, litter and debris	Air emissions (dust, noise)	Impact on air quality	None	Pre-wet road Air sweepers	1	1	1	2	2	7	
Snow/ice control	Storing and handling salt, salt/gravel mixtures and calcium chloride brine	Salt contaminated runoff to the ground, surface water or groundwater	Contamination of soil, surface water or groundwater. Impacts on vegetation, fish or wildlife	CEPA EPA Fisheries Act TAC BMP Road Salt Mgmt Drinking Water Act	Covered storage of salt Some covered storage for salt / gravel Some stormwater retention ponds Some paved yards Housekeeping BMPs Salt Management Plan On board pre-wetting system	3	3	4	1	4	16	**HIGH**
	Application of salt and salt/gravel to roads	Salt contaminated runoff to the ground, surface water or groundwater	Contamination of soil, surface water or groundwater. Impacts on vegetation, fish or wildlife	CEPA EPA Fisheries Act TAC BMP Road Salt Mgmt Drinking Water Act	Electronic controlled spreaders Equipment calibration RIIS / Weather information systems Training Salt Management Plan	3	2	4	2	4	15	**HIGH**
	Snow storage sites	Salt contaminated runoff to the ground, surface water or groundwater	Contamination of soil, surface water or groundwater. Impacts on vegetation, fish or wildlife	CEPA EPA Fisheries Act TAC BMP Road Salt Mgmt Drinking Water Act	Impermeable liners Ponds / vortex units	2	1	4	0	1	8	

Activity	Sub-Activity	Environmental Aspect	Impact	Legislation	Operational Controls	Env. Effect	Business Significance	Legislation Regulation Policy	Public Acceptance	Prob.	Rank	Significant (High ≥12)
Saw cutting	Saw cutting asphalt and concrete in various operations (e.g. signal loops, concrete construction, etc.)	Runoff of tar and saw cutting slurry to ground or storm sewer	Contamination of storm water	CEPA EPA Fisheries Act Drinking Water Act	Collection and disposal of slurry	2	1	4	1	1	9	
Contamination discovery and cleanup	Contamination discovery (i.e. during construction)	Improper disposal of contaminated materials	Contamination of landfill	EPA CEPA Drinking Water Act	Training / Awareness Project Pre-screening	2	3	4	1	1	11	
Construction project management	Road and bridge construction projects	Environmental impacts from construction activities	Loss of vegetation, impact to wildlife and aquatic habitats Impact to air Impact to surface water or groundwater	Fisheries Act EPA CEPA Migratory Birds Convention Act Species at Risk Act Soil Bylaw Tree Protection Bylaw ESC Policy Drinking Water Act	ESC Plans Contract and Special Provisions Construction Administration / Environmental Inspectors	2	3	4	2	2	13	**HIGH**
Bridge maintenance and road maintenance	Painting and recoating structures and ridges, guard rails, fences and noise barriers	Air emissions (solvents)	Impact on air quality	None	Use of non-toxic materials / substances whenever possible	1	1	0	0	3	5	
Street lighting and traffic signals	Operation of streetlights and traffic lights	Consumption of electricity and light pollution	Generation of GHGs Light pollution	Climate Change Plan	Lighting retrofit program LED traffic signals Solar powered signage	2	1	3	2	3	11	

Activity	Sub-Activity	Environmental Aspect	Impact	Legislation	Operational Controls	Env. Effect	Business Significance	Legislation Regulation Policy	Public Acceptance	Prob.	Rank	Significant (High ≥12)
Specifications	Updating standard specifications	Environmental considerations not included in specifications	Environmental impacts on soil, water or air	None	Spec circulated to Environmental Planners / Specialist for review	1	1	0	1	1	4	
Line painting	Line painting	Volatile organic compound (VOC) emissions to air	Impact on air quality	CEPA - NPRI Reporting	Use of low VOC paint (e.g. latex, epoxy or thermal plastic) Testing low VOC paints	3	3	4	2	3	15	**HIGH**
Paving operations	Surface overlays (paving)	Release of sediment from grinding	Contamination of surface water	Drainage Standards Fisheries Act Drinking Water Act	Roads are swept with sweepers right after milling Stormwater inlet controls	2	1	4	1	2	10	
Construction	Hillside restoration, slope stabilization	Improper hillside stabilization	Erosion or hillside failure: sedimentation & slope stability	Fisheries Act Water Resources Act Drinking Water Act ESC Policy	Inspection of stabilization systems	2	2	4	3	1	12	**HIGH**
Concrete construction	Treating wooden forms	Improper containment of form oil storage tanks	Contamination of soil, surface water or groundwater	CEPA EPA Fisheries Act	Secondary containment Covered tanks	2	1	4	1	0	8	

Activity	Sub-Activity	Environmental Aspect	Impact	Legislation	Operational Controls	Env. Effect	Business Significance	Legislation Regulation Policy	Public Acceptance	Prob.	Rank	Significant (High ≥12)
Bridge Maintenance	Removal of bird nests and beaver dams	Removal of nesting sites and habitat	Loss of habitat	Migratory Birds Convention Act Species at Risk Act Wildlife Protection Act	Inspections prior to work starting	2	2	4	1	4	13	**HIGH**
	Runoff from hydro-demolition rehabilitation, washing structures and bridges	Release of runoff to storm sewer or surface water	Surface water contamination Impact to aquatic life or habitat	EPA Fisheries Act Drinking Water Act	Standard Provision for capture of hydro-demolition water	2	2	4	2	1	11	
	Sandblasting structures and bridges	Improper management / disposal of blast media	Contamination of landfill	EPA	Material testing prior to disposal with landfill approval BMP for bridge maintenance	2	2	4	1	1	10	
Asphalt plant	Operation of the asphalt plant (including managing bag-house fines) and the asphalt recycler unit	Air emissions (COx, NOx, dust, odours)	Impact on air quality	EPA	Bag-house Covered storage for fines	2	1	4	2	1	10	
	Operation of the asphalt plant	Improper containment of bitumen and oil from equipment	Contamination of soil, surface water or groundwater	EPA Drinking Water Act	Secondary containment for bitumen tanks Spill response materials Spill training	2	1	4	1	0	8	

APPENDIX A.3

EXAMPLE TABLE OF CONCORDANCE FOR TASK 5

Table of Concordance

The following Table of Concordance identifies key environmental aspects/impacts (arranged alphabetically) and the corresponding primary regulatory requirements (act, regulation, bylaw, code of practice, standard, guideline)[1] that relate to those aspects/impacts.

ASPECT		IMPACTS	REGULATORY REQUIREMENTS		
			FEDERAL	PROVINCIAL	MUNICIPAL
Aesthetics		View Shed	N/A	N/A	N/A

Air	Particulate Matter Emissions	Air Pollution, Human Health	• Canadian Environmental Protection Act, 1999 (Schedule 1, PM_{10} toxic substance)
			• CCME PM_{10} Canada Wide Standard
				• Environmental Protection and Enhancement Act
				  ○ Activities Designation Regulation
				  ○ Environmental Assessment (Mandatory and Exempted Activities) Regulation
				  ○ Release Reporting Regulation
				  ○ Substance Release Regulation
				  ○ Release Reporting Guideline
				  ○ Code of Practice for Asphalt Paving Plants
				  ○ Code of Practice for Concrete Producing Plants
					N/A

Changes to Site Conditions	Drainage	Erosion, Fisheries, Navigable Waters, Surface/Groundwater	• Canadian Environmental Assessment Act
			• Fisheries Act
			• Navigable Waters Protection Act
				• Environmental Protection and Enhancement Act
				  ○ Activities Designation Regulation
				  ○ Conservation and Reclamation Regulation
				  ○ Environmental Assessment (Mandatory and Exempted Activities) Regulation
				  ○ Code of Practice for Pits
				• Natural Resources Conservation Board Act
				• Public Lands Act
				• Soil Conservation Act
				• Water Act
				  ○ Water (Ministerial) Regulation
					N/A

ASPECT		IMPACTS	REGULATORY REQUIREMENTS		
			FEDERAL	PROVINCIAL	MUNICIPAL

	Potential Land Uses	Erosion, Fisheries, Historical Resources, Resources/Raw Materials Consumption, Species At Risk, Topsoil Consumption, Topsoil Admixing, View Shed, Wildlife	• Canadian Environmental Assessment Act
			• Fisheries Act
			• Migratory Birds Convention Act, 1994
			  ○ Migratory Birds Regulations
			• Species At Risk Act
				• Environmental Protection and Enhancement Act
				  ○ Activities Designation Regulation
				  ○ Environmental Assessment (Mandatory and Exempted Activities) Regulation
				  ○ Conservation and Reclamation Regulation
				  ○ Code of Practice for Pits
				• Historical Resources Act
				• Natural Resources Conservation Board Act
				• Public Lands Act
				• Soil Conservation Act
				• Weed Control Act
				  ○ Weed Regulation
				• Wildlife Act
				  ○ Wildlife Regulation
					N/A

	Extraction of Materials	Erosion, Fisheries, Historical Resources, Resource/Raw Materials Consumption, Surface/ Groundwater, View Shed	• Canadian Environmental Assessment Act
			• Fisheries Act
				• Environmental Protection and Enhancement Act
				  ○ Activities Designation Regulation
				  ○ Environmental Assessment (Mandatory and Exempted Activities) Regulation
				  ○ Approvals and Registrations Procedure Regulation
				  ○ Conservation and Reclamation Regulation
				  ○ Code of Practice for Pits
				  ○ Environmental Protection Guideline for Pits
				• Historical Resources Act
				• Natural Resources Conservation Board Act
				• Soil Conservation Act
				• Public Lands Act
				• Water Act
				  ○ Water (Ministerial) Regulation
					N/A

	Placement of Materials	Erosion, Fisheries, Navigable Waters, Surface/Groundwater	• Canadian Environmental Assessment Act
			• Fisheries Act
			• Navigable Waters Protection Act
				• Environmental Protection and Enhancement Act
				  ○ Activities Designation Regulation
				  ○ Environmental Assessment (Mandatory and Exempted Activities) Regulation
				  ○ Conservation and Reclamation Regulation
				• Public Lands Act
				• Natural Resources Conservation Board Act
				• Soil Conservation Act
				• Water Act
				• Water (Ministerial) Regulation
					N/A

ASPECT		IMPACTS	REGULATORY REQUIREMENTS		
			FEDERAL	PROVINCIAL	MUNICIPAL

	Site Clearing	Erosion, Fisheries, Historical Resources, Resource/Raw Materials Consumption, Species at Risk, Surface/Groundwater, View Shed, Wildlife	• Canadian Environmental Assessment Act
			• Fisheries Act
			• Migratory Birds Convention Act, 1994
			  ○ Migratory Birds Regulations
			• Species At Risk Act
				• Environmental Protection and Enhancement Act
				  ○ Activities Designation Regulation
				  ○ Environmental Assessment (Mandatory and Exempted Activities) Regulation
				  ○ Conservation and Reclamation Regulation
				  ○ Code of Practice for Pits
				• Historical Resources Act
				• Natural Resources Conservation Board Act
				• Public Lands Act
				• Soil Conservation Act
				• Water Act
				  ○ Water (Ministerial) Regulation
				• Weed Control Act
				  ○ Weed Regulation
				• Wildlife Act
				  ○ Wildlife Regulation
					N/A

Chemicals	Transportation, Storage, Handling, Use and Disposal	Chemical Agents Consumption, Contamination, Fisheries, Human Health, Species At Risk, Surface/Groundwater, Wildlife, Hazardous/Non-Hazardous Waste	• Canadian Environmental Protection Act, 1999
			• Fisheries Act
			• Migratory Birds Convention Act, 1994
			  ○ Migratory Birds Regulations
			• Pest Control Products Act
			• Species At Risk Act
			• Transportation of Dangerous Goods Act
			  ○ Transportation of Dangerous Goods Regulations
				• Environmental Protection and Enhancement Act
				  ○ Activities Designation Regulation
				  ○ Pesticide (Ministerial) Regulation
				  ○ Code of Practice for Pesticides
				• Water Act
				• Weed Control Act
				  ○ Weed Regulation
					N/A

Energy/ Resources/Raw Materials	Consumption	Energy/Resources/Raw Materials Consumption, Fuel Consumption, Species At Risk, View Shed, Wildlife/Habitat	• Migratory Birds Convention Act, 1994
			  ○ Migratory Birds Regulations
			• Species At Risk Act
				• Environmental Protection and Enhancement Act
				  ○ Activities Designation Regulation
				  ○ Conservation and Reclamation Regulation
				• Natural Resources Conservation Board Act
				• Wildlife Act
				  ○ Wildlife Regulation
					N/A

General Releases	Into Water (Surface and Ground)	Fisheries, Human Health, Navigable Waters, Surface/Groundwater	• Fisheries Act
			• Canadian Environmental Protection Act, 1999 (toxic substances)
			  ○ Code of Practice for the Environmental Management of Road Salts
			• Navigable Waters Protection Act
				• Environmental Protection and Enhancement Act
				  ○ Substance Release Regulation
				  ○ Release Reporting Regulation
				  ○ Release Reporting Guideline
					N/A

ASPECT		IMPACTS	REGULATORY REQUIREMENTS		
			FEDERAL	PROVINCIAL	MUNICIPAL
	Onto Soil	Contamination, Human Health	• Canadian Environmental Protection Act, 1999 (toxic substances) o Code of Practice for the Environmental Management of Road Salts	• Environmental Protection and Enhancement Act o Release Reporting Regulation o Release Reporting Guideline o Salt Contamination Assessment and Remediation Guidelines • Soil Conservation Act	N/A
Noise	Emissions From Equipment, Vehicles, Operating Facilities, Explosives, etc.	Human Health, Wildlife	• Migratory Birds Convention Act, 1994 o Migratory Birds Regulations	• Environmental Protection and Enhancement Act o Release Reporting Regulation o Release Reporting Guideline • Occupational Health and Safety Act o Noise Regulation • Wildlife Act o Wildlife Regulation	Noise Bylaws (e.g., City of Calgary Noise Bylaw, No. 45M95, City of Edmonton Noise Bylaw No. 7255)
Topsoil	Removal, Use	Erosion, Fisheries, Resource/Raw Materials Consumption, Species At Risk, Topsoil Consumption, Topsoil Admixing, View Shed, Wildlife/Habitat	• Fisheries Act • Migratory Birds Convention Act, 1994 o Migratory Birds Regulations • Species At Risk Act	• Environmental Protection and Enhancement Act o Conservation and Reclamation Regulation o Code of Practice for Pits • Public Lands Act • Soil Conservation Act • Wildlife Act o Wildlife Regulation	
Vibrations	From Equipment, Vehicles, Operating Facilities, Explosives, etc.	Fisheries, Human Health, Wildlife	• Canadian Environmental Assessment Act • Fisheries Act o Guidelines for the Use of Explosives In Or Near Canadian Fisheries Waters (1998) • Migratory Birds Convention Act, 1994 o Migratory Birds Regulations	• Environmental Protection and Enhancement Act o Release Reporting Regulation o Release Reporting Guideline	N/A
Waste	Generation, Disposal (hazardous & non-hazardous waste)	Contamination, Human Health, Landfill Space Consumption, Odour, Surface/Groundwater	• Canadian Environmental Protection Act, 1999 o Export and Import of Hazardous Wastes Regulations o Interprovincial Movement of Hazardous Waste Regulations • Transportation of Dangerous Goods Act o Transportation of Dangerous Goods Regulations	• Environmental Protection and Enhancement Act o Waste Control Regulation o Snow Disposal Guidelines for the Province of Alberta	N/A

ASPECT		IMPACTS	REGULATORY REQUIREMENTS		
			FEDERAL	PROVINCIAL	MUNICIPAL
Water	Consumption	Erosion, Fisheries, Navigable Waters, Resource/Raw Materials Consumption, Surface/ Groundwater	• Canadian Environmental Assessment Act • Fisheries Act • Navigable Waters Protection Act	• Environmental Protection and Enhancement Act o Activities Designation Regulation o Environmental Assessment Regulation o Environmental Assessment (Mandatory and Exempted Activities) Regulation • Natural Resources Conservation Board Act • Water Act o Water Ministerial Regulation	N/A
	Diversion	Erosion, Fisheries, Navigable Waters, Surface/Groundwater, View Shed	• Canadian Environmental Assessment Act • Fisheries Act • Navigable Waters Protection Act	• Environmental Protection and Enhancement Act o Environmental Assessment Regulation o Environmental Assessment (Mandatory and Exempted Activities) Regulation • Natural Resources Conservation Board Act • Public Lands Act • Water Act o Water Ministerial Regulation o Code of Practice for Watercourse Crossings	N/A
	Dewatering	Erosion, Fisheries, Navigable Waters, Surface/Groundwater, View Shed	• Canadian Environmental Assessment Act • Fisheries Act • Navigable Waters Protection Act	• Environmental Protection and Enhancement Act o Environmental Assessment Regulation o Environmental Assessment (Mandatory and Exempted Activities) Regulation • Natural Resources Conservation Board Act • Public Lands Act • Water Act o Water Ministerial Regulation o Code of Practice for Watercourse Crossings	N/A

APPENDIX A.4
EXAMPLE EMS CONTEST FOR TASK 7

TRANSPORTATION EMS CONTEST

Congratulations to our January contest winner!! John from Drafting knew that all of the following are requirements for waste/recyclable material drums and that everyone in the area is responsible for ensuring the requirements are met.

a) drums must be appropriately stored
b) drums must be closed when not in use
c) drums must be appropriately labeled including an accumulation start date
d) drums must contain only the waste/recyclables that they are intended for (no mixed waste)
e) drums that have been damaged must be appropriately managed and/or replaced

EMS Contest Question for February 2007:

Since our internal Environmental ISO 14001 audit will be completed April 23-25th, this month's question is audit related.

When preparing for the Environmental ISO 14001 audit which of the following are important?

a) know your environmental roles & responsibilities
b) know where environmental information is found such as the environmental policy, idling policy, EMS Contest, available training courses, etc.
c) follow/reference the most current environmental processes and procedures
d) use/reference the most current environmental forms
e) when asked a question, if not sure of the answer do not guess, try to show the auditor where the answer can be found (bulletin board, our website, etc.)
f) if you have any environmental questions/concerns contact your manager, supervisor, or Environmental Coordinator
g) all of the above

Draw Date: March 5, 2007 (entries should be in by March 2nd)
Draw Prize: $50.00 Home Depot *Gift Certificate

To Enter: Send your entry to Bob, EMS Coordinator
By Phone: 555-1234 ext. 1345
Fax: 555-4321
Mail: EMS Coordinators Office
e-mail: BobEMS Coord@agency.ca
Intranet: Visit our intranet site and enter on-line (http://EMS)

Contact your local regional Environmental Coordinator if you have any environmental questions or concerns.

(One entry per Transportation employee please)

* To meet Revenue Canada requirements, effective immediately all gift certificates will be considered a taxable benefit. When/if a draw prize is accepted by a winner, tax conditions will apply. For any questions or concerns regarding this requirement, please contact your manager

APPENDIX A.5

PRESENTATION: FLEET AND FACILITIES

CENTRAL FLEET SECTION: ISO REGISTERED QUALITY AND ENVIRONMENT MANAGEMENT SYSTEM

Provincial Case Study
ENVIRONMENTAL UPDATE

CEM Plan Audit 2006

The objective of the CEM Plan audits was to:

- determine if work site CEM Plans meet the requirements and are properly implemented and maintained;
- assess if the environmental requirements of the construction contract and the Consultant Service Agreement are adhered to;
- survey work site activities for compliance to environmental legislation; and
- assess if the requirements within relevant department specifications are being adhered to.

Scope of Audit

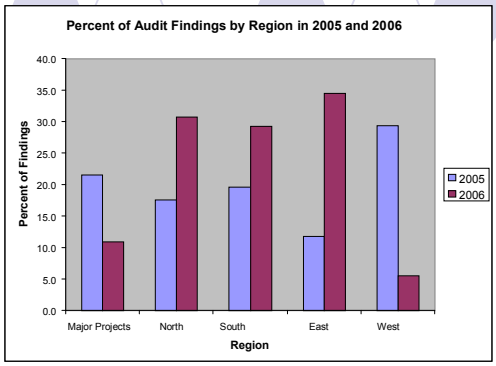
- **21 projects identified for audit**
- **14 actually audited**

Definitions

- Non-conformance**: An item that does not conform to the audit criteria.**
- Non-compliance: **An item that does not meet regulatory requirements.**
- Opportunity for Improvement**: An issue that may possibly become a non-conformity or non-compliance in the future if not addressed.**

Audit Results

	Number	Average per Project
Non-conformance	94	5.2
Non-compliance	11	0.6
Opportunity for improvement	15	0.8
Total	120	6.6



Non-Compliance

- **5 cases of failure to produce Water Resources Act approval for temporary diversion**
- **3 cases of failure to adhere to clauses in Letters of Advice under Fisheries Act**
- **2 cases of failure to salvage fish**
- **1 case of lack of secondary containment as require by Contamination Reduction Regulation**
- **1 case of burning without a permit**

No Water Resources Act Approval

- **Failure to have approval on site:**
  - $150 fine to individual
  - $2,000 fine to corporation
- **Commencing activity without approval**
  - $125,000 fine and/or two years jail for individual
  - $1,000,000 fine for corporation
  - Each day is a new offence

Fisheries Act

- **Failure to meet conditions in Letter of Advice (3 occurrences)**
- **Problem if it results in violation of act**
- **Failure to conduct fish salvage (2 occurrences)**
- **Problem if it results in dead fish**
- **Penalties**
  - Summary offence $300,000 and/or 6 months
  - Indictable offence $1,000,000 and/or 3 years

Non-Conformance Results

Training	**No training or no records**	**12**
Risk Assessment	**No Risk Assessment or items missing**	**12**
CEM Plan Currency	**Not updated to situation or 2005 Framework**	**9**
Erosion and Sediment Control	**Not in CEM Plan or not properly implemented**	**9**

Non-Conformance Results

Inspections	**Not conducted or no records**	**7**
Wastes	**Not in CEM Plan or not properly handled**	**5**
Weed Survey	**Not completed**	**6**
Authorization	**CEM Plan not signed by site representative**	**5**

Non-Conformance Results

Borrow	**Borrow Assessments not complete**	**5**
Gravel Crushing	**Crushing in progress but not in CEM Plan**	**4**
Winter Shutdown	**Not in CEM Plan and likely to occur**	**3**
Soil Assessment	**Deficient assessment or tender information**	**2**

Enforcement Actions

- 13 environmental occurrences reported
- 6 involved release of sediment
- Two formal warning from DFO
- One fine against contractor under City By-law
- Follow-up documentation to EMS incomplete
- Need for clarification of reporting requirements

New Procedures

Regulatory Approval Sign-off

- Current Consultant Guidelines directs consultants to obtain regulatory approvals
- Regulatory approvals are an agreement between the department and regulatory agencies
- Individual with authority to meet conditions should sign
- New procedure consultant prepares applications and project Sponsor signs

Initiatives

Wetland Policy Revision

- Environment Office led process
- Draft to go for public consultation
- Seeks to expand scope of Interim Policy
  - Buffers
  - Non-permanent wetlands
- Seeks to set and expand compensation requirements
- Issue of created/constructed wetlands

CEM Plan Expansion

- Initiative to extend CEM Plan frameworks among municipalities
- Consistent approach across the province
- Initial review of similarities and differences complete
- Partners will be consulted as process proceeds

APPENDIX B

GLOSSARY

PART I - APPLICATION

GLOSSARY

This glossary of terms was compiled from definitions within the ISO 14001 standard, as well as an EMS glossary from the PEER Center (downloaded from http://www.peercenter.net/ewebeditpro/items/O73F1605.pdf on March, 2007). The PEER Center is the Public Entity Environmental Management System Resource Center. A virtual clearinghouse, it is specifically designed to aid local, county, and state governments in the united states of America that are considering implementing or have implemented an environmental management system (EMS) and want to access the knowledge and field experience of other public entities that have done so.

Audit: A planned, independent and documented assessment to determine whether agreedupon requirements are being met within an organization.

Boundary: Also knmown as fenceline, the area in which an organization chooses to implement its environmental management system – a department, division or specific operation .

Compliance: An affirmative indication or judgment that the supplier of a product orservice has met the requirements of the relevant specifications, contract, or regulation.Comparable to Conformance.

Conformance / Conformity: An affirmative indication or judgment that a product or service has met the requirements of the relevant specifications, contract, or regulation. In terms of ISO, conformance to ISO 14001 certification requirements - comparable to Compliance.

Continual Improvement: The process of enhancing an organization's environmental management system to achieve improvement in overall environmental performance in line with the organization's environmental policy. This widely adopted principle is intended to ensure that an organization does not simply adopt an environmental management system for cosmetic purposes and thereby remain static, without commitment to reduce its impact on the environment.

Emergency Response Plan: A formal, detailed plan that describes an organization's specific logistics and reporting requirements in the event an emergency, such as fires, erosion or spills. This is a fundamental element of an environmental management system.

Environment: Surroundings in which an organization or facility operates, including air, water, land, natural resources, flora, fauna, humans and their interrelation.

Causes / Effects: Element of an organization's activities, products or services that can interact with the environment (Cause) and any change to the environment, whether adverse or beneficial wholly or partially resulting from an organization's activities, products or services (Effects). The ISO standard refers to "causes/effects" as *Environmental Aspects* and *Environmental Impact* respectively.

EMS Audit: A systematic, documented verification process of objectively obtaining and evaluating an organization's environmental management system to determine whether or not it conforms to the environmental management system audit criteria pre-defined by the organization, and for communication of the results of this process to management.

EMS Coordinator: The project leader for the EMS and the EMS driver and key communicator.

EMS Core Team: Comprised of representatives from the various functional areas, it plays a leadership role in planning the EMS project, delegating the tasks, establishing deadlines, collecting and evaluating work, and providing training, guidance and assistance as needed.

EMS Implementation Levels:

- **Registered:** An EMS that has all of the elements of the ISO 14001 standard as verified by an accredited third-party registrar.
- **Full:** An EMS that has all of the elements of the ISO 14001 standard but is not registered.
- **Partial:** An EMS that has only selected elements of a full EMS.

EMS Steering Committee (SCOM): Comprised of Senior Management representatives, it ensures that resources are available when needed; functional units coordinate with and support the EMS effort; and employees throughout the agency recognize the commitment of Senior Management.

Environmental Management System (EMS): A management approach which enables an organization to identify, monitor and control its environmental aspects. An environmental management system is part of the overall management system that includes organizational structure, planning activities, responsibilities, practices, procedures, processes and resources for developing, implementing, achieving, reviewing and maintaining the environmental policy.

Environmental Objective: Overall environmental goal, arising from the environmental policy, that an organization sets itself to achieve, and which is quantified where practicable. Objectives are based on specific significant aspects.

Environmental Performance: Measurable results of the environmental management system related to an organization's control of its environmental aspects, based on its environmental policy, objectives and targets.

Environmental Policy: An organization's formal statement defining its intentions and principles in relation to its overall environmental performance, which provides a framework for action and for the setting of its environmental objectives and targets.

Environmental Target: Detailed performance requirement, quantified where practicable, based on an organization's defined environmental objectives and that must be met in order to achieve those objectives.

Environmental Unit: A convention adopted in this document in reference to a functional unit or group tasked with environmental management tasks – typically referred to as Environment Office, Head Office Environment, Environmental Department, etc.

Functional Group: A convention adopted in this document referring to groups with a particular task – design or senior management, engineering design, maintenance, etc.

Full EMS: see EMS Implementation Levels.

Gap Analysis: Preliminary assessment of an organization's environmental programs and management practices to see where they match up with EMS requirements.

ISO: The International Organization for Standardization (ISO) is a worldwide federation of national standards bodies from some 140 countries, one from each country. ISO is responsible for the development of ISO 14001.

ISO 14001: An international voluntary standard for environmental management systems. This is one standard in the ISO 14000 series of International Standards on environmental management.

Non-conformity: The non-fulfillment of a specified requirement. Any or all of the following: a) one or more environmental management system requirements have not been addressed; or b) one or more environmental management system requirements have not been implemented; or c) several nonconformities exist that, taken together, lead a reasonable auditor to conclude that one or more environmental management system requirements have not been addressed or implemented.

Partial EMS: see EMS Implementation Levels

Registrar: Third-party entity which audits and registers an organization's environmental management system with respect to the ISO 14001 environmental management system standard.

Registration: The environmental management system of an organization is registered for conformance with ISO 14001 after it has demonstrated such conformance through a formal audit process through a third party.

Registered EMS: see EMS Implementation Levels

Stakeholders: Those groups and organizations having an interest or stake in a organization's environmental management system program (e.g., regulators, shareholders, customers, suppliers, special interest groups, residents, competitors, investors, bankers, media, lawyers, geologists, insurance companies, trade groups, unions, ecosystems and cultural heritage).

Transportation Association of Canada

Environmental Management Systems User Guide for Transportation Practitioners

Part II - Examples and Case Studies

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INTRODUCTION TO PART II

The Guide is divided into two parts:

- **PART I – APPLICATION** is under a separate cover. It provides a "how-to" for developing an EMS in an organization, and consists of:
    - Chapter 1 Introduction
    - Chapter 2 EMS Overview
    - Chapter 3 Planning Your EMS
    - Chapter 4 Building Your EMS
    - Appendix A – Tools and Reference
    - Appendix B – EMS Glossary

- **PART II – EXAMPLES AND CASE STUDIES** (this document) provides the practical experience from agencies in developing and implementing an EMS, and consists of:
    - Examples for salt management EMS and a project specific EMS
    - Case studies for a provincial and municipal transportation agency
    - Plus Appendices (C - Case Study Supporting Documents, D - TAC Member Survey; and E - TAC Member EMS Contact Information).

5.0 EXAMPLES

5.1 INTRODUCTION

Two "examples" are provided to illustrate the EMS planning and implementation process described in Chapters 3 and 4 of Part I. The examples are based on real-world EMS experience and include:

- Salt Management EMS; and
- Project-Specific EMS for a new (Greenfield) highway undertaken as a public / private partnership.

The Salt Management EMS provides a familiar issue that is consistent and applicable Canada-wide while the Project-Specific EMS provides another potential application of the EMS model in transportation.

Each example is comprised of the Task tables from the chapters with a description of how each sub-task was undertaken.

5.2 SALT MANAGEMENT EMS

Environment Canada strongly encouraged road authorities to prepare Salt Management Plans (SMPs) as part of its risk management strategy to address growing concerns over the environmental effects of road salt use. Furthermore, a national salt management working group committed to prepare salt management plans if Environment Canada did not declare road salts to be toxic under the Canadian Environmental Protection Act. SMPs were seen as the win-win solution to this issue. All road authorities using more than 500 tonnes of salt annually have or are preparing Salt Management Plans.

Agreeing to develop a SMP, road authority had the ability to design their own response to the issue and therefore have more control over their operations. In 2003, TAC developed a Syntheses of Best Practices Road Salt Management (http: / / www.tac-atc.ca / english / pdf / saltplan.PDF). This document included a SMP framework based on the ISO 14001 EMS model.

The following example reflects the approach taken by approximately 100 road authorities in developing and implementing their SMP with the assistance of Ecoplans Limited, using their SMP example. It is not necessarily the process followed for all SMPs in Canada. It is intended to show the thinking behind SMPs. The reader is encourages to look at their agency's SMP or the TAC Syntheses of Best Practices Road Salt Management for details on SMPs.

5.2.1 Planning Your EMS: Tasks A to E

Task A: Determine your Agency's General Readiness for an EMS

The following is the completed "Are You Ready for an EMS?" Checklist that reflects the thinking of road authorities prior to developing SMPs.

"Are You Ready for an EMS?" Checklist

	EMS Checklist	Yes	No	Unknown	Comment
1	*Have key internal / external stakeholders of your agency required or requested that you develop an EMS?*	X			Environment Canada and senior road authorities agreed that Salt Management Plans would be developed and implemented.
2	*Could your agency benefit from establishing a process to prioritize and incorporate stakeholder requirements into operations?*	X			Agreeing to develop a Salt Management Plan avoided the need for Environment Canada to regulate salt use and avoided standardized requirements. Each road authority could design its own response to the issue and therefore have more control over its operations.
3	*Do you see value in developing a system and procedures to identify and address environmental risks, liabilities and potential impacts?*	X			The risk was already identified by Environment Canada and accepted by senior management. The value in having the system is self determination in addressing the risks.
4	*Do you see value in developing a system and procedures to ensure regulatory compliance?*	X			The main value is avoiding regulatory intervention by Environment Canada. There are also cost savings, improved environmental stewardship, and reduce liability with a proper SMP. Because the process is voluntary (albeit with strong encouragement) some road authorities have chosen not to prepare SMPs.
5	*Could your agency benefit from establishing a procedure to monitor its operations, track its performance and evaluate compliance with environmental legislation?*	X			Improved monitoring and tracking of performance allows road authorities to better manage road salt use. Without good information on current operations it is impossible to determine if a road authority is complying with the intent of Environment Canada's Code of Practice for the Environmental Management or Road Salts.
6	*Are other counterpart agencies pursuing an EMS?*	X			Most road authorities using more than 500 tonnes of salt annually are preparing Salt Management Plans.
7	*Do you feel your agency has sufficient resources available, in terms of personnel and funds, to pursue an EMS?*	X			Road authorities allocated the funds and personnel required to prepare Salt Management Plans. Road authorities obtained the funds to implement the plan through the normal budgeting process. Some road authorities have not launched into preparing a plan due to resource limitations.

	EMS Checklist	Yes	No	Unknown	Comment
8	*Is external perception of and acceptance by regulators, the public / community, local businesses, etc. of importance to your agency? In other words, would it be valuable for your agency to announce that you have an EMS?*	X			It is important for road authorities to show that they have a Salt Management Plan from two perspectives: 1. to honour the commitment that road authorities made to Environment Canada that they would make changes in salt use practices; and 2. to show the public and environmental agencies that they are taking action on this issue.

Task B: Survey Management / Organization to Identify Environmental Issues and Opportunities

Sub-Tasks	Salt Management Example
B.1 Determine issues	
Gather and prioritize environmental information: list problems, prior formal notifications and informal concerns from regulatory agencies, complaints from the public, associated environmental	The issues were laid out by Environment Canada and the Transportation Association of Canada. Most road authorities have a system for logging public complaints. These were taken into account as priorities were set.
B.2 Determine opportunities	
List relevant environmental opportunities - consider: due diligence, cost savings, cost avoidance, increased productivity, enhanced environmental performance, public perception, etc..	In the case of salt management plans cost benefit analyses were not explicitly done. The key opportunities driving change were: avoidance of regulatory control, better environmental stewardship, reduction of environmental liability (well contamination) and improved public perception. In some cases, initial actions taken saved money that could then be invested in more costly changes.
B.3 Prioritize	
Determine which issues and opportunities are the most important to your agency. Also identify issues or opportunities that can be quickly realized.	Since it usually required large financial investment to make some changes (e.g. buy new equipment, build new storage facilities), the implementation of the plans was spread over many years. Prioritization was made based on ability to pay, and where the "best bang-for-the-buck" could be achieved. Sometimes low cost investments (e.g. training) returned large savings in salt use, which in turn was invested in more costly best practices (e.g. better equipment). Some newer best practices took time to "sell" to the organization (e.g. direct liquid application) so they tended to be pushed further out in the planning horizon and were often the subject of pilot projects.

Task C: Determine the Scope of the EMS

Sub-Tasks	Salt Management Example
C.1 Identify the EMS Boundary	
Select the specific issues and opportunities. Then, identify the functional groups related to the selected issues and opportunities.	The general boundaries of the plan are specified in Environment Canada's Code of Practice and TAC's *Synthesis of Best Practices for Salt Management Plans (2003)*. When developing their Salt Management Plans road authorities were encouraged to look at their entire winter operations program. The focus was on salt management but it was recognized that a winter operations plan that addressed the salt management issues was more valuable to road authorities. Therefore the scope of salt management plans expanded. This was done through goal setting workshops with the key decision-makers in the organization, led by an experienced outside facilitator. In all cases, only those issues that could be controlled by the agency were included in the plans. The plans tended to be large, with upwards of 90 goals being identified for action. The functional groups involved in the plans varied depending upon the road authority's organizational structure. In all cases management and operations personnel were involved. The functional groups generally included those responsible for: the fleet; yards or buildings; purchasing and contracts; environmental stewardship; communications; operational decision-making; human resources including the union; training; and legal advice.
C.2 Determine the level of EMS implementation	
Three levels of EMS implementation exist for an agency: Registered, Full:, and Partial	Some road authorities used the salt management plan as the first element of their corporate EMS. In one municipality's case, the SMP was the only element to be completed although a corporate-wide EMS was planned. In the case of another municipality, the SMP was integrated with their ISO registered EMS.
C.3 Conduct a Gap Analysis	
Compare existing systems to a standard (generally ISO 14001) to provide a benchmark for identifying where you are and where you want to go.	The SMPs typically involved a Gap Analysis that involves a situational analysis and a comparison to best practices. The situational analysis looks at all aspects of the salt handling cycle including: • Level of service policies • Equipment • Material and snow storage • Application rates and policies • Personnel • Record keeping • Training • Salt Vulnerable Area Mapping The current practices were compared to best practices using resources published by the Transportation Association of Canada and the technical experience of the team preparing the plan. The gap between the current situation and best practices was the starting point for the SMPs. Management then identified how they would move from where they are to where they wanted to be.

Task D: Develop the EMS Business Case

Sub-Tasks	Salt Management Example
D.1 Environmental benefits	
List environmental benefits in the near-term and long-term that can be expected.	The environmental benefits are identified in Environment Canada and TAC publications. The primary environmental benefits are: • compliance with EC's requirements; • reduced liability from salt damage to groundwater, surface water; wildlife and vegetation; and • improved overall environmental stewardship.
D.2 Estimate resources	
Estimate the resources needed to develop and implement the EMS.	SMP preparation was usually the responsibility of the Operations Manager. The framework for the SMP had, for each goal, the following: • identify the position responsible for achieving the goal; • determine the timeframe for achieving the goal; and • identify performance measures. In some cases, a budget for implementing the plan was prepared to assist in obtaining corporate approval and funding. The planning model used in this example was facilitated by a consultant.
D.3 Identify business benefits	
Identify business benefits that can also be measured including: dollars saved; costs avoided; etc..	Although the driving force behind requiring salt management plans was environmental, the motivators that build buy-in within the organization were: • dollar savings through reduced salt use and reduced equipment / labour hours; • reduced liability due to accidents as a result of better winter maintenance practices; and • improved public image by improving levels of service by using best practices.
D.4 Estimate schedule	
	The schedule was set by Environment Canada. They set a date by which all subject road authorities were to have their SMPs in place. For the SMPs that were developed by consultants, the timeframes were specified in the contract. The EMS implementation timeframe was developed through goal setting workshops and set out in the plan based on priorities and resource availability. The goals were set by those responsible for their implementation thus ensuring the greatest chance of success.
D.5 Conduct management review	
	Road Authorities varied in their amount and frequency of feed back to Senior Management and / or Council.
D.6 Complete business case template / follow process	
	Since the SMP is usually top-down driven, business cases are not usually prepared to develop the SMP. However, business cases were usually required to obtain funding to implement the elements of the plan. These were presented in the form required by the road authority. In the case of municipalities, a summary of the plan was presented to Council along with the annual budget in year one. In subsequent years the budget request can refer to the SMP.

Task E: Obtain Senior Management Commitment

Sub-Tasks	Salt Management Example
E.1 Solicit Senior Management feedback	
	Since the salt management plan preparation process was top-down driven, there was an initial degree of commitment from senior management. However this did not mean that top management was onboard. Usually, top management or Council (in municipalities) approval was still needed. In cases where the preparation of the plan was facilitated by a consultant, the consultant selection process usually had senior management support. The goal setting workshops usually involved the senior manager responsible for the winter operations program. This was the individual ultimately responsible for presenting the program to top management for approval.
E.2 Obtain Senior Management commitment	
	In all cases the plan preparation was lead by a senior management representative. The SMP also frequently contained a signature page where the key senior personnel signed a commitment to the policy and guiding principles in the plan and the implementation of the plan. The degree of commitment to the plan varied. Some senior managers were passionate advocates of the plan and strongly committed to the objectives of salt management. In other cases the senior manager was merely a custodian of the process only wanting to be able to say to Environment Canada that a plan had been prepared. Successful road authorities tend to be led by a strong senior level champion who is committed to change. We have also seen road authorities lose their leadership position when that champion changed jobs or moved on.

5.2.2 Building Your EMS (Task 1 to 13)

Task 1 – Set EMS Responsibilities and Functional Structure

Sub-Tasks	Salt Management Example
1.A Determine Senior Management coordination structure	
SComm: Represents Senior Management and ensures that resources are available when needed; functional units coordinate with and support the EMS effort; and employees throughout the agency recognize the commitment of Senior Management.	In most cases the SMP was lead by the head of operations. This person was usually senior enough to make the necessary decisions on what would go into the plan. In some cases the SMP was championed by one individual and lost momentum when that individual left and was no longer responsible for the plan. In a few cases the new individual was less committed to salt management and the implementation of the plan languished. Environment Canada's expectation was that a plan be prepared. Once prepared there was little pressure to ensure that the plan was fully and properly implemented. A strong internal "champion" helped ensure implementation of the plan.
1.B Establish EMS Coordinator Position	
The EMS Coordinator (EMC) is the project leader for the EMS.	The responsible senior manager was the in-house coordinator. In the cases used in this example, the in-house coordinator was supported by an experienced consultant team the guided the process. The coordinator worked with his counterparts in other departments to facilitate implementation. This was made easier by ensuring that these counterparts were involved during the plan preparation stage and actually signed off on the plan.
1.C Set EMS Core Team	
The Core Team plays an important leadership role in planning the EMS project, delegating the tasks, establishing deadlines, collecting and evaluating work, and providing training, guidance and assistance as needed.	The Core Team typically involved the middle managers, supervisors and lead hands. Since these people were involved in developing the plan they have some ownership of the plan. They are also the ones identified in the plan as responsible for implementing key elements of the plan. The Core Team was involved in the Goal Setting Workshop that formed the heart of the plan. They determined the goals, identified who would be responsible for implementing each goal and set the target date. In many cases they signed a commitment page in the plan. Therefore, they agreed (albeit sometimes reluctantly) to implementing the plan. This core team was made up of the key representatives from departments that would be responsible for implementing the plan, such as fleet, accommodations, parks and recreation, etc. Frontline operators were also usually included to get input and insight into some of the implementation challenges.

Task 2 – Set Environmental Policy

Sub-Tasks	Salt Management Example
2.A Develop Environmental Policy	
The Environmental Policy provides the foundation and direction for the rest of the EMS.	In some cases the organization had an environmental policy. Sometimes this was merely a general environmental commitment statement on their corporate website. In other cases it was a formal environmental policy statement. Most often one was prepared as part of the process and approved along with the plan. The following was one such environmental policy statement. *Our Environmental mandate is to manage, enhance and protect our natural and environmental resources - fish, wildlife, lands, forests, parks and protected areas, air, water and soil - for conservation, recreation, social, and economic purposes and to ensure they are sustained for future generations.*
2.B Check Environmental Policy against ISO 14001 standard	
Reviewing your agency's Environmental Policy against the ISO standard is recommended or required.	The environmental policies were typically not compared to the ISO standard.
2.C Set internal communication program for Environmental Policy	
Publicize management's commitment to EMS to all employees.	In many cases the commitment to salt management is published on the corporations' website.
2.D Setting a public Environmental Policy	
A full EMS requires that agencies make their Environmental Policy "available to the public".	Where there was a corporate environmental policy, it was usually posted on the corporate website. This policy was used in the SMP. Where there was no environmental policy, one was composed as part of the SMP. However, it is unlikely that this became the corporate environmental policy.

Task 3 – Steering Committee (SComm) Feedback

Sub-Tasks	Salt Management Example
It is beneficial to have SComm input at various planning steps.	The steering committee was usually involved both with developing and implementing the plan thus ensuring smooth transition

Task 4 – Approval of Environmental Policy

The new or revised Environmental Policy was approved by the Road Authority.

Task 5 – Focus and Prioritize

Sub-Tasks	Salt Management Example
5.A Identify the activities to be included in your EMS	
Develop a list of the operations and the associated activities related to the issues and opportunities identified.	A generic list of operations was identified in EC and TAC publications. It essentially focuses on all aspects of winter maintenance involving salt. The plans tended to be large, with upwards of 90 goals being identified for action. The goals were broken down into manageable actions that could be implemented on a priority basis.
5.B Determine the causes / effects of these activities	
For your activities, create a list, matrix, etc. of environmental effects and their causes (cause / effects).	Since a specific guide had been prepared for salt management plans the cause / effect analysis had been done. The specifics do not change from one jurisdiction to another. One area that changes to some extent is with respect to salt vulnerable areas (SVAs). The priority SVAs may change from one locale to another. For example in the Niagara area, tender fruit impacts were a priority whereas in the Region of Waterloo, groundwater impacts were of paramount concern.
5.C Undertake a regulatory review	
A Regulatory Review is the process to identify the regulatory and policy requirements of each identified cause / effect.	A detailed location-specific regulatory review was not generally carried out during the preparation of the SMP. The primary motivation of the plan was to reduce the amount of salt entering the environment. This was driven by Environment Canada's Code of Practice and not by any specific environmental regulation. However the goals would likely support local water quality protection objectives. During the implementation phase certain regulatory requirements would need to be considered. For example: it would be necessary to consider local containment regulations prior to building brine storage facilities.
5.D Prioritize the causes / effects	
Develop a "ranking system" for prioritizing causes / effects. This process should be clear and repeatable.	A ranking system was inherent in the guidelines prepared by TAC and Environment Canada. This ranking was further prioritized by each road authority when setting and budgeting for the implementation phase.
5.E Set objectives for action	
For your significant causes / effects, identify an objective to provide a focus for action.	Objectives were set for each cause / effect area, although they were not called cause / effects. For example we know that poor calibration of spreaders leads to high salt use. This is a cause / effect. Goals related to improved calibration were set.

Task 6 – Set Work Plans

Sub-Tasks	Salt Management Example
6.A Setting targets and milestones	
The target (results) you are trying to achieve should be realistic and measureable.	The cornerstone to preparing the SMP was the goal setting workshop. During this workshop, managers were challenged to improve their operations to the greatest extent possible. This required them to rationalize their selected end targets. In all cases, the targets were tested to ensure achievability. For each goal, a performance measure was established so people knew when it was achieved. Examples of targets and milestones are: • 100% of spreaders will have pre-wetting capabilities by 2009 • 100% of spreaders will be calibrated by October 15th of each year. • 100% of salt will be stored undercover on impermeable pads by 2008.
6.B Determine procedures, processes, tools, etc. to achieve results	
1. Identify existing programs, procedures, processes, and tools relevant to the EMS. 2. Identify new initiatives that are needed.	The SMP framework follows a step-by-step process beginning with overarching policies (e.g. level of service) and ending with standard operating procedures and training. The action items are linked to timeframes that are near, medium and longer term. Many of the goals identified in the SMP were built on existing winter operation practices. For example: • New equipment was purchased through the normal procurement process; • Existing training programs were supplemented with salt management training; • Current reporting forms were modified to capture new information. New processes and technologies were introduced gradually with pilot projects often used to work the bugs out and train staff. The SMP is written in terms that are understandable to the maintenance personnel and presented in simple table format so that it is easy to follow. The "easy successes" were done early in the program to gain confidence with the more difficult and costly elements spread out over a longer period. In one situation, an early training program yielded significant salt savings. The money that was saved was then channeled into new technologies that saved more salt and money. The SMP was developed with the help of the people that had to implement the plan. This ensured that it was practical and fit well with the culture and current processes of the organization.
Emergency Preparedness	The SMP includes a section on emergency response in the event of a spill.
6.C Determine roles and responsibilities	
Identify the position(s) that would be responsible for each of the initiatives and meeting the targets.	For every action item in the SMP a responsible person is identified. A responsibility table is presented in the front of the plan showing the responsibilities of key positions from senior management to the operators. Every position identified within the plan as having responsibility for implementing a goal is listed in the responsibility table. The table also identifies who is responsible for developing and overseeing the implementation of the SMP.
6.D Set measures of success	
Determine how success will be measured.	Every goal has a corresponding performance measure. There is an entire section in the SMP dedicated to monitoring progress.

Task 7 –Organize the System

Sub-Tasks	Salt Management Example
7.A EMS Manual	
An EMS manual is the collection of all of the policy, procedures, etc., of the EMS in one place.	The SMP includes: • An Environmental Statement (it is not always in the form of a policy); • For each component of the plan the following are identified: o Objective o Environmental consideration (e.g. cause / effect) o Current situation o Best practices (ultimate goal) o Action plan & target date o Implementation considerations o Responsibilities o Performance measure • Training goals • Emergency response goals • Communication goals • Documentation goals • Monitoring of both the plan and its implementation
7.B Internal communications procedures	
	Existing lines of internal communication are usually used. The SMP typically includes processes for keeping senior management or Council informed of salt management initiatives.
7.C External communications procedures	
Set procedures for receiving, documenting and responding to relevant communication.	The SMP has a specific section that deals with external communications. It usually includes informing the public through a website.
7.D Document control procedures	
Set for controlling documents.	The plan has “document control” footer on each page identifying the file number, Revision number, Last Revision Date and page number. The Monitoring section of the plan addresses Salt Management Plan Review and update and tracking of implementation of the plan’s elements.
7.E Record keeping procedures	
Records are the evidence of activities preformed and the results achieved.	The SMP includes sections dealing with: o Material usage record keeping o Storm response record keeping o Training record keeping o Annual tracking of implementation of the SMP
7.F Procedures for determining / reporting non-conformances, and for preventative and corrective actions	
Non-conformity is a non-fulfillment of a requirement.	A procedure for audit and non-conformance is not specifically set out in the SMP.
7.G Procedures for maintaining your EMS	
Regularly review and update your EMS planning.	Maintenance of the SMP is discussed in the Plan. Provisions are made for annual reviews and updates of the plan. Annual training is a goal identified in the plan.

Task 8 – Set Staff EMS Responsibilities

Sub-Tasks	Salt Management Example
8.A Assigning responsibility	
	Responsibility statements are contained within the plan.
8.B Communicate responsibilities	
	Communications is a section in the SMP with responsibilities assigned.

Task 9 – Develop and Implement the Enhanced and New Procedures, Processes and Tools

Examples of initiatives undertaken as part of the SMP include:

- New equipment purchases;
- Modification of current reporting forms to capture new information.

In many cases pilot projects were used to introduce new technologies and techniques. Special implementation teams would work out the bugs and become the trainers and advocates amongst their peers.

Task 10 – Conduct EMS–Related Training

Sub-Tasks	Salt Management Example
10.A Determine learning outcomes	
Learning Outcomes are statements of what a trainee can be expected to know, understand and / or do as a result of training.	Salt management Training is a key element of the plan. The learning goals are set out in the *Transportation Association of Canada's Syntheses of Best Practices Salt Management – Training.*
10.B Develop training programs	
Different types and content of training will be needed.	Training focuses on what the staff needs to do their job and implement the salt management goals. The plan usually specifies that training must be given annually in the fall to all operators, supervisors, contractors and managers.
10.C Identify existing training materials, schedules, and / or programs	
Identify any existing training materials, schedules, and / or programs that could be adapted.	Training programs use in-house trainers or a number of outsourced training packages. The SMP usually include a section on technology transfer whereby the organization commits to participating in outreach programs and conferences to learn about salt management practices and share their experiences with others.
10.D Develop the training materials	
	There are a number of existing training packages that can be used. Some road authorities use these packages along with outside trainers. Others have in-house trainers.
10.E Deliver the training	
Deliver the training to the intended recipients, in accordance with the established schedule.	Training is carried out each fall. Many have tailgate training where certain leaning goals need to be reinforced. Training records are usually maintained. Training is one of the elements that must be reported to Environment Canada each year.

Implement

Preparation of the plan was the easiest part of the process. Implementing the plan is much more difficult. Environment Canada's expectation was that a plan be prepared. Once prepared, there was little pressure to ensure that the plan was fully and properly implemented.

Task 11 – Review EMS

Sub-Tasks	Salt Management Example
11.A Review measures and determine success	
Analyze and review the measures of success set out in the Work Plan.	The SMP includes a monitoring section where performance measures are checked. The results of this review are used to take corrective action which may include amending the plan. Every goal has a corresponding performance measure and the plan had a requirement for an annual review to ensure that the plan is reviewed and updated as required. There is an entire section in the SMP dedicated to monitoring progress on implementation of the plan.
11.B Audit program	
	An audit program is not usually part of the plan.
11.C Review of Environmental Policy	
	The Environmental Policy is not normally reviewed as part of the SMP implementation process. If the corporate policy is revised, then this would be reflected in an updated SMP.
11.D Reporting	
	Progress on the SMP is expected to be reported to senior management annually. Annual reports are also to be submitted to Environment Canada.

Task 12 – Steering Committee (SComm) Review

Senior management or Council review is part of plan.

Task 13 – Staff Buy-in

Getting and Maintaining Staff Buy-in at Various Tasks
Obtaining and maintaining buy-in to the SMP is challenging. The greatest success comes through a strong champion at the top. This champion has to be committed to the principles of good salt management. Supervisors and operators (i.e. frontline staff) tend to be resistant to change and it takes a lot to convince them that "these new fangled practices" make sense. We have often seen a progressive organization falter when the champion moves on to a new position and his / her replacement is less committed to the principles of salt management.

5.3 PROJECT SPECIFIC EMS

This example is for the development of an Environmental Management System (EMS) for a large highway project being planned, designed, constructed and maintained through a Public-Private-Partnership (P3). The highway is new (i.e. greenflield), and the project's key features include:

- four lane divided controlled access;
- interchanges and overpasses;
- major river crossings with bridges and minor river crossings with culverts;
- crossing of special attention watercourses and wetlands;
- accommodation for deer crossings, recreational trails and access roads; and
- a completed Environmental Assessment for the project.

The private sector partner is a consortium of companies (referred to as the Consortium) that would develop and maintain the EMS over the life of the project. The Transportation Agency (the Agency) is responsible for the contracting and oversight of the Consortium.

The tasks for planning the EMS are undertaken by the Agency, while implementation tasks are done by the Consortium.

5.3.1 Planning Your EMS: Tasks A to E

The following tasks are undertaken by the agency.

Task A: Determine your Agency's General Readiness for an EMS

The following is the completed "Are You Ready for an EMS?" Checklist that reflects the thinking of the Agency prior to developing SMPs.

"Are You Ready for an EMS?" Checklist

	EMS Checklist	Yes	No	Unknow	Comment
1	*Have key internal / external stakeholders of your agency required or requested that you develop an EMS?*	X			Federal and Provincial Environmental Agencies have expressed concerns about the lack of environmental protection and honouring of the commitments made in the EA on P3 projects.
2	*Could your agency benefit from establishing a process to prioritize and incorporate stakeholder requirements into operations?*	X			Agreeing to have the Consortium have an EMS is anticipated to improve the ability to obtain environmental approvals, meet regulatory requirements and honour EA commitments.
3	*Do you see value in developing a system and procedures to identify and address environmental risks, liabilities and potential impacts?*	X			The EMS will help to reduce environmental risk, liabilities and impacts by ensuring that the P3 consortium systematically identifies and manages the environmental aspects of the project. The P3 consortium will have greater environmental responsibility and accountability. The owner does not control the day to day activities therefore environmental responsibility is appropriately placed with the consortium.
4	*Do you see value in developing a system and procedures to ensure regulatory compliance?*	X			There are extensive environmental commitments and obligations that need to be honoured by the owner. These commitments and obligations therefore need to be transferred to the Consortium with a level of confidence that they will be honoured.
5	*Could your agency benefit from establishing a procedure to monitor its operations, track its performance and evaluate compliance with environmental legislation?*	X			The owner will benefit from building environmental discipline into the P3 project. The Consortium can benefit because an EMS helps to ensure that it is meeting the environmental requirements imposed by the contract and thereby avoid costly delays, fines, cleanup costs and rework.
6	*Are other counterpart agencies pursuing an EMS?*	X			Project-specific EMSs have been successfully used on large P3 projects.
7	*Do you feel your agency has sufficient resources available, in terms of personnel and funds, to pursue an EMS?*	X			The costs of the EMS are built into the bid price by the Consortium. The Consortium has the ability to allocate the funds and personnel required.
8	*Is external perception of and acceptance by regulators, the public / community, local businesses, etc. of importance to your agency? In other words, would it be valuable for your agency to announce that you have an EMS?*	X			Having an EMS in place and effectively implemented helps to build positive relationships with regulatory agencies. This in turn can speed up regulatory approval and build good will for dealing with the inevitable unforeseen events that arise on projects. It also deflects some of the negativity away from the Agency and onto the Consortium.

Task B: Survey Management / Organization to Identify Environmental Issues and Opportunities

Sub-Tasks	New P3 Highway Example
B.1 Determine Issues	
Gather and prioritize environmental information: list problems, prior formal notifications and informal concerns from regulatory agencies, complaints from the public, associated environmental	• The owner assembled and documented the environmental obligations and commitments arising from regulatory requirements, their own environmental policies and the EA process in the RFP for the P3 project. Furthermore they required that bidders submit an EMS as part of their bid. The RFP required that the EMS be ISO 14001 compliant but not registered. It was important that the owner was thorough in identifying their requirements for the EMS process as well as the environmental protection requirements in the RFP. • The successful bidder demonstrated in the P3 proposal their EMS and how they would comply with the bid requirements.
B.2 Determine Opportunities	
List relevant environmental opportunities - consider: due diligence, cost savings, cost avoidance, increased productivity, enhanced environmental performance, public perception, etc..	• The EMS ensured that the project was in compliance with the Agency's environmental objectives. • There were programs implemented as part of the EMS to restore degraded natural areas and expand significant habitats. In one case a rare plant was propagated in a nursery and planted during the restoration phase. In another case a watercourse that had been degraded and channelized over many years was completely re-established into its original channel using the principles of natural channel design. • In most cases the EMS was focused on preventing environmental damage. This in itself saved time and money mostly through avoidance of delays, more rapid permitting, less conflict with regulatory agencies, less rework, and avoidance of environmental fines. These are elaborated on below. • The EMS helped to anticipate problems early on in the planning process and identify opportunities to avoid or mitigate environmental issues. The EMS facilitated adaption and rapid response to environmental issues as the design, construction and operation of the project proceeded. • Having the EMS improved trust and good will with regulatory agencies. The EMS established a mechanism to communicate effectively throughout the project with the regulatory agencies and to address issues in a timely fashion. This proved invaluable in avoiding delays, getting permits and addressing project issues. The EMS led to a more efficient process for issuing permits and approvals which decrease regulatory staff time required to do this. • The rigor built into the planning for environmental management saved money for the Consortium by minimizing re-work of environmental design, construction and operational components. One contractor actually admitted that it saved them money. • You don't get it perfect at the start. The EMS created a mechanism to revise, refine and update environmental requirements, and to meet overall project requirements, throughout the project lifecycle. This continual improvement helped to make the EMS more practical as time went on – thus helping to gain contractor acceptance. • The EMS provided clear direction to the Consortium on the implementation requirements for the environmental components. It also put in place contingency plans that ensured that they respond quickly to unplanned events such as spills, wildlife rescues and archaeological

Sub-Tasks	New P3 Highway Example
	finds. • All project personnel were trained in the EMS and their associated responsibilities. This education / awareness program was essential to the success of the EMS. Everyone was an ex-officio member of the Environmental Team.
B.3 Prioritize	
Determine which issues and opportunities are the most important to your agency. Also identify issues or opportunities that can be quickly realized.	• Since the EMS was expected to be ISO 14001 compliant, it was necessary to include all elements of the standard. It was not possible to leave certain elements out. • The critical environmental issues were defined by the owner through years of experience with the numerous potential environmental effects associated with large highway projects. The issues were also defined and focused through the EA process. These were ultimately specified in the RFP. • In one case the regulatory agencies were closely involved in defining the issues to be included in the RFP and in evaluating the bids. • In the case of a P3 project all key issues need to be addressed in the RFP. It is not possible to phase in issues except to the extent that some project phases (e.g. maintenance) come later in the project life-cycle.

Task C: Determine the Scope of the EMS

Sub-Tasks	New P3 Highway Example
C.1 Identify the EMS Boundary	
Select the specific issues and opportunities. Then, identify the functional groups related to the selected issues and opportunities.	The scope of the EMS was the design, construction, operation and maintenance phases of the entire project. The environmental scope covered all natural and socio-economic environmental issues.
C.2 Determine the level of EMS implementation	
Three levels of EMS implementation exist for an agency: Registered, Full, and Partial	In the two cases being used for this case study the EMS was Full. The intent was to be ISO compliant but not registered.
C.3 Conduct a Gap Analysis	
Compare existing systems to a standard (generally ISO 14001) to provide a benchmark for identifying where you are and where you want to go.	The ISO standard was used for defining the scope of the EMS and was stipulated in the RFP. Each bidding Consortium was required to model their EMS after the ISO standard.

Task D: Develop the EMS Business Case

Sub-Tasks	New P3 Highway Example
D.1 Environmental benefits	
List environmental benefits in the near-term and long-term that can be expected.	• The environmental requirements were incorporated early in the planning, design and construction phases of the project. The EMS team learned and improved on implementation and mitigation measures throughout the project. As the project became more complicated, the project benefitted from the lessons learned early on. Continuous improvement was a valuable part of the process. • All those involved in the project had a clear understanding of their environmental roles and responsibilities. This created many environmental eyes in the field and helped in identifying and rapidly addressing potential problems. Specific examples included: spills (we eventually were given relief from reporting requirements because they knew we were handling them), archaeological finds (we were congratulated by the local First Nation on how we responded to a discovery), and suspended solids in watercourses (we had ongoing monitoring and response procedures in place). • With a comprehensive EMS in place there were opportunities to issue blanket approvals within the project limits for items such as non-fish and fish watercourse crossings. This meant fewer approvals to monitor and reduced staff time when amendments to approvals were required. • With the EMS there were fewer environmental violations due to education of all parties involved and constant monitoring and reporting. The rapid response shortened duration and decreased impact of any environmental violation. • The clear and ongoing communication and consultation with regulatory agencies and the public to address concerns early enhanced relationships and project image.
D.2 Estimate resources	
Estimate the resources needed to develop and implement the EMS.	The cost to develop the framework in the first instance was fairly high due to a lack of example. The second instance was less costly because it was modeled on the first. Implementation cost by the Consortium is high because of the number of staff on the environmental team. However the cost savings can be significant. These costs were not tracked or quantified.
D.3 Identify business benefits	
Identify business benefits that can also be measured including: dollars saved; costs avoided; etc..	It is not clear that a business case was prepared in the P3 example since the regulatory agencies expected that the project would have an EMS and this commitment was important to being able to obtain the necessary regulatory approvals. The business benefits are widespread and have been discussed previously. In summary they include: • Reduced environmental liability and costs; • Less project delays and associated costs from regulatory conflict, rework, environmental repair, work stoppage, permitting, etc.; • Less time taken to respond to issues thus saving money and time; and • Better project image with regulators and the public.

Sub-Tasks	New P3 Highway Example
D.4 Estimate schedule	
	The EMS requirements needed to be incorporated into the RFP when selecting a P3 Consortium. The Consortium then must design and define the EMS in their proposal. It is not sufficient to just commit to preparing the EMS as the elements must be reflected in the agreement between the owner and the Consortium. The EMS needs to be implemented at the start of the project with some latitude in phasing in elements that apply at later stages.
D.5 Conduct management review	
	The owner's Senior Management committed to requiring the EMS as part of the RFP and the Agreement with the Consortium. The Consortium should have management review of the elements of the EMS because it is important to the success and cost of the project. In one case there was not enough senior management support which led to challenges implementing the EMS.
D.6 Complete business case template / follow process	
	Not Applicable.

Task E: Obtain Senior Management Commitment

Sub-Tasks	New P3 Highway Example
E.1 Solicit Senior Management feedback	
	Senior management involvement at both the owner and Consortium is important.
E.2 Obtain Senior Management commitment	
	The owner's Senior Management must commit to including an EMS requirement as part of the RFP and the agreement with the Consortium. They must also commit to enforcing the EMS provisions of the contract. This is the only way that the benefits will be realized. If they are not enforced by the owner, the Consortium may reduce the EMS implementation to save costs. They do not necessarily recognize that this actually increases their costs in the long-run.

5.3.2 Building Your EMS (Task 1 to 13)

The following tasks are undertaken by the Consortium.

Task 1 – Set EMS Responsibilities and Functional Structure

Sub-Tasks	New P3 Highway Example
1.A Determine Senior Management coordination structure	
SComm: Represents Senior Management and ensures that resources are available when needed; functional units coordinate with and support the EMS effort; and employees throughout the agency recognize the commitment of Senior Management.	The EMS framework was developed by a team composed of key regulatory agencies and the owner. The owner had a project management team that included senior staff that was committed to the EMS. There was also a Regulatory Liaison Committee with representatives from the Owner, the Regulators and the Consortium. This Committee was invaluable in achieving the benefits of the EMS and ensuring accountability. The EMS Coordinator at the Consortium was on the Consortium's Senior Management Team (SComm).
1.B Establish EMS Coordinator position	
The EMS Coordinator is the project leader for the EMS.	The Consortium had a dedicated EMS Manager who was responsible for implementing the EMS. He was involved in designing the EMS and therefore was committed to its implementation.
1.C Set EMS Core Team	
The Core Team plays an important leadership role in planning the EMS project, delegating the tasks, establishing deadlines, collecting and evaluating work, and providing training, guidance and assistance as needed.	The EMS Management Team at the Consortium was made up of the Environmental Manager (aka Coordinator) and 4 coordinators as described in the EMS Functional Group Table below. The Core team expanded as the project expanded and then was reduced as the project wound down. Some of the Coordinator positions were able to be combined as the project progressed towards completion.

EMS Functional Group Responsibility Table

Group Member	Role and Responsibilities
Environmental Manager (project manager of the EMS project)	The Environmental Manager was responsible for the implementation of the EMS. The Environmental Manager was also co-chair of the Regulatory Liaison Committee and reported to the overall project manager.
Environmental Protection Planning and Design Coordinator	This coordinator was responsible for developing and implementing site-specific environmental protection plans.
Environmental Inspection and Monitoring Coordinator	This coordinator managed the field inspection and monitoring work. The Team included environmental inspectors and technologists. The number increased and decreased with the amount of project work that was ongoing during the life of the project as well as seasonally.
Environmental Emergency Response Coordinator	When the project was in full swing it had a full time Emergency Response Coordinator to deal with unexpected events – mostly spills from blown hydraulic hoses.
Environmental Permitting and Approvals Coordinator	The project had a large number of ongoing approvals that were required. A well recognized and respected individual was appointed to this position at the outset. The project had very few permitting issues , due to his relationships with the regulatory agencies, his thoroughness and his attention to detail (records management) along with the EMS.

Task 2 – Set Environmental Policy

Sub-Tasks	New P3 Highway Example
2.A Develop Environmental Policy	
The Environmental Policy provides the foundation and direction for the rest of the EMS.	The Consortium developed an Environmental Policy as part of its EMS. The policy was consistent with the ISO 14001 standard.
2.B Check Environmental Policy against ISO 14001 standard	
Reviewing your agency's Environmental Policy against the ISO standard is recommended or required.	See above.
2.C Set internal communication program for Environmental Policy	
Publicize management's commitment to EMS to all employees.	The Consortium's Environmental Policy was documented in the EMS and was communicated to all staff as part of the mandatory training program. It was also published on the project website.
2.D Setting a public Environmental Policy	
A full EMS requires that agencies make their Environmental Policy "available to the public".	The Consortium's Environmental Policy was provided to regulatory agencies and the public.

Task 3 – Steering Committee (SComm) Feedback

Sub-Tasks	New P3 Highway Example
It is beneficial to have SComm input at various planning steps.	The nature of the project changed over time. The EMS was updated as required. In some cases the changes required approval by the owner and therefore needed to go through the formal amendment process. SComm was involved wherever significant changes were made. The SComm was also updated at its weekly meeting on any EMS related issues. The Environmental Manager was a member of the SComm.

Task 5 – Focus and Prioritize

Sub-Tasks	New P3 Highway Example
5.A Identify the activities to be included in your EMS	
Develop a list of the operations and the associated activities related to the issues and opportunities identified.	The initial list was indentified by the Owner and included in the RFP. There were a number of catch-all phrases such as "The Consortium must comply with all applicable legislation". Therefore the Core Team designing the EMS for the Consortium needed to educate themselves on all requirements. The EMS had to deal with design, construction, operation and maintenance and the various activities associated with each phase.
5.B Determine the causes / effects of these activities	
For your activities, create a list, matrix, etc. of environmental effects and their causes (cause / effects).	It was necessary to identify the causes / effects which were specific to the environmental features within the planning corridor. The causes / effects include encroachment (loss) of wetlands and fish habitat, interference impacts to groundwater, air quality impacts, archaeology and disruption of wildlife movement among others. The program even had to deal with unexploded ordinances.
5.C Undertake a regulatory review	
A Regulatory Review is the process to identify the regulatory and policy requirements of each identified cause / effect.	The initial regulatory review was carried out by the owner and included in the RFP. The Consortium further confirmed the regulatory list in the RFP as well as identified any other legislation associated with each of the above causes and effects. Having access to the Regulatory Liaison Committee helped in this regard. In total, it was necessary to deal with Environmental Assessment commitments and Conditions of Approval, municipal, provincial and federal environmental legislation (e.g. municipal zoning and by-laws, provincial and federal transportation, culture, natural resources, planning, environment and protection legislation, and Agency policies).
5.D Prioritize the causes / effects	
Develop a "ranking system" for prioritizing causes / effects. This process should be clear and repeatable.	The ranking was essentially established by the owner and reflected in the RFP. The Consortium further ranked issues depending on the risks related to where construction was occurring, time of year and weather events.
5.E Set objectives for action	
For your significant causes / effects, identify an objective to provide a focus for action.	In most cases the objective was protection of the environment. In some cases (e.g. sediment loadings) levels were identified. Very few specific quantified objectives were identified. This did not seem to be a problem.

Task 6 – Set Work Plans

Sub-Tasks	New P3 Highway Example
6.A Setting targets and milestones	
The target (results) you are trying to achieve should be realistic and measureable.	In all cases, the targets were specified in the RFP and reflected in the EMS. As experience was gained and trust was built, modifications to some requirements were negotiated that made them more practical.
6.B Determine procedures, processes, tools, etc. to achieve results	
3. Identify existing programs, procedures, processes, and tools relevant to the EMS. 4. Identify new initiatives that are needed.	For the most part the procedures were relatively new as there was no clear template. However, the RFP had a lot of detail as to what was expected. The Consortium had to design the process. There were some examples around to draw upon. The processes included: • Preparing Design Guidelines for Environmental Requirements • Developing Environmental Protection Plans for high risk areas • Developing and implementing an Environmental Effects Monitoring and Compliance Monitoring Program • Developing and implementing Contingency and Emergency Response Plan • Obtaining, maintaining and updating Regulatory Approval, Authorization and Permit Requirements • Implementing an Environmental Inspection and Reporting Program along with Environmental Reporting Forms detailing accountability and responsibilities All of these programs were described in the EMS and essentially formed the framework of the EMS system (see Task 7).
Emergency Preparedness	Emergency preparedness was very valuable and paid off. Contingency and emergency response plans were developed for key unexpected events along with responsible key personnel and 24 hour emergency phone numbers.
6.C Determine roles and responsibilities	
Identify the position(s) that would be responsible for each of the initiatives and meeting the targets.	The EMS specified roles and responsibilities. See Implementation Roles and Responsibilities Table below.
6.D Set measures of success	
Determine how success will be measured.	In most cases the measure of success was compliance with the commitments made in the contract and the EMS.

Implementation Roles and Responsibilities Table

EMS Component	Responsible Parties for Implementation
Design Guidelines for Environmental Requirements	• The design guidelines were developed by the designers and the environmental team. The designers were responsible for reflecting the principles of the guidelines on the design drawings and placing the environmental specifications into the contract. • The contractors were responsible for adhering to the contract specifications and the design drawings. • The quality assurance engineers were responsible for ensuring that the contract was adhered to. • The environmental inspectors were responsible for ensuring that the environmental protection objectives were being met. • All staff on the project was responsible for identifying and reporting potential environmental concerns to the environmental inspectors. • The Environmental Manager was responsible for ensuring that immediate corrective actions were taken on any known environmental problems. • An independent engineer was hired by the owner to audit the commitments in the contract, including the EMS.
Environmental Protection Plans	• All contractors, Consortium staff and highway maintenance staff were responsible for adhering to the environmental protection plans. • The field quality assurance engineers were responsible for ensuring that the plans were being implemented and maintained as per the specifications. • The environmental inspectors were responsible for ensuring the plans were being followed and taking corrective actions where necessary.
Environmental Effects Monitoring Program	• The environmental inspectors were responsible for undertaking the environmental effects monitoring, reporting immediately any problems to the Environmental manager and taking corrective actions where necessary. • The Environmental Manager and later the highway operator, were responsible for reporting the results of the monitoring program.
Compliance Monitoring Program	• The environmental inspectors were responsible for undertaking the environmental compliance monitoring, reporting immediately any problems to the Environmental Manager and taking corrective actions where necessary. • All project staff was responsible for identifying and reporting potential environmental concerns to the environmental inspector. • The Environmental Manager was responsible for ensuring that immediate corrective actions were taken on any known environmental problems.
Contingency and Emergency Response Plan	• All staff and contractors were responsible for activating the appropriate plans where required, e.g. if a spill occurs, it must be reported and cleaned up. • The environmental inspectors were responsible for ensuring that the plans were being followed and taking corrective actions where necessary. • The Environmental Manager was responsible for ensuring that immediate corrective actions were taken on any environmental emergencies.
Regulatory Approval, Authorization and Permit Requirements	• The Environmental Permitting and Approvals Coordinator was responsible for obtaining and maintaining all required approvals, authorizations and permits. • All contractors and highway operation staff were responsible for being familiar with and adhering to approvals, authorizations and permits. • The Quality Assurance Engineers and the environmental inspectors were responsible for ensuring that the approvals, authorizations and permits were being followed and taking corrective actions where necessary. • All staff on the highway project was responsible for complying with approvals, authorizations and permits, and reporting potential environmental concerns to the environmental inspector.

Task 7 –Organize the System

Sub-Tasks	New P3 Highway Example
7.A EMS Manual	
An EMS manual is the collection of all of the policy, procedures, etc., of the EMS in one place.	The documentation developed in Task 6 were aggregated together to form the framework of the EMS system.
7.B Internal communications procedures	
	Effective internal communications were critical to the EMS. All personnel on the project attended a training program on the project and no one could go on site unless they had taken the environmental, health and safety and quality control training. All field foremen and contractors were given a field binder with critical information about environmental protection measures as well as a wallet-sized card with 24 hour emergency contact phone numbers in the event of an issue. Every Monday morning, key staff got together to review the work plans for the week and the weather forecasts so that erosion & sediment control measures could be repaired in the event of pending rain.
7.C External communications procedures	
Set procedures for receiving, documenting and responding to relevant communication.	The Regulatory Liaison Committee was the most effective external communications mechanism. The relationships that were developed, helped to ensure that rapid permitting, emergency responses and issue resolution could be implemented.
7.D Document control procedures	
Set for controlling documents.	The EMS and all formal documents contained a "Document Control Footer" with document identifiers, dates, and date of last update so that people were sure they had the most up-to-date version. When a revision was made it was distributed to all personnel that had a controlled document along with an updated chronology sheet that went in the front of the binder. Fax-back confirmations that the documents had been updated and the old versions destroyed were required.
7.E Record keeping procedures	
Records are the evidence of activities performed and the results achieved.	Because of the independent audit program and the quality assurance program, records were carefully managed.
7.F Procedures for determining / reporting non-conformances, and for preventative and corrective actions	
Non-conformity is a non-fulfillment of a requirement.	Inspectors could issue infraction reports with copies going to the Environmental Manager, Construction Manager and Quality Manager. The independent auditor also issued non-conformance notices which needed to be carefully managed because of the associated financial penalties.
7.G. Procedures for maintaining your EMS	
Regularly review and update your EMS planning.	All documents could be updated when warranted. The process ensured that staff always had the current version of all key documents.

Task 8 – Set Staff EMS Responsibilities

Sub-Tasks	New P3 Highway Example
8.A Assigning responsibility	
	Responsibilities were clearly assigned through the organizational structure laid out in the EMS.
8.B Communicate responsibilities	
	The communications plan was set out in the EMS and reinforced through training particularly with respect to emergency response.

Task 9 – Develop and Implement the Enhanced and New Procedures, Processes and Tools

The basic framework of the EMS was stipulated in the RFP. During the bid process the Consortium designed the EMS including the staffing structure, communication structure, emergency preparedness documents, generic environmental protection plans and monitoring and reporting plans.

After award, these were refined as on the job experience was gained. The amending procedure was set out in the EMS and the contract with the owner.

The continuous improvement principle was followed. Impractical provisions were updated to ones more easily complied with by the contractors.

Task 10 – Conduct EMS–Related Training

Sub-Tasks	New P3 Highway Example
10.A Determine learning outcomes	
Learning Outcomes are statements of what a trainee can be expected to know, understand and / or do as a result of training.	Training and awareness was a major element in the success of the program. Everyone going onto the job site was trained in the Environmental Management System. The key learning outcomes were: • Why there was an EMS? • What were the expectations of everyone? • The Emergency Preparedness program and reporting requirements. • Who to report issues to. • Where to find answers. In addition, an environmental sensitivity training program was developed to make people aware of the environmental concerns and how their actions can adversely affect the environment. Specialized training was provided for staff and contractors when working in particularly sensitive areas (e.g. installation and maintenance of erosion and sediment control structures, and natural channel design). Training activities were more intensive at the beginning of the project and decreased as fewer new staff joined the project. On site refresher training was given when required. Training records were maintained for audit and quality assurance purposes.
10.B Develop training programs	
Different types and content of training will be needed.	As shown in 9.A there were a number of training programs offered. Some were hands on in the field but most were in the classroom.
10.C Identify existing training materials, schedules, and / or programs	
Identify any existing training materials, schedules, and / or programs that could be adapted.	There were no existing materials to use. All had to be created.
10.D Develop the training materials	
	The training materials were developed by the Environmental Manager with help from the Core Team.
10.E Deliver the training	
Deliver the training to the intended recipients, in accordance with the established schedule.	It was the policy of the project that no one could go onto the construction site without environmental, quality assurance and health & safety training. Therefore training had to be given as soon as project staff and contractors were hired. Weekly training was given in the early stages. As fewer new staff joined the team, the frequency of training was reduced.

Implement

The EMS was implemented over the 4 year life of the design and construction phases.

Task 11 – Review EMS

Sub-Tasks Description	New P3 Highway Example
11.A Review measures and determine success	
Analyze and review the measures of success set out in the Work Plan.	• Regular meetings were held to direct the implementation and evaluate the EMS. • The independent auditor was checking the project on an ongoing basis and bringing non-conformances to the Environmental Manager's attention. All such non-conformances were addressed on a priority basis. • The Environmental Manager attended the weekly SComm meeting. • There was a mechanism whereby anyone could provide recommendation for improvement to the EMS.
11.B Audit program	
	The environmental inspectors were checking for compliance as were the quality assurance team. The independent auditor was checking the project on behalf of the owner.
11.C Review of Environmental Policy	
	The Environmental Policy was not reviewed once it was approved.
11.D Reporting	
	See 11.A

Task 12 – Steering Committee (SComm) Review

The EMS was the subject of ongoing discussion because many of the contractors did not agree with it and did not want to comply with it. There were many on SComm that objected to the level of rigor required and the associated cost. The Environmental Team had strength in that the EMS was imposed through the project agreement.

Task 13 – Staff Buy-in

Getting and Maintaining Staff Buy-in at Various Tasks
The degree of buy-in varied depending on who we were dealing with. Some contractors fought the process whereas others embraced it. Some contractors bid their contracts assuming they would not have to comply and then had to live with the costs. It was difficult to maintain buy-in as the project progressed and money became tight. On another project the commitment was maintained because the project director and construction manager were both strongly committed to the EMS and would not let the contractors off the hook.

6.0 CASE STUDIES

6.1 INTRODUCTION

The following two case studies highlight some of the aspects of a provincial agency and a municipal agency EMSs. The case studies are drawn together from Canadian Transportation Agency's EMSs.

6.2 PROVINCIAL TRANSPORTATION AGENCY ("THE MINISTRY")

Scope of the EMS

The Ministry has a partial EMS that include many of the ISO 14001 (2000) elements and that includes Highway Infrastructure**:** The EMS is intended to manage the environmental impacts related to the Ministry's core activities related to the design, construction, operations, maintenance and decommissioning of the provincial highway network.

EMS Responsibilities and Functional Structure

Roles and responsibilities under the EMS are identified for all levels of personnel (Ministry employees and Service Providers).

- Minister
- Deputy Minister & Executive Committee
- Assistant Deputy Ministers & Divisional Executive
- Assistant Deputy Minister, Transportation Infrastructure Management
- Environmental Process Management Committee
- Environmental Management Services
- Regional Environmental Coordinators
- Ministry Employees
- Service Providers

Environmental Process Management Committee

The Environmental Process Management Committee (EPMC) provides support to Environmental Management Services by ensuring the implementation of the EMS effectively and consistently within the functional units within the Department. The members of the EPMC identify environmental issues within the functional units and provide advice and recommendations to upper management. EPMC members also review proposed changes to the EMS and identify the need for further improvements.

Objectives and Targets

The Ministry does not create EMS specific objectives and targets as per the ISO 14001 EMS standard. The objective of the EMS is conformance to Environmental Office's specifications and compliance to relevant regulation by department staff and consultations. Objectives and targets focused on improving the Ministry's conformance with regulatory requirements (e.g. reducing the number of formal and informal complaints from regulatory agencies).

Procedures and Tools

To improve the Ministry's conformance with regulatory requirements, the ministry has developed several procedures and tools. Two key ones are:

1. Environmental Approval Framework; and
2. Construction Environmental Management Plans (CEM Plans) framework.

Environmental Approval Framework

The environmental approvals (generally including Approvals, Authorizations, Licenses, Permits, Clearance, etc.) processes are often complex and confusing. Non-compliance could result in environmental damage and enforcement action from regulators. Also, projects can experience scheduling delays if the necessary approvals have not been obtained from the regulatory agencies.

The purpose of the Environmental Approvals Framework is to:

- ensure that environmental legislation is considered where an approval may be necessary;
- provide a guide to the application processes of the various legislation;
- record the considerations and decisions related to environmental approvals;
- ensure the necessary approvals are in place before work is commenced; and
- provide generalized timelines for the process, so that project planning may be improved.

Various tables, diagrams and checklists form the basis of the framework. These checklists fall into three groups:

1. a checklist to consider which approvals will be necessary for the project to proceed (Checklist 1 in Appendix C);
2. an environmental reports and considerations checklist (Checklist 2 in Appendix C), listing a number of details to be examined at each project phase; and
3. a series of legislation-specific checklists and diagrams (example of checklist and diagram for the federal *Fisheries Act* is provided in Checklist 1 Appendix C), to determine which approvals are required and document the tasks completed and include.

The Project Administrator is responsible for verifying that:

- all required environmental approvals have been obtained prior to starting work;
- all necessary consultation with regulatory agencies has taken place; and
- the various checklists have been completed throughout each project phase.

At the beginning of each project, the framework is reviewed by the Project Administrator to determine which approvals may be necessary and ensure appropriate time constraints are included in the project schedule. Once the project is completed, the original signed project checklists are sent to the project file as a record of agency's actions.

CEM Plans framework

The goal of the CEM Plan is to prevent, or minimize, environmental impacts and to enhance the environmental values of the air, land and water affected by projects where possible. A CEM Plan is prepared by the Contractor and consists of written procedures and drawings that address the environmental protection issues relevant to the site specific activity being performed. A CEM Plan identifies:

- The environmental issues;
- Environmental protection and mitigation measures to be implemented;
- Who is responsible to address the environmental issues; and
- What standards are to be met and monitored.

The CEM Plan is reviewed by Design Consultants.

The CEM Plan is to be flexible and responsive to situations encountered as work proceeds. Within the framework, the Contractor will have the ability to adjust the CEM Plan based on site conditions. The reasons or circumstances necessitating changes made to the CEM Plan must be documented in writing and approved by the Consultant. It is critical that all parties are in agreement on the procedures, signing configurations and devices to be used for the protection of the environment prior to commencement of the work.

Details of the Construction Environmental Management Plan (CEM Plan) Framework are provided in Appendix C.

Organization of the EMS

Non-compliance and Corrective and Preventive Action

The Ministry has procedures for investigating and correcting non-conformances, and for preventing the re-occurrence of non-conformances. Non-conformances are activities and / or incidents that do not conform to identified requirements. Ministry has two classifications of non-conformances:

- Minor: isolated deficiency that has not led to an adverse environmental effect. Example: missing documentation from files, or improperly maintained erosion control devices that have not resulted in a sediment release.
- Major: serious deficiency that has led to a break down of the ‘system’ where adverse environmental impacts have occurred and / or where there has been a failure to conform to regulatory or Ministry requirements. Any administrative penalty, no matter how small, is regarded as a Major Non-conformance.

Non-compliance / non-conformance incidents are typically identified during audits, Ministry site inspections, or by regulators.

In identifying non-compliances / non-conformances, the Ministry ensures that appropriate steps for correcting the situation are implemented and that preventative measures to prevent similar occurrences are taken.

The ministry has written detailed procedures for handling environmental incidents that include reporting, investigation and corrective & preventive action

Inspection and Monitoring

The Ministry's process for inspection and monitoring of the key characteristics includes tracking of environmental liabilities (aggregate sources and contaminated property), regulatory monitoring, site inspections, and the monitoring of EMS objectives and targets. These activities allow the Department to establish its due diligence and evaluate its environmental performance on an annual basis.

Communication

The Ministry's EMS includes a system of communication that ensures:

- relevant employees within the organization are kept informed regarding the EMS and environmental issues associated with the organization's operations, and
- communication from interested external parties is received and handled according to established procedures

Audit Program

Audits are co-coordinated and scheduled by the Environmental Office. Auditing environmental performance has two goals:

1. to determine whether the appropriate procedures, processes and plans are in place to ensure good environmental stewardship.
2. to determine if these processes are being properly implemented.

The auditing program focuses on the CEM Plan. Certified third party auditors annually undertake the audit. The results of the audits are presented to management so that the environmental performance may be evaluated.

Management Review

The Management Review includes:

- an assessment of the continuing suitability, adequacy and effectiveness of the department's environmental specifications and guidelines; and
- an assessment of the department's environmental performance over the past year.

Appendix C contains an example of an Environmental Update presentation.

Staff Buy-in / Training

Environmental training includes:

- Using annual meetings, workshops / seminars, and at industry functions to reach the largest number of Ministry employees and Service Providers possible. Environmental awareness topics at these functions have included discussion introducing new departmental specifications, guidelines or Best management Practices, updates regarding functional groups environmental performance, and / or recent regulatory trends.
- Using external organizations and associations throughout the Province that provide skill-specific training courses, workshops, and seminars.

Each year the Ministry holds a "Spring Break-up" meeting between the Ministry, consultants and contractors. The Environmental Office presents the audit results and provides a picture of overall environmental performance of the previous year.

6.3 MUNICIPAL TRANSPORTATION AGENCY

Scope of the EMS

The Municipality has an ISO 14001 (2000) registered EMS that includes all operational and office activities associated with the following Business Units:

- Roads
- Fleet Services
- Fire Department
- Transit
- Parks
- Corporate Properties & Buildings
- Recreation
- Waste & Recycling Services
- Wastewater
- Water Services

EMS Responsibilities and Functional Structure

Environmental Management is a business unit within the Municipality with the mandate of managing the municipality's impact on the environment and creating leadership in developing an environmentally sustainable municipality. Environmental Assurance & Sustainability is one of three divisions within the business unit. It directs the continual improvement of the Corporate EMS and ISO 14001 registration, identifies community sustainability indicators, performance measures and reporting standards, and aligns the environmental policy with other policies.

Senior management is represented by the Administrative Leadership Team and Council through the Standing Policy Committee on Utilities and Environment.

Objectives and Targets

Climate Change Action Plan

Reduce corporate greenhouse gas (GHG) emissions by 50 per cent from 1990 levels by 2012. This initiative is realized through an agreement with Energy Corporation to increase green electricity to 75 per cent of Municipalities' total use as of January 1, 2007. Other key areas that will facilitate achieving the reduction include greening of the vehicle fleet, and conserving water and energy in Municipal facilities.

Environmental Construction

In 2007, Supply Management updated the existing Contractor Prequalification process with environmental information to ensure contractors have a system in place to protect the environment when performing work on behalf of the municipality. This process applies to construction projects greater than $50,000. Contractors were requested to provide their Environmental Policy and documentation on their environmental procedures for fuel handling and storage, vehicle and equipment maintenance, material and equipment storage, waste management, erosion and sediment control, spill response and reporting and environmental training. Appendix C includes the Contractor Environmental Acknowledgement Form that is used by the contractor to acknowledgement what document is necessary prior to beginning work. The City makes it clear that it is possible that during the course of the contract work, the municipality may review the information in this document with the contractor and their personnel.

Approximately 150 construction contractors (50 per cent) have submitted this information for evaluation by Supply Management and Environmental Specialists from several business units. Supply Management with support from Environmental & Safety Management created a database to track the ongoing status of submissions.

Construction and Demolition Waste

The municipality is working with local stakeholders to develop recommendations for a Construction, Renovation and Demolition Waste Strategy for Calgary. Waste & Recycling Services has engaged a consulting team to assist with the consultations and design a pilot project.

Sustainable Environmental and Ethical Procurement Policy

The Municipality's Environmental and Ethical Procurement Policy (EEPP) was developed over a period of two years, with the goal of taking social, economic, and environmental considerations into account for purchases. In 2007, the policy will be piloted on food, apparel, janitorial services and chemicals using a lifecycle analysis focused on the environmental and ethical implications.

Organization of the EMS

A cooperate database tool was developed from established data tracking systems for use for all Business Units to track environmental aspects, protocols, non-conformances, audit findings, corrective actions, record keeping, staff awareness and training

Audit Program

An internal audit program was undertaken to assess business unit conformance to the ISO 14001 standard and compliance with applicable regulatory and other legal requirements, municipal policies, industry standards and best practices. The internal EnvoRisk audit program is managed by Environmental & Safety Management and relies on support and collaborative input from all business units. The results of internal audits are reviewed by an external auditor (retained consultant) to demonstrate continued conformance to the standard and continual improvement in environmental performance in municipal operations. Results of the audits and corrective / preventive action plans are regularly reported to senior management (Administrative Leadership Team) and Council (through the Standing Policy Committee on Utilities and Environment).

Audit findings identify areas of concern where policies, procedures or regulations are not being followed and / or areas where improvement has been identified. The 2006 internal audit program was

designed to strategically focus on specific elements of the standard including areas of higher environmental risk and gap areas identified from previous audit findings. Some of the areas targeted for the 2006 EnvoRisk audit included:

- Competence, training and awareness. (Are staff and contractors properly trained and competent to ensure adequate environmental controls are implemented?)
- Resources, roles, responsibility and authority. (Are resources adequate, roles and responsibilities clearly defined and understood?)
- Nonconformity, corrective and preventive actions. (Are nonconformities properly identified and documented, and are the corrective / preventive actions effective at preventing recurrences?)
- Some additional operational and compliance areas targeted in the 2006 audits included:
- Fuel and hazardous materials management. (Are all compliance requirements being met and are controls adequate?)
- Facility inspection processes. (Are inspection processes consistently carried out, documented, and action items implemented?)

The 2006 audit results show that the majority of findings were in the following areas:

- Control of documents.
- Operational control
- Competence, training and awareness.
- Nonconformity, corrective action and preventive action.

Reporting

An annual environmental report is produced and released to the public.

Staff Buy-in

Some of the techniques to improve staff buy-in include:

- Establishment of a internal environmental network to share best practices across Business Units
- Cross Business Units internal audit teams / cross-functional implementation teams
- Customize awareness / training to each Business Unit's particular culture
- Use lots of various communications tools: internet site, posters, contests, e-learning, online video, etc.).

APPENDIX C

CASE STUDY SUPPORTING DOCUMENTS

PART II – EXAMPLES AND CASE STUDIES

TABLE OF CONTENTS

APPENDIX C.1
ENVIRONMENTAL APPROVALS FRAMEWORK CHECKLIST A: NECESSARY ENVIRONMENTAL APPROVALS

Environmental Approvals Framework
Checklist A: Necessary Environmental Approvals

PROJECT: _____ **CE:** _____

PROJECT SPONSOR: _____ **CONSULTANT:** _____

PROJECT DESCRIPTION (provide a brief description of the work and any special environmental conditions/concerns):

_____

_____

_____

_____

COMPLETE THE FOLLOWING TABLE: FOR EACH TYPE OF WORK PLANNED, CHECK THE COLUMNS WHERE AN ENVIRONMENTAL APPROVAL (AUTHORIZATION, APPROVAL, LICENCE, CLEARANCE, NOTIFICATION, ETC.) MAY BE REQUIRED OR WHERE CONSULTATION WITH A REGULATORY AGENCY IS NECESSARY.

	Federal Legislation							**Provincial Legislation**									**Municipal Legislation**
Administered by:	**Fisheries and Oceans Canada**	**Transport Canada**	**Canadian Environmental Assessment Agency**	**Environment Canada**	**Environment Canada/ Fisheries and Oceans Canada**	**Environment Canada/Health Canada**	**OTHER**	**Environment**			**Community Development**	**Sustainable Resource Development**		**Agriculture, Food and Rural Development**	**OTHER**	**OTHER**	**OTHER**
Activity	*Fisheries Act*	*Navigable Waters Protection Act (NWPA)*	*Canadian Environmental Assessment Act (CEAA)*	*Migratory Birds Convention Act (MBCA)*	*Species at Risk Act (SARA)*	*Canadian Environmental Protection Act (CEPA)*		*Water Act*	*Environmental Protection Act*	*Natural Resources Act*	*Historical Resources Act*	*Place to Live Act*	*Wildlife Act*	*Weed Act*			
Base/Paving/Overlay																	
Borrow																	
Bridge deck replacement																	
Bridge painting (including paint removal)																	
Bridge rehabilitation (structural enhancements, etc.)																	
Clearing																	
Dams																	
Dewatering																	
Drainage channel works																	
Excavation/Dredging																	

	Federal Legislation							Provincial Legislation									Municipal Legislation
Administered by:	**Fisheries and Oceans Canada**	**Transport Canada**	**Canadian Environmental Assessment Agency**	**Environment Canada**	**Environment Canada/ Fisheries and Oceans Canada**	**Environment Canada/Health Canada**	**OTHER**	**Environment**			**Community Development**	**Sustainable Resource Development**		**Agriculture, Food and Rural Development**	**OTHER**	**OTHER**	**OTHER**
Activity	*Fisheries Act*	*NWPA*	*CEAA*	*MBCA*	*SARA*	*CEPA*		*Water Act*	*EPEA*	*NRCBA*	*HRA*	*PLA*	*Wildlife Act*	*WCA*			
CONT'D FROM PAGE 1																	
Erosion control and bank protection																	
Functional Planning (Corridor Studies, Hwy Upgrading, Bridge Replacement, Freeway Mgmt, etc.)																	
Grading/Grade Widening																	
Maintenance - Bridge (washing, etc.)																	
Maintenance - Highway (crack sealing, plowing, salt storage, etc.)																	
Maintenance - Water Management Infrastructure (weed spraying, etc.)																	
Pits																	
Riparian Vegetation Management Activities																	
Water reservoirs																	
Watercourse Crossings (standard bridges, major bridges, bridge sized culverts, non-bridge sized culverts)																	
Watercourse diversion/canal																	
Watercourse realignment/training																	
Weirs																	
Wetlands																	
Other:																	
Other:																	
Other:																	
Other:																	

NOTES ON APPROVALS/CONSULTATION:

SIGNATURE: _____ **DATE:** _____

NAME: _____ **POSITION:** _____

ORIGINAL SIGNED COPY TO FILE: _____

APPENDIX C.2
ENVIRONMENTAL APPROVALS FRAMEWORK CHECKLIST B: ENVIRONMENTAL REPORTS AND CONSIDERATIONS

Environmental Approvals Framework
Checklist B: Environmental Reports and Considerations

Project: _____ CE: _____

Project Sponsor: _____ Consultant: _____

		REQUIRED		COMPLETED		NOTES
		YES	NO	YES	NO	
PLANNING	Intergovernmental / Interdepartmental Referrals (Provincial and Federal) at Project Initiation with Alternative Corridors with Preferred Alignment with Recommended Alignment					
	Environmental Evaluation					
	Fish & Fish Habitat Assessment					
	Historical Resources Overview					
	Sensitive Species Assessment					
	Provincial Wetland Policy addressed					
	Contaminated sites identified					
	Other:(air/noise/climatewildlife/etc.)					
DESIGN (preliminary design to tender)	Intergovernmental / Interdepartmental Referrals (Provincial and Federal) Regulatory agencies advised Final Design					
	Historical Resources Impact Assessment					
	Qualified Aquatic Environmental Specialist (QAES) assessment					
	Environmental Assessment (*Canadian Environmental Assessment Act*)					
	Environmental Impact Assessment (*Environmental Protection and Enhancement Act*)					
	Environmental Risk Assessment with design package					
	Migratory Birds Convention Act addressed					
	Vegetation Assessment includes rare plants includes weeds					
	Right-of-Way Topsoil Assessment prior to tender package review					
	Permanent Erosion and Sediment Control Plan prior to tender package review					
	Environmental Approvals Checklists completed					
	Environmental Approvals received all prior to tender					
	Other:					
CONSTRUCTION (post tender to construction completion)	Borrow Pre-disturbance Assessment within 1 month of undertaking assessment					
	Erosion Plan 10 days prior to pre-construction meeting					
	Environmental Management Plan					
	Borrow Post-disturbance Assessment with reclamation certificate					
	Reclamation Certificate with final details					
	Other:					
MAINTENANCE	Environmental Approvals Checklists completed					
	Environmental Approvals received prior to commencement					
M-NG	Environmental Approvals Checklists completed					

DECOMMISSIONING	Environmental Approvals received prior to commencement					
	Reclamation Certificate					

If a report has not been completed provide an explanation of why it was not completed, or when it is expected to be finalized. Also, this listing is not all encompassing. Depending on project specific circumstances, further study/assessment may be required.

Signature: _____ **Date:** _____

Name: _____ **Position:** _____

Signed original to project file: _____

APPENDIX C.3
CHECKLIST 1: FISHERIES ACT

Checklist 1: *Fisheries Act*

Project:
Watercourse:
CE:

Consultant:

Fisheries and Oceans Canada (DFO) administers the *Fisheries Act*. The Act can be viewed at: _____

	Task	Description			
INTERGOVERNMENTAL AND INTERDEPARTMENTAL REFERRALS					
1a	**Initial contact made with DFO**	It is beneficial to begin involving DFO early on in the project, however, this referral may not be required in all cases. The initial contact should include location, proposed work, construction schedule, suggested crossing structure, etc. Also, DFO can aid in the design process to alleviate any concerns, saving future project time and money.	Y	N	Date of referral:
1b	**Consultation with Sustainable Resource Development (SRD)**	Contact the Prov. Fisheries Biologist responsible for the project area as they may have fisheries concerns. They can help provide a guide for the design and Fisheries Act submission, alleviating concerns early on in the project.	Y	N	Date of contact:
1c	Operational statements applicability	Only for s.35(1) compliance, consult with the current DFO Operational Statements (OS) for Alberta to determine the applicability of OS to proposed work/project. Ensure OS applies to proposed activity. If cannot incorporate all OS measures and conditions into project/proposed activity, OS does not apply to project and must contact DFO for review (and follow rest of checklist). If OS applies, fill out DFO notification form and send to nearest DFO office. Notification form must be kept on-site during construction. If accident occurs that causes negative impacts to fish habitat, contact local DFO office as soon as possible. Tasks 6 & 7 of checklist still must be followed if OS applies, in addition to any other applicable checklist tasks.	Y	N	Date of contact:
ACT APPLICABILITY					
2a	**Is there sufficient information to determine if there are any impacts on fish or fish habitat?**	This would involve reviewing literature, contacting SRD for information, determining obstructions on watercourse, etc.	Y	N	
2b	**Fish and Fish Habitat Assessment completed**	Complete when sufficient information is not available to make a recommendation. This assessment is completed to determine whether fish or fish habitat will be impacted by the proposed work, including a field study to review which species are currently present, the available habitat in the area, etc. This report usually follows the Code of Practice requirements for Watercourse Crossings.	Y	N	Date completed:
2c	**Fisheries Report completed**	This report gives specific information on watershed characteristics, channel morphology, the fish community, physical habitat features and habitat use. It should also suggest possible impacts and mitigation, if required.	Y	N	Date completed:
2d	**Will the proposed activity likely affect fish or fish habitat by:**	Causing a Harmful Alteration, Disruption or Destruction (HADD) of fish habitat [Section 35(2)]?	Y	N	
		Destroying fish (including fish capture and release) (Section 32)?	Y	N	
		Affecting safe fish passage (Section 20)?	Y	N	
		Requiring fish screens (Section 30)?	Y	N	
		Using explosives in or near watercourse (Section 32)?	Y	N	
		Other ? _____	Y	N	
		If the activity will include any of the previous, an Authorization is required and all appropriate steps below need to be followed.			Date sent: _____

Checklist 1: *Fisheries Act*

	Task	Description			
APPLICATION PROCESS					
3a	**Drawings and plans prepared**	Drawings may be obtained from engineering reports and designs, however, the information required may vary depending on the project size and complexity.			Date completed:
		Drawings should include:			
		1. Maps - showing the location, name of water body, location of project (arrow drawn to the exact location) and approximate latitude and longitude.	Y	N	
		2. Plan views - showing any existing works on subject or adjacent properties, existing shorelines, dimensions of the project (from ordinary high water mark), average water depth around the project and the drawing scale. Use photographs when possible.	Y	N	
		3. Plan profiles - showing front/rear and side views, dimensions of the project, ordinary high water mark, high water mark, height above waterway bed, type of construction material to be used, north arrow and the drawing scale.	Y	N	
3b	***Fisheries Act* Application submitted**	Submit to the local DFO office.	Y	N	Date sent:
		Submission includes:			
		1. Letter of application with a description of the project, project milestone dates and description of how fish or fish habitat may be affected. There may be a number of sections to which the *Fisheries Act* applies. These are Sections 35, 32, 36, 20, 30, 22, among others.	Y	N	
		2. Completed "Application for Authorization for Works or Undertakings Affecting Fish Habitat" [Section 35(2)] form, available at: www.dfo-mpo.gc.ca/canwaters-eauxcan/water-eau/pdf/authorization_application_form.pdf	Y	N	
		3. Drawings and plans	Y	N	
		4. Available reports or report summaries.	Y	N	
		5. Any other concise information that may help DFO assess the application.	Y	N	
ENVIRONMENTAL ASSESSMENT					
4	**Complete screening process under the *Canadian Environmental Assessment Act (CEAA)***	The project must be screened to determine if an Environmental Assessment (EA) is required under *CEAA*. If *CEAA* does apply to the project, complete the appropriate EA. Also, see the Supplementary *CEAA* Screening Process Flow Chart. A Section 32 or 35(2) Authorization under the Fisheries Act would require an Environmental Assessment under *CEAA*.	Y	N	Date completed:
DFO AUTHORIZATION/LETTER OF ADVICE					
5a	**Discuss conditions of Authorization with DFO**	Conditions should be discussed with DFO before an Authorization is issued, to ensure that all requirements are reasonable. A "draft" copy of the Authorization can be requested.	Y	N	
5b	**Authorization or Letter of Advice received from DFO**	In the comments field, note all conditions and mitigation measures given in the Authorization or Letter of Advice. Review conditions with Service Providers.	Y	N	Date received:
5c	**Copy of *Fisheries Act* Authorization/Letter of Advice included in the tender document**	Include in the Plans Section	Y	N	
5d	***Fisheries Act* Authorization conditions or Letter of Advice mitigation measures included in SP's**	Special Provisions to describe: (1) the specialized work required to be performed by the contractor and the method of payment; and/or (2) excluded conditions of the Authorization/Letter of Advice, which are outside the scope of the contractor's work. Ensure the Authorization/Letter of Advice is onsite during construction. In the comments field, briefly describe the tender SP's and reasons any conditions were exempt from the contractor's work.	Y	N	

Alberta Infrastructure and Transportation Environmental Approvals Framework
Checklist 1: *Fisheries Act*

	Task	Description			
PROJECT MODIFICATIONS					
6	**Notify DFO of project modifications or construction scheduling changes**	DFO must be contacted if project changes occur, even if the Authorization or Letter of Advice has already been received. An amendment may be required depending on the nature of the modification. Note actions taken and complete further requirements.	Y	N	Date contacted:
FOLLOW-UP CONDITIONS					
7a	**Follow-up and monitoring conditions are assigned to appropriate personnel**	The Authorization may indicate that additional follow-up conditions or monitoring requirements must be completed. These duties must be assigned to the appropriate departmental personnel to complete.	Y	N	Date forwarded:
7b	**Follow-up and monitoring conditions completed**	The Project Administrator is responsible for ensuring these requirements are completed within the specified timelines.	Y	N	Date completed:

Signature: _____ **Date:** _____

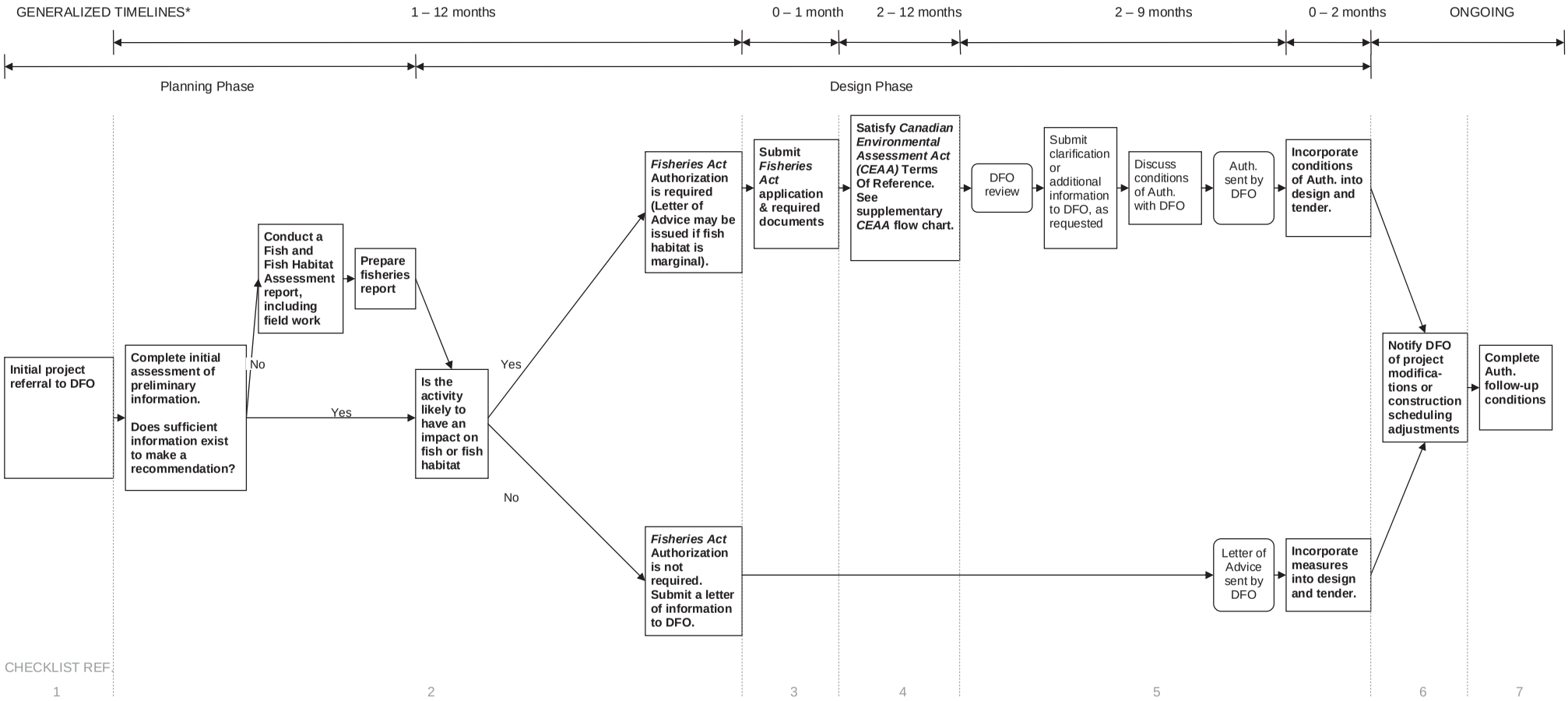
Name: _____ **Position:** _____

Signed original to project file: _____

APPENDIX C.4
DIAGRAM 1: FISHERIES ACT FLOW CHART

Diagram 1: *Fisheries Act* Flow Chart

Fisheries Act administered by Fisheries and Oceans Canada (DFO)



* Note: Operational Statement may apply to project. If Operational Statement applies, and if project can fully comply with operational statement, send notifications to local DFO office. - Operation Statements are only applicable in relation to section 35(1) compliance with *Fisheries Act*.

APPENDIX C.5

CONSTRUCTION ENVIRONMENTAL MANAGEMENT PLAN (CEM PLAN) FRAMEWORK

Construction Environmental Management Plan (CEM Plan) Framework

1 INTRODUCTION

A Construction Environmental Management Plan (CEM Plan) is prepared by the Contractor and consists of written procedures and drawings that address the environmental protection issues relevant to the site specific activity being performed.

An CEM Plan identifies:

- The environmental issues;
- Environmental protection and mitigation measures to be implemented;
- Who is responsible to address the environmental issues; and
- What standards are to be met and monitored.

The goal of the CEM Plan is to prevent, or minimize, environmental impacts and to enhance the environmental values of the air, land and water affected by projects where possible. The development and implementation of the CEM Plans will:

- Ensure environmental considerations are part of decision making processes;
- Ensure compliance with regulatory requirements governing our transportation and water infrastructure activities; and
- Demonstrate to the stakeholders and public that there is an environmental commitment by all parties involved, both in writing and in action.

On construction, maintenance and rehabilitation contracts, the Contractor must submit the CEM Plan to the Consultant prior to commencement of the work and in sufficient time to allow the Consultant to evaluate the suitability of the proposed strategy. The Consultant will then review the CEM Plan and address any concerns with the Contractor. The timelines for the submission and review of the CEM Plan are outlined in the Standard Specifications for Highway Construction.

The CEM Plan is to be flexible and responsive to situations encountered as work proceeds. Within the framework, the Contractor will have the ability to adjust the CEM Plan based on site conditions. The reasons or circumstances necessitating changes made to the CEM Plan must be documented in writing. It is critical that all parties are in agreement on the procedures, signing configurations and devices to be used for the protection of the environment prior to commencement of the work.

2 PRIMARY RESPONSIBILITIES

In order for the environment to be protected, it is critical that all parties to the Ministry's contracts, agreements, permits and authorizations, be aware of their respective responsibilities concerning environmental protection. This includes meeting compliance with regulations, department specifications and guidelines, and defined roles and responsibilities under the Environmental Management System (EMS).

A completed CEM Plan document contains site specific information that provides direction and guidance for environmental protection and is enforceable. Ministry requires both the Contractor's 'Principle-In-Charge' and work zone representative sign completed CEM Plans indicating that they acknowledge that the CEM Plan contains site specific detail regarding environmental protection and accept responsibility to ensure these procedures are implemented as stated.

The primary responsibilities of the Contractor, Consultant, and the Department for Environmental Construction Operations are as follows:

2.1 CONTRACTOR

The following are the primary responsibilities of the Contractor;

- Develop an CEM Plan, based on the Contractor's own site information and with reference to the Consultant's Environmental Risk Assessment.
- The relevant conditions contained within approvals/authorizations shall be specifically addressed within the CEM Plan.
- Submit the CEM Plan to the Consultant prior to the pre-construction meeting. In the absence of a Consultant, the Contractor will submit the CEM Plan

to the relevant Ministry manager for review.
- Finalized CEM Plans shall be signed by the Contractor's "Principle-In-
- Charge" as well as the Contractor's work site representative before the
- commencement of work.
- Identify an individual to be the Contractor's work site representative at the work zone to maintain the environmental protection devices and address any environmental protection issues that arise. The Contractor must identify this individual to the Consultant at the pre-construction meeting. CEM Plan Framework
- Ensure that staff and Subcontractors are trained and empowered to identify, address and report potential environmental problems.
- Implement environmental protection measures in accordance with the CEM Plan.
- Take appropriate and timely action to correct any deficiencies.
- Take action (i.e. shut down work) where it is recognized that an impact to the environmental may occur.
- Ensure that all Subcontractors comply with the CEM Plan.
- All requests for changes to authorizations and approvals in the Department's name shall be forwarded to the Consultant for submission to the appropriate agency.
- Attend any meetings initiated by the Consultant to address any concerns regarding the performance of the CEM Plan.
- Sufficiently monitor the work zone to ensure that the CEM Plan is effective for all conditions, including inclement weather conditions and during periods of construction and shut down. All monitoring efforts are to be documented and provided to the Consultant.
- The ECOPlan is an environmental protection plan. The Contractor shall ensure that no OH&S statements are included.
- Ensure that environmental incidents are reported as stated in Chapter 12: Spill Release Response Procedures of the EMS.

2.2 CONSULTANT

The following are the primary responsibilities of the Consultant.

- Identify in the special provisions of a contract, any anticipated unique situations that will require special environmental protection measures.
- Ensure the Contractor addresses these situations in the CEM Plan.
- As appropriate, identify bid items within the tender document.
- Review the Contractor's CEM Plan prior to commencement of the work to ensure completeness. Ensure that the Contractor addresses all environmental impacts identified in the Environmental Risk Assessment, approvals, and authorizations. A signed copy of this review is to be placed in the project file.
- Provide a copy of the Contractor's CEM Plan to the Project Sponsor.
- Liaise with the Contractor to address any concerns with the proposed CEM Plan.
- Provide a copy of the CEM Plan to the applicable regulatory authorities as required.
- Develop an adequate inspection/monitoring program, as appropriate to the activities being performed, to ensure the Contractor implements and maintains the CEM Plan. These efforts are to be documented and placed in the project file.
- Advise the Contractor of any deficiencies in the Contractor's environmental protection measures and ensure that the Contractor takes appropriate and timely corrective action. These actions are to be documented and placed in the project file.
- Order the Contractor to suspend work in cases of recognized noncompliance with the CEM Plan or where the Contractor fails to undertake appropriate and timely measures to protect the

environment or fails to correct recurring deficiencies. Immediately notify the Project Sponsor in cases where such orders are issued.
- Ensure that environmental incidents are reported as stated in Chapter 12: Spill Release Response Procedures of the EMS.
- Ensure the Contractor does not begin work if the CEM Plan is not signed, is incomplete, or has not been reviewed prior to the pre-construction meeting.

2.3 PROJECT SPONSOR

The Department Project Sponsor will perform the following functions:

- Provide comments to the Consultant concerning the Contractor's proposed CEM Plan.
- Periodically visit the work zone. During such visits, advise the Consultant of any deficiencies noted in the CEM Plan or its implementation and ensure that the Consultant takes appropriate and timely corrective action. These actions are to be documented and placed in the project file.
- Order the Contractor to suspend work in cases of recognized noncompliance with the CEM Plan or where the Contractor fails to take appropriate and timely measures to protect the environment. Typically, the Department would only take on this responsibility during a periodic visit where the Consultant cannot be contacted to issue the order to suspend work.
- Ensure that environmental protection is given a high priority on Department projects. Environmental protection must be encouraged on all job sites.
- Ensure that environmental incidents are reported as stated in Chapter 12: Spill Release Response Procedures of the EMS.
- Ensure all relevant documentation is maintained in the project file.

2.3.1 ENVIRONMENTAL Unit

The Department's Environmental Unit will perform the following functions:

- Ensure the CEM Plan framework allows for consistent application of environmental protection from project to project.
- Update the CEM Plan framework as required.
- Conduct periodic audits to ensure CEM Plans are properly developed and implemented.

2.4 CEM PLAN REVIEW PROCESS

2.4.1 General

CEM Plans are prepared by the Contractor and submitted to the Consultant prior to commencement of the work and in sufficient time to allow the Consultant to evaluate the completeness of the proposed plan. The Contractor should submit the CEM Plan as soon as possible but no later than the deadlines stated in the Department's specifications. The Consultant will then review the CEM Plan and address any concerns with the Contractor by the deadlines stated in the Department's specifications.

2.4.2 Process Review

a) Upon receipt of the CEM Plan from the Contractor, the Consultant will review it for completeness and:
   i. if accepted to the mutual satisfaction of the Contractor and the Consultant, the Consultant will advise the Contractor and send a copy to the Project Sponsor.
   ii. if the Department identifies any deficiencies or have any questions related to the CEM Plan, they will advise the consultant accordingly who in turn will follow-up with the Contractor.
   iii. if initial agreement cannot be reached, the Consultant will forward a copy of the CEM Plan, with the Consultant's comments, to the Project Sponsor. The Consultant will inform the Contractor that CEM Plan concerns have been forwarded to the Project Sponsor. The Project Sponsor will review the CEM Plan and advise the Consultant accordingly. The

Project Sponsor, in the course of the review, may request input from the Environmental Unit or other Department Staff.

b) If it is determined that the CEM Plan is not complete, it will be modified and completed to the mutual satisfaction of all parties. All changes to the CEM Plan must be documented and copies of the change to the CEM Plan forwarded to the Consultant, Project Sponsor and, if instructed, to the appropriate approval agencies. No work can begin until the CEM Plan has been agreed to by all parties.

2.5 CEM PLAN APPLICATION

The application of CEM Plans is at the discretion of the Department and is included within the contract documents. When a Consultant performs work that does not coincide with the Contractor's activities, the Consultant is responsible or the preparation of CEM Plans that cover the Consultant's activities. The responsibilities under section 2.1 of this framework will apply to the Consultant when preparing CEM Plans. CEM Plans are required for the following activities:

- Construction and demolition
- Rehabilitation and Maintenance
- Earthwork
- Surfacing

2.5.1 Planned Winter Shutdowns

In the case of a planned winter shutdown, the Contractor will address the environmental protection measures for the shutdown period in the CEM Plan. During the planned winter shutdown, the Contractor is responsible to provide all necessary and acceptable measures to protect the CEM Plan Framework environment and is responsible for the maintenance of the environmental
protection measures.

2.5.2 Unplanned Winter Shutdowns

In the case of unplanned winter shutdowns, The Contractor will revise the CEM Plan to include the environmental protection measures that will be required for the shutdown period. During the unplanned winter shutdown, the Contractor is responsible to provide all necessary and acceptable measures to protect the environment and is responsible for the maintenance of the environmental protection measures.

2.6 GRAVEL CRUSHING OPERATIONS

Gravel crushing operations are often the first activity to occur on a project. All gravel crushing operations must have an CEM Plan completed and reviewed prior to start up.

3 CEM PLAN FRAMEWORK

The purpose of the CEM Plan Framework is to provide assistance to Contractors in developing an acceptable CEM Plan for the duration of the project. It is the contractor's responsibility to prepare and determine the measures included in an CEM Plan. This document is to be used with the Contract Special Provisions and other guidelines that are available to assist the Contractor with specific environmental protection procedures and measures. The CEM Plan Framework describes the components and information that are included in an CEM Plan and the steps that a Contractor will typically follow to develop and implement an CEM Plan. An CEM Plan details the Contractor's plan for satisfying the environmental requirements specific to the project. The plan must:

- Identify and address the environmental requirements and potential impacts.
- Provide site specific drawings as they relate to the work being performed.
- Provide emergency response procedures to minimize potential impacts of emergency situations on the environment.
- Describe how monitoring and reporting will be conducted to satisfy contractual and regulatory requirements.
- Describe how the CEM Plan will be implemented by establishing a plan for training, communication, documentation, and CEM Plan adjustments.

The General Contractor is required to submit one CEM Plan for the project that includes Sub Contractor activities. The CEM Plan may be broken into phases corresponding to the Sub Contractor activities. CEM Plans

provided by Sub Contractors for their activities must be included in the project CEM Plan. The General Contractor is responsible for the coordination of CEM Plans with subsequent General Contractors.

3.1 PREPARING AN CEM PLAN

To prepare a CEM Plan, a Contractor would conduct the following steps:

1. Identify the environmental aspects and potential environmental impacts of the project. To identify environmental aspects and potential environmental impacts of the project, the Contractor would review:
    a. Environmental impacts of site activities (Sections 3.3 – 3.6).
    b. The Consultant's Environmental Risk Assessment;
    c. The Contract and Special Provisions;
    d. Regulatory permits, licenses and approvals (supplied by the Consultant); environmental legislation; and Department specifications and guidelines.
2. Describe procedures to address the environmental aspects and potential environmental impacts relating to:
    a. Site activities of specific project stages (Section 3.3)
    b. Construction site management (Section 3.4)
    c. Construction materials management (Section 3.5)
    d. Waste management (Section 3.6)
3. Describe emergency response procedures for all potential environmental site emergencies (Section 3.7).
4. Describe procedures for monitoring and reporting information to satisfy environmental legislation and contractual requirements (Section 3.8).
5. Describe how the CEM Plan will be implemented, reviewed and adjusted as appropriate (Section 3.9).
    a. Define roles and responsibilities.
    b. Provide a plan for staff training and communication of the CEM Plan.
    c. Indicate what documentation is to be kept.
    d. Provide audits to demonstrate implementation.
    e. Review CEM Plan performance regularly and after incidents.
    f. Adjust CEM Plan as appropriate for late issued environmental permits, environmental protection and continual improvement.
6. Coordinate, as appropriate, with the CEM Plans developed by other Contractors on the project.

3.2 SITE ACTIVITIES

A Contractor's CEM Plan must address the environmental aspects and impacts associated with each of the site activities that the Contractor is involved in. This information will then become the basis of the project-specific CEM Plan, and will determine the potential environmental impacts, monitoring requirements and emergency response plans that are relevant to the project. As appropriate, the Contractor shall coordinate the CEM Plan with other Contractors on the project.

3.2.2 Earthwork

Earthwork activities have an impact on the environment. The CEM Plan must contain a description and drawings detailing the measures that the Contractor will implement to mitigate the impacts of earthwork on the environment.

3.2.2.1 Surfacing / Aggregate Production

Surfacing and aggregate production activities may cause disturbances and releases that impact terrestrial and aquatic environments. The CEM Plan must describe procedures to mitigate any impacts of resurfacing or aggregate production on the environment.

3.3 CONSTRUCTION SITE MANAGEMENT

Many projects require the establishment of a construction site for project management, staging of staff and equipment, and materials storage and handling. The CEM Plan must identify the potential environmental impacts relating to the setup and management of the construction site and describe the measures that the Contractor will implement to mitigate the impacts. The Contractor, when locating a site, should choose the best location and prepare the site for its intended use.

3.4 MATERIALS MANAGEMENT

During the duration of a project, various materials are utilized for construction, rehabilitation and maintenance of equipment. The CEM Plan must identify those materials and their potential impacts. In order to meet contract requirements, WHMIS and Transportation and Dangerous Goods responsibilities, the CEM Plan must provide procedures to address the proper transportation, storage, containment and handling of materials. Materials may be construction materials used for resurfacing, preparation or other purposes or materials needed for the maintenance of equipment.

3.5 WASTE MANAGEMENT

During the duration of the project, various wastes may be generated on site that may have the potential to impact the environment. The CEM Plan must identify the waste materials generated and the potential impacts of the wastes on the environment. The CEM Plan must describe procedures for the proper handling, containment, storage, transportation, and disposal of waste materials. First, identify all waste materials that will be generated during the project and evaluate the potential impact of the waste materials on the environment. Then, identify in the CEM Plan and drawing how and where the waste materials will be CEM Plan Framework stored and transported. As appropriate to the waste generated, provide handling procedures (containment and transportation) and details on site preparation. Show on the CEM Plan drawings designated waste storage areas and measures taken to prepare the area (e.g. berms, liners, ponds, containers). When establishing handling and disposal procedures the Contractor must consider if the waste materials can be recycled and, if it is hazardous or nonhazardous waste. Where possible, the Contractor shall endeavor to recycle waste materials. As appropriate, procedures must comply with applicable regulatory handing, transportation and disposal requirements.

3.6 EMERGENCY RESPONSE PROCEDURES

The CEM Plan must identify potential incidents that, through natural causes, accidents, human error or improper work practices, impact the environment. The CEM Plan must describe the emergency procedures that will be implemented to address the potential incidents.

3.7 MONITORiNG AND REPORTING

The CEM Plan must describe the monitoring and reporting that is conducted though the duration of the project to satisfy contractual and regulatory CEM Plan Framework requirements. The Contractor will develop an appropriate monitoring program that is consistent with the contract terms and conditions, site characteristics, work activities and potential environmental risks associated with the work to be performed. It is the Contractor's responsibility to understand and comply with the reporting requirements. Monitoring and reporting requirements may include:

- Water flow, levels and velocity
- Water quality (turbidity and/or suspended solids)
- Channel erosion
- Fish passage
- Fish captured and released
- Soil erosion
- Effectiveness of sediment ponds and other structures
- Reclamation

Deficiencies identified during monitoring activities must be addressed immediately.

3.8 CEM PLAN IMPLEMENTATION

Implementation is critical to the success of the CEM Plan. It is important to have corporate support and for the staff to have ownership of the CEM Plan. The Contractor is responsible for implementation of the CEM Plan for the duration of the project. This section of the CEM Plan describes the Contractor's plan for the implementation of

the CEM Plan through the duration of the project.

3.8.1 Training and awareness

Describe procedures to ensure that managers, staff and subcontractors are aware of the CEM Plan and are trained, updated and responsible for the procedures contained in the CEM Plan and any changes to the CEM Plan. A training and awareness plan may include:

- Training and awareness sessions
- Tailgate meetings
- A description of meeting frequency
- A log of trained and updated staff
- A bulletin board and memorandum circulation
- Encourage employee to submit ideas and suggestions

Employees at all levels whose work may have an impact on the environment will be appropriately trained to perform their duties in an environmentally responsible manner. The Contractor is responsible for training its staff about environmental regulations and project specific requirements prior to beginning work.

3.8.2 Documentation

Describe the information that will be kept to document the significant events relating to the implementation and adjustment of the CEM Plan. A binder or file with all relevant information should be retained at the construction site. The following are some of the events that must be documented:

- Accidents, spills and releases and the procedures followed in those events
- Reviews, improvements and adjustments to the CEM Plan
- Training
- Materials inventory
- Waste Inventory
- Equipment inspections and maintenance
- Monitoring and maintenance of erosion and sediment controls

3.8.3 Communication

Describe the communication that will be conducted through the duration of the project relating to the CEM Plan. Although each project may differ, communication with managers, staff, other Contractors and Subcontractors, the Consultant, Ministry and regulatory agencies may include:

- Daily, weekly or monthly meetings.
- Daily, weekly or monthly reports.

3.8.4 CEM Plan Adjustments / Continual Improvement

The CEM Plan is a document that is designed to change based on site conditions. The goal is for continual improvement of the CEM Plan by adjusting the plan as experience is gained. Describe the procedures to CEM Plan framework ensure that the CEM Plan is reviewed and adjusted with a goal of continual improvement of the CEM Plan though the duration of the project.

APPENDIX C.6
PRESENTATION: ENVIRONMENTAL UPDATE

Provincial Case Study
ENVIRONMENTAL UPDATE

CEM Plan Audit 2006

The objective of the CEM Plan audits was to:

- determine if work site CEM Plans meet the requirements and are properly implemented and maintained;
- assess if the environmental requirements of the construction contract and the Consultant Service Agreement are adhered to;
- survey work site activities for compliance to environmental legislation; and
- assess if the requirements within relevant department specifications are being adhered to.

Scope of Audit

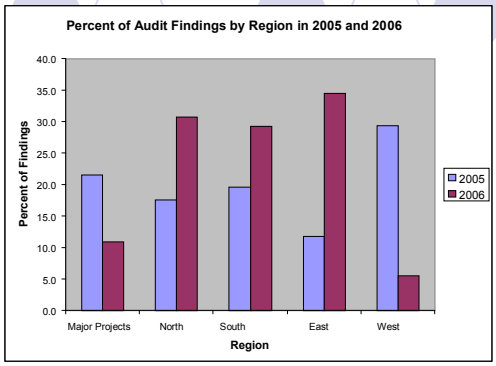
- **21 projects identified for audit**
- **14 actually audited**

Definitions

- Non-conformance**: An item that does not conform to the audit criteria.**
- Non-compliance: **An item that does not meet regulatory requirements.**
- Opportunity for Improvement**: An issue that may possibly become a non-conformity or non-compliance in the future if not addressed.**

Audit Results

	Number	Average per Project
Non-conformance	94	5.2
Non-compliance	11	0.6
Opportunity for improvement	15	0.8
Total	120	6.6



Non-Compliance

- **5 cases of failure to produce Water Resources Act approval for temporary diversion**
- **3 cases of failure to adhere to clauses in Letters of Advice under Fisheries Act**
- **2 cases of failure to salvage fish**
- **1 case of lack of secondary containment as require by Contamination Reduction Regulation**
- **1 case of burning without a permit**

No Water Resources Act Approval

- **Failure to have approval on site:**
  - $150 fine to individual
  - $2,000 fine to corporation
- **Commencing activity without approval**
  - $125,000 fine and/or two years jail for individual
  - $1,000,000 fine for corporation
  - Each day is a new offence

Fisheries Act

- **Failure to meet conditions in Letter of Advice (3 occurrences)**
- **Problem if it results in violation of act**
- **Failure to conduct fish salvage (2 occurrences)**
- **Problem if it results in dead fish**
- **Penalties**
  - Summary offence $300,000 and/or 6 months
  - Indictable offence $1,000,000 and/or 3 years

Non-Conformance Results

Training	**No training or no records**	**12**
Risk Assessment	**No Risk Assessment or items missing**	**12**
CEM Plan Currency	**Not updated to situation or 2005 Framework**	**9**
Erosion and Sediment Control	**Not in CEM Plan or not properly implemented**	**9**

Non-Conformance Results

Inspections	**Not conducted or no records**	**7**
Wastes	**Not in CEM Plan or not properly handled**	**5**
Weed Survey	**Not completed**	**6**
Authorization	**CEM Plan not signed by site representative**	**5**

Non-Conformance Results

Borrow	**Borrow Assessments not complete**	**5**
Gravel Crushing	**Crushing in progress but not in CEM Plan**	**4**
Winter Shutdown	**Not in CEM Plan and likely to occur**	**3**
Soil Assessment	**Deficient assessment or tender information**	**2**

Enforcement Actions

- 13 environmental occurrences reported
- 6 involved release of sediment
- Two formal warning from DFO
- One fine against contractor under City By-law
- Follow-up documentation to EMS incomplete
- Need for clarification of reporting requirements

New Procedures

Regulatory Approval Sign-off

- Current Consultant Guidelines directs consultants to obtain regulatory approvals
- Regulatory approvals are an agreement between the department and regulatory agencies
- Individual with authority to meet conditions should sign
- New procedure consultant prepares applications and project Sponsor signs

Initiatives

Wetland Policy Revision

- Environment Office led process
- Draft to go for public consultation
- Seeks to expand scope of Interim Policy
  - Buffers
  - Non-permanent wetlands
- Seeks to set and expand compensation requirements
- Issue of created/constructed wetlands

CEM Plan Expansion

- Initiative to extend CEM Plan frameworks among municipalities
- Consistent approach across the province
- Initial review of similarities and differences complete
- Partners will be consulted as process proceeds

APPENDIX C.7
CONTRACTOR ENVIRONMENTAL ACKNOWLEDGEMENT FORM

CONTRACTOR ENVIRONMENTAL ACKNOWLEDGEMENT FORM

X 502 (2005-08)

As a Contractor for the City your review and acknowledgement of this document is necessary prior to beginning work. The items in this checklist are in addition to any speci c environmental requirements identi ed in the Tender/Contract document. Please complete this Form by initialing each item in the checklist and then by signing the acknowledgement at the bottom of the document. It is possible that during the course of the contract work, the City may review the information in this document with you and your personnel.

Initial	**Environmental Policy** I acknowledge that I have been made aware of and will follow the City Environmental Policy. The Policy includes the following obligations: **Comply** with applicable legislation. **Conserve** resources and prevent pollution. **Continually** improve our environmental performance.
Initial	**Compliance** I am aware of the environmental regulatory requirements applicable to the project. I understand the importance of compliance with environmental legislation, approvals or permits and the consequences of non-compliance.
Initial	**Awareness and Competence** I acknowledge that I am responsible for ensuring that environmental responsibilities contained in the Contractor Environmental Responsibilities Package are communicated to all onsite personnel including Subcontractors. I acknowledge that I am responsible for ensuring that all personnel working for this project are competent to perform the assigned work based on training, education and experience.
Initial	**Erosion and Sediment Control** Recognized practices will be utilized that minimize erosion and prevent the movement of sediment into watercourses and storm infrastructure. Where one has been created, the Erosion and Sediment Control Report or Plan will be followed. Any required erosion and sediment control devices will be frequently inspected and maintained during the project, will be removed once the area has been stabilized against erosion and will be disposed of appropriately.
Initial	**Dewatering** Discharges of surface and subsurface water resulting from dewatering activities will be conducted following City procedures. Written authorization will be obtained from Wastewater to dispose of water that has accumulated on construction sites by precipitation or groundwater infiltration into the storm/sanitary system.
Initial	**Saw Cutting and Coring** When undertaking saw cutting or coring activities, slurry will not be allowed to enter the stormwater system.
Initial	**Soil Conservation and Stockpiles** Appropriate soil conservation and stockpiling practices will be implemented to prevent erosion and the loss of topsoil.
Initial	**Tree Protection** Adequate protection will be taken to not damage City-owned or controlled trees on site and on adjacent properties.
Initial	**Site Management** The work site will be maintained free from accumulations of debris or waste. The effects of noise, odor, light, dust emissions, and tracking of dirt and mud will be minimized. Appropriate non-hazardous and hazardous materials management procedures will be implemented. Chemical, fuel and lubricant storage areas will be suitably located and protected to minimize releases. Site specific hazardous materials management procedures will be communicated to all Contractor and Subcontractor personnel.
Initial	**Waste Management** All waste materials generated from activities will be removed and disposed of in accordance with regulatory requirements and facility procedures.
Initial	**Recycling** Generation of waste will be avoided or minimized. At a minimum, the recycling of cardboard, wood, concrete and metal will be considered and assessed. Construction materials with recycled content will be used where reasonably practical and safe.
Initial	**Fuelling** Contractor and Subcontractor personnel will be present during fuelling operations for the duration of the fuelling process. Fuelling or maintenance of equipment will not take place within 30 m of waterways including the stormwater system or environmentally sensitive areas unless a written Standard Operating Procedure is developed.

Initial	**Spill Prevention** Measures will be taken to prevent pollution of land or waterways, including the stormwater system.
Initial	**Release Reporting and Cleanup** Spills and releases will be reported to the appropriate regulatory agencies as required by law. Spills and releases will be reported to the city Project Designate* at the earliest possible opportunity. If a spill or release into the environment occurs, the affected area will be cleaned-up and remediated to the satisfaction of the city and appropriate regulatory agency.
Initial	Contamination Discovery Suspected or potential contamination encountered during the work will be reported to the city Project Designate,* HazMat** (264-1022) and Ministry of Environment. All releases will be immediately reported to the appropriate regulatory agencies as required by law. Any suspected or potentially hazardous building materials exposed during the work will be reported to the city Project Designate* immediately.
Initial	**Offsite Disposal of Excavated Soil or Material** Excavated soil or material that is not required for fill or other purposes will be properly disposed of.
Initial	**Imported Fill Material** The source location of any imported fill material will be reported to the city Project Designate* prior to material being brought onsite. If requested, the suitability of the material will be verified.
Initial	**Vehicle Idling** Idling of vehicles not essential for performance of work will be minimized.

*The Project Designate is the city contact for a specific construction job. This could be a Project Manager, Contract Manager, Site Supervisor, Project Engineer, Foreman or Safety/Environmental Specialist.

**HazMat is the Hazardous Materials response unit within the Fire Department.

I _____ , acknowledge that I have been made aware of these expectations, and I understand it is my responsibility to comply with them and communicate this information to all onsite personnel that are engaged in carrying out the work or providing material to the job site.

Contractor signature	Title	Company	Date

SUPPLEMENTAL INFORMATION (optional) – to be completed by the Project Designate and Contractor if required.

Special instructions were provided to the Contractor: Yes ❒ No ❒

Description of Information:

Project Designate Name	Business Unit	Contractor Name
Project Designate Signature	Date	Contractor Signature

APPENDIX D

TAC MEMBER SURVEY - STATE OF EMS IN THE PUBLIC TRANSPORTATION SECTOR IN CANADA

PART II – EXAMPLES AND CASE STUDIES

TABLE OF CONTENTS

D.1 INTRODUCTION

This chapter is a general discussion of EMS within transportation. It includes statistics on EMS status within the TAC membership, which were collected through an email survey and subsequent follow-up conversations. This Appendix includes an explanation of the survey and tabulated results.

D.2 EXPLANATION OF THE SURVEY OF TAC MEMBERS

A survey was distributed to 32 TAC members. Five additional surveys were sent out to agencies at the request of TAC members.

The intent of the survey was to assemble specific types of relevant information:

- Identify members with existing formalized EMSs for a follow-up interview and to obtain their EMS documentation.
- Develop statistics on EMS status with TAC members (e.g.. number of members with active EMSs).
- Determine issues of interest to agencies with no EMS and / or no desire to develop one.
- Compile EMS "fact sheets" on a variety of EMSs.

The survey questions are provided in Table D.1 and the Survey is included in Appendix B.

Table D.1 Environmental Management System Survey Questions

Number	Question
1	Does your organization have any of the following systems in place (Quality management system (e.g. ISO 9001 or TQM), Health and safety management system (e.g. OHSAS 18001), Other)?
2	Does your organization have a Environmental Management System (e.g. ISO 14001) in place?
3	Is your organization currently developing an EMS?
Questions for organizations *WITH* an EMS in place or in development	
4	How long has your organization had or been developing Its EMS?
5	Please list the activities your EMS covers.
6	Can you provide us with your EMS documents or an internet link?
7	What were your main reasons for developing / implementing the EMS?
8	Can you provide us with any documents / reports which justify the creation of the EMS?
9	Please tell us the benefits that were expected from the EMS, if they were realized and why.
10	Did you have or plan to have ISO 14001 registration, please list reasons for your decision?
11	Please list the barriers you encountered, their effect on the EMS, and strategy used to overcome them.
12	What are your rough estimates on the cost of your EMS?
13	What were the three most challenging elements of your EMS to develop (e.g. Scope, Aspects, Impacts, Review Process) and why?
14	Where consultants used to develop, maintain or audit your EMS?
15	Please list the reference documents you found the most helpful in developing and maintaining your EMS.
16	Please list the websites you found the most helpful in the developing and maintaining your EMS.
17	Did you use any specialized software to develop or maintain your EMS?
18	Please list your "Keys to Success" that you would recommend to others.
19	What would you do differently and why?
20	If you were starting an EMS again, what would be your first three steps?
21	Please provide any other advice for transportation professionals who are contemplating the development of an EMS.
22	Would you be willing to speak with us in more detail?
23	Would you be interested in participating in an informal EMS Networking group?
24	would you be willing to complete a One-Page Fact Sheet about your organization's EMS for inclusion inthe *Synthesis of Practice?*
25	Is there anyone who you think we should contact with respect to EMS in the transportation sector?
Questions for organizations *WITHOUT* an EMS in place or in development	
26	Is there any considerations being given to implementing an EMS?

D.3 EMS SURVEY RESULTS

Table D.2 is a list of the respondent's EMS Status, which are in a histogram in Figure D.1. The results indicate that a majority of responding agencies (80%) are considering, developing or have an EMS. An overall summary of responses by question is provided in Table D.3. This table references the more detailed summary by question in the subsequent series of tables in this chapter. The comments included in the tables have been provided *verbatim* from the respondents with some minor editing for clarity. The responses by agency are provided in a series of Information Sheets found in Appendix B. By request of several respondents, all information is anonymous.

Table D.2 EMS Status

Category	Number of Agencies	Percentage of Respondents
No Response to Survey	**17**	**-**
Responded to Survey	**21**	**-**
Agency has an EMS	6	29%
Agency is ISO 14001 Registered	2	10%
Developing an EMS	6	29%
Considering an EMS	4	19%
Not considering an EMS	3	14%

Figure D.1 EMS Status

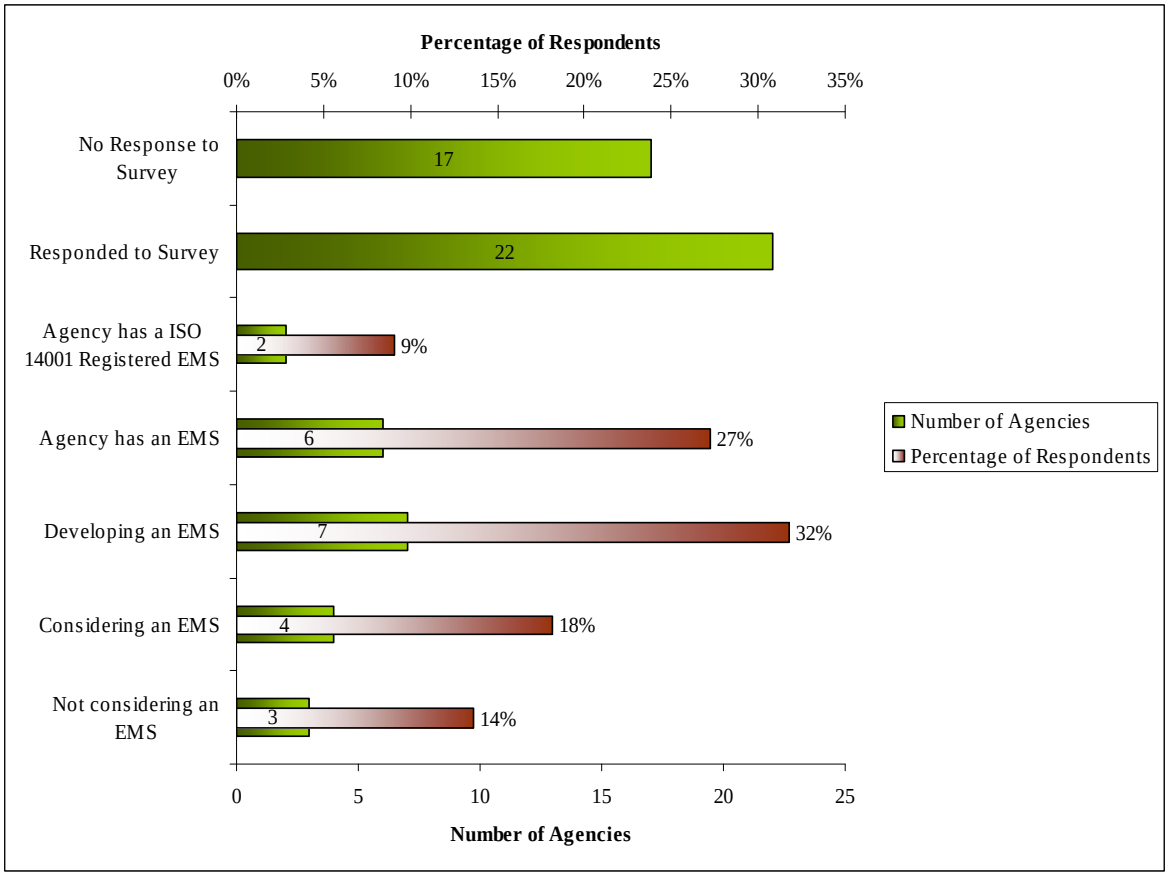


Table D.3 Overall Summary of Responses

Table Reference	Question(s) from Survey	Summary of Responses
Table D.4 Are You Considering an EMS?	2 and 26	Most considerations for developing an EMS centre on improving due diligence.
Table D.5 Activities that Agencies' EMSs Cover	5	Most EMSs are broad in scope (unit or agency wide).
Table D.6 Main Reasons for Developing / Implementing an EMS	7	The reasons provided generally fit into the following categories: Reduced Liability / Compliance, Top Down Direction, Sustainability and Reduced Costs. The most common reason was due diligence which corresponds to the desire for an EMS from Table D.4.
Table D.7 Benefits from Developing / Implementing an EMS	9	The benefits provided generally fit into the following categories: Compliance / Due Diligence; Reducing Costs; Reducing Impacts; Environmental Awareness; and Environmental Leadership / Improved Public Image. Due diligence was the most cited benefit.
Table D.8 The Barriers Encountered, Their Effect on the EMS, and Surmounting Strategies	11	The barriers provided generally fit into the following categories: Management Buy-In; Organizational Culture; Staff Buy-In; EMS Framework; Communication; and Costs. The most common barrier cited was corporate culture and senior management buy-in (when solutions to the barrier are included).
Table D.9 Rough Estimates of the Cost of an EMS	12	There was a large range for budget $50,000 to $500,000 likely based on the lack of specificity in the survey about what to include or exclude and the scope of the EMS. The number of person days to maintain an EMS is generally consistent around 1 FTE.
Table D.10 The Most Challenging Elements in Developing an EMS	13	The challenges provided generally fit into the following categories: Buy-In: Communication / Data; Coordination; Aspects; and Scope with some included under Other. The challenges cited are consistent with those usually provided in the EMS literature.
Table D.11 "Keys to Success" in Developing an EMS	18	The "Keys to Success" provided generally fit into the following categories: Buy-In; Fit to Your Organization; Communications; Resources; and Training. These are consistent with those usually provided in the EMS literature.
Table D.12 What Would You Do Differently and / or What Advice Do You Have?	19 and 21	The advice provided generally fit into the following categories: Data, Scope, Senior Management Buy-In / Corporate Culture, Implementation, and Policy. There is good advice in this table for anyone developing an EMS.
Table D.13 What Would You Recommended as the First 3 Steps in Developing an EMS	20	The steps provided generally are: secure Senior Management buy-in, develop the EMS Framework, and obtain resources / develop the team.

Table D.4 Are You Considering an EMS? (Questions 2 and 26)

Seven respondents said they were considering an EMS and gave the following reasons why:	Four respondents said they are NOT considering an EMS. Three gave the following as reasons why:
1. To track environmental issues, set priorities and evaluate environmental performance.	1. More information is needed: resources required, benefits, how to establish, etc..
2. Various procedures usually associated with an EMS are in place in various departmental operations. We would like to formalize and expand these procedures into a formal departmental EMS.	2. The mandate of the Department is to ensure the safety of the travelling public. It has been difficult to find the budget and resources to address environmental issues within the branch.
3. In response to the recommendations contained in the City Auditor's Report, Senior Management have requested a review the costs and benefits of implementing an EMS.	3. have not heard it being an area of need.
4. There needs to be a systematic approach for our organization to follow to ensure that environmental considerations are taken into account when making decisions (long term and day-to-day).	
5. Should be part of the Department's "Due Diligence".	
6. In public-private partnership (PPP), it was realized that a certified EMS was needed.	

Table D.5 Main Reasons for Developing / Implementing an EMS (Question 7)

Agency	Explanation of Reasons
	Reduced Liability / Compliance[1]
1	Better management of environmental risks in third party delivery environment.
2	Minimize environmental liabilities and show stewardship for the environment.
3,4	Compliance: Compliance / due diligence / providing tools to consultants & contractors.
5	Improve the capacity to act in a diligent way.
5	Report on the Ministry performance regarding the environment and sustainable development.
	Top Down Direction[1]
6	1992 Code of Environmental Stewardship, Auditor General's Report, etc..
7	Chief Administrative Officer's office and Auditor's Report.
8	Council / Senior management environmental directive.
	Sustainability[1]
9	Part of sustainable development / larger plan.
5	Carry on ministerial activities in a responsible way towards the environment and sustainable development.
5	Facing an increasing complexity of environmental issues and the globalization of problems bound to it.
	Reduced Costs[1]
10,5	High cost of remediation and the intent to have more responsible environmental actions and controls.

[1] *Respondents did not pick the categories; they were developed post-survey.*

Table D.6 Activities that Agencies' EMSs Cover (Question 5)

Agency	Activities (Shading used to differentiate agency responses)

1	• Fleets (aviation, marine, field equipment, vehicle)
	  o GHG emissions
	• Buildings (owned and operated);
	  o Drinking Water management
	  o Waste management
	  o Environmental Emergency Plans
	  o Wastewater
	• Contaminated land
	• Equipment containing ozone depleting substances
	• Storage tanks (owned and operated)
	• Green Procurement

2, 3	• Highway planning • Design • Construction • Maintenance / operations
4	• Waste • Chemicals • Water • Energy • Salt and sand • Sewage • Erosion & sediment control • Emissions to air • Vegetation • Liquid bulk containment • Emergency response
5	• Engineering design and planning • Policy and program development
6	• All operational and office activities associated with the Roads Business Unit.

7	• Roadways maintenance
	• Roadways construction,
	• Roadways design & engineering services
	• Environmental services
	  o Survey
	  o Geotechnical
	  o Gravel operations
	  o Quality assurance services

8	• City Wide - incorporate environmental considerations into daily management activities and provide a tool to meet environmental performance objectives.

Table D.7 Benefits from Developing / Implementing an EMS (Question 9)

Agency	Expected Benefit	Was the Benefit Realized?
Compliance / Due Diligence[1]		
1	Improved due diligence by having a review the environmental laws affecting our operations.	The review was not specific enough to address our operation activities.
2	Improvements in operational and environmental performance through the utilization of a management framework that includes formal written operating procedures, training and regular management reviews.	This element has not been implemented yet.
3	A reduction in non-compliance incidents.	There has been a slight reduction. However, more work needs to be done.
4	Complying with applicable legislation.	An EMS system is closed loop and guides the organization driven by management commitment.
5	Increased assurance of environmental regulatory compliance and evidence of due diligence in the event of a negative incident.	This element has not been implemented yet.
6	Documentation to prove due diligence has been practiced by the department.	We have provided excellent documentation for use but it is not always utilized to the extent expected.
7	Insure continuous legal and statutory compliance / improve the capacity of the agency to act in a diligent way.	-
7	Improve the environmental performance by insuring the consistency between strategic vision and actions while reducing environmental risks.	-
8	Ensure compliance to legal requirements.	Compliance audit in place.
Reducing Costs[1]		
1	Reduced cost of remediation of contaminated property by improved operational controls.	-
2	Conserving agency resources.	The EMS system (as a closed loop Plan-Do-Check-Act) ensures benefits are are realized.
3	The potential to save money through enhanced efficiencies in the use of resources.	This element has not been implemented yet.
4	The potential to continually improve environmental performance and efficiency.	The audit process is in place for internal, surveillance and registration audits. We are using the results to improve.
5	Reduce costs and improve effectiveness and efficiency with optimum resources use.	-
6	Use resources in a more rational way.	-
Reducing Impacts[1]		
1,2	Reduce pollution.	For Agency 1, it is too early to tells as objectives, targets and programs are just in place for significant aspects. For Agency 2, the EMS system (as a closed loop Plan-Do-Check-Act) ensures benefits are realized.
3	Decrease the environmental impact of the Department activities.	Unknown.

Agency	Expected Benefit	Was the Benefit Realized?
4	Improve the environmental performance of the whole Department activities.	-
5	Continually improving environmental performance.	The EMS system (as a closed loop Plan-Do-Check-Act) ensures benefits are realized.
6	Integrate in a sustainable way various environmental concerns (waste production, energy consumption, air pollution, travels, etc.) in the daily work of the Department.	In parallel to the implementation of an EMS, that became a tool of continuous improvement with regard to environmental management, the Department was already very active and undertook several efforts.
Environment Awareness[1]		
1	Integrating environmental considerations into daily decision-making, and to meeting the objectives of sustainable development.	This objective was achieved.
2	Increased environmental awareness among staff.	It continues to be difficult to convince 20% of the staff that the benefits are real.
3	Increased environmental expertise in department.	Some staff became eager to be role models.
4	Provide consultants / contractors the tools they needed to understand environmental obligations.	We have created high quality tools to our Service Providers to guide them to act in an environmentally responsible manner.
Environmental Leadership / Improved Public Image[1]		
1	Our image was enhanced through the adoption of ISO 14001 as a widely recognized approach to improving environmental performance.	This has not been completely implemented yet.
2	We wanted to give the public confidence that we are an environmentally responsible organization.	We are not sure that this was an issue then or even now. There has not been any significant public interest in our EMS.
3	Improve the capacity of the Ministry to act in a diligent way.	-
4	We wanted to set an example and act as a leader in the environmental field.	By implementing an EMS, the Department meets a requirement of the sustainable development plan.
	[1] *Respondents did not pick the categories; they were developed post-survey.*	

Table D.8 Barriers Encountered, Their Effect on the EMS, and Surmounting Strategies When Developing an EMS (Question 11)

Agency	Barrier	Effect	Surmounting Strategies
Management Buy-In[1]			
1	Lack of buy-in from Corporation.	There was no dedicated funding or support.	Presentations and workshops were given to Sr. management to provide information on the benefits of EMS.
2	It was difficult to maintain the interest (commitment) of Senior Management team when their members changed.	It was difficult to maintain the momentum of implementing the EMS.	Keep Senior Management engaged by ensuring regular updates even if they don't ask for them.
3,4	Lack of dedicated staff to implement the EMS.	Considerable delays were found in implementing the EMS (such as the risk assessment).	Agency 3 used existing staff was assigned to address gaps, while Agency 4 allocated budget to hire staff.
5	Lack of dedicated funds to develop and implement the EMS.	There was significant delay in implementing elements of EMS.	We had to use existing funding.
6	Difficult to get buy-in at all levels.	We had numerous non-compliances.	We sough to firm up our Management Commitment.
Organizational Culture[1]			
1	Our data collection process previously collected through emails.	Data collection method was often labour intensive and disorganized. Over the years the method was streamlined but still inefficient.	The new Environment Information System being created will solve the data collection problem by eliminating the use of emails.
2	Since we are an outsourced organization there are not many department staff available to ensure that process is adhered to on the work site.	Consultants / contractors are not implementing many aspects of the EMS on the job site.	Have third party auditors randomly visiting work sites to evaluate compliance and conformance. Also, it shows the department is serious about this.
3	Lack of awareness & compliance with legislation.	Increased regulatory risk.	Improved management commitment[2] to better implement the EMS.
4	We had a disjointed EMS(s) within the organization.	-	Improved management commitment[2] to with Steering and Working Committees put in place.
5	Lack of an "environmental culture" within the agency.	We had a negative public image.	Improved management commitment[2] to better implement the EMS.
6	Lack of understanding by the administrators of what is an EMS. The current governmental process of sustainable development incites ministries and public bodies to implant an EMS or at least, to take environmental measures of management.	-	-

Agency	Barrier	Effect	Surmounting Strategies
7	Changing the EMS scope as our organization changed from operator to "landlord".	It has taken many years to determine EMS applicable facilities and lands.	-
Staff Buy-In[1]			
1	People are scared of change: it is important to understand that not everyone is environmentally conscious and change is often scary.	-	People need to be convinced that any changes that result from the EMS are there for a good reason.
2	Lack of buy-in from staff / consultants / contractors.	Whining & complaining about additional work.	We are trying to convey the message that having proper procedures in place protects everyone involved (liability wise).
3	Lack of buy-in throughout the organization.	Delays in implementing the EMS.	Improved management commitment[2] to better implement the EMS.
4	Lack of understanding by staff about the EMS and its benefits.	EMS activities lack priority and resources.	Improved management commitment[2] to better implement the EMS.
5	Lack of participation by all employees.	EMS activities lack priority and resources.	Raise EMS awareness about the EMS continuously with staff.
EMS Framework[1]			
1	Difficulty interpreting ISO 14001 EMS clauses.	We wasted time and resources.	We retained a qualified consultant to help.
2	Difficulty determining how to measure performance.	-	Development of a set of measurement tools.
Training[1]			
1	Staff training requirements were extensive.	Huge amount of training time required.	Have Deputy Minister and mgmt buy-in (critical)[2].
2	Lack of training resources.	Increased risk as a result of not implementing operational controls, etc..	Improved management commitment[2] to better implement the EMS.
Communication[1]			
1	Lack of comprehension by staff of the EMS project.	The schedule of implementation was delayed.	An awareness campaign was launched and, implementation of small actions was done to prove the benefits of the projects and ensure employees take over the project.
2	Poor coordination of information from around province.	Not the same message was given to all staff.	We had a trained implementation team assigned to deliver information.
Costs[1]			
1	Large cost of implementation.	-	Tried to minimize cost by using internal resources for development and implementation.

[1] *Respondents did not pick the categories; they were developed post-survey.*
[2] *Senior Management buy-in is the solution to these barriers*

Table D.9 Rough Estimates of the Cost of an EMS (Question 12)

Agency	Budget	Implementation (person days)	Maintenance (person days / year)
1	$50 000	Consultant 30 days; employees 200.	200
2	From inception to completion of first cycle - $500,000.	120 days to author and get reviewed / approved (1 FTE).	0.3 FTE department (consultants / contractors are responsible for EMS implementation on the work site as per contract).
3	Varies, pending scope of costs.	300	200
4	Salary and fringe benefits of a research officer dedicated full-time to the EMS implementation project and of a planning advisor part-time on the project (more or less 135 000$ per year).	About 45h per week or 1.5 FTE.	One and a half person full-time (about 1.5 FTE).

Table D.10 The Most Challenging Elements in Developing an EMS (Question 13)

Agency	Challenging Elements
Buy-in[1]	
1	Ensure ownership of program by the team.
2	Maintaining Support: The EMS is not always a priority and tends to be put aside when employee work levels are high. It is important to be flexible when those types of situations arise but it is also necessary to stress the importance of the EMS and that work will resume after the crisis is over.
3	Currently, our largest challenge is getting buy in at senior levels.
4	Resistance to change: Our Department consists of several work teams from different professional background. It is a challenge to persuade everybody and modify their working habits.
Communication / Data[1]	
1	Having a team that could help us in facilitating the implementation across various work teams and a structured coordination of this working team (monthly meeting).
2	It is still difficult to compile data as there are several data collection systems. The development of user-friendly and efficient database tool seams to be our greatest challenge. Data is essential to measuring performance.
Coordination[1]	
1	Non-planning staff are impatient with comprehensive planning ("let's get on with it").
2	Challenging trying to work the ISO clause requirements into our existing non-ISO processes.
Aspects[1]	
1	Developing a "Aspects Registry" within our organization is difficult given the seasonal and dynamic nature of our activities.
2	We are often faced with adding Government initiatives into the EMS even when they are not significant environmental aspects for the department.
Scope[1]	
1	The EMS applies only to owned and operated facilities but the agency has several other responsibilities depending on EMS environmental aspect. It is challenging to determine our EMS scope.
2	It is difficult to narrow our focus as we need to determine the most important aspects of our business.
Other[1]	
1	We have limited legal resources for legal reviews.
2	We face challenges in the allocation of adequate human and financial resources toward the project
3	I don't think any one element stood out more than the rest. They were all a lot of work.
	[1] *Respondents did not pick the categories; they were developed post-survey.*

[1] *Respondents did not pick the categories; they were developed post-survey.*

Table D.11 "Keys to Success" in Developing an EMS (Question 18)

Agency	Keys to Success
Buy-In[1]	
1	Secure the following: • top down support • input from bottom up • involve lots of staff in development and implementation as it builds role models and expertise: lots and lots of training, make yourself available to answer questions and help people implement program; plan for feedback and improvement.
2	Solid support from upper management is key. Some environmental management components and responsibilities may be foreign to staff. It may mean changing the way staff conduct operations. For these reasons, solid upper management support is needed when encountering resistance from staff in other sections.
3	Ensure that senior management support the development of EMS.
4	An strong EMS stems from 100% Management Commitment.
5	The engagement and support of senior management was a essential conditions of success.
6	The participation of all employees as each employee, in his sphere of activity, is capable to determine the measures to take to reduce the impacts.
7	• Educate senior management on the benefits of developing an EMS and the cost of not developing an EMS. • Establish an EMS Committee for the Corporation with the responsibility to share information, reduce duplication and promote a harmonized approach across the organization.
Fit to Your Organization[1]	
1	Create an EMS that meets the needs of your organization - perhaps not that of a standard / auditor. Within the organization define what it is you want to achieve then create an EMS that makes it happen.
2	Flexibility: Occasionally, urgent issues arise and the EMS gets put on the back burner. It's important for the EMS coordinator to let EMS data collection or initiatives be put aside in times of crisis but to also reaffirm that EMS data reporting etc., will resume after the crisis is dealt with.
3	The EMS must be a flexible approach with possible evolutions.
4	Do not overload employees with the theoretical part of an EMS but concentrate on practice and operational elements of such a system.
5,6	An strong EMS stems from a reasonable and achievable Environmental Policy and reasonable / achievable expectations.
Communications[1]	
1	Communication: Every person that is impacted by the EMS should be involved in some way or another in the planning process and the development of the EMS framework. Communication is also needed between the EMS coordinator and operational personnel to ensure that any problems can be dealt with in a quick and efficient manner.
2	Network, research, and use external / internal consultant assistance when developing and implementing your EMS.
3	Collaborate with other divisions and foster support for the development of an EMS.
Resources and Training[1]	
1	A strong EMS stems from adequate resources.
2	Ensure that lead staff is knowledgeable and receive the necessary EMS training.

[1] *Respondents did not pick the categories; they were developed post-survey.*

Table D.12 What Would You Do Differently and / or What Advice Do You Have? (Question 19 and 21)

Agency	Comment
Data[1]	
1	Data has often been collected informally in the past. It is not possible to meet with everyone is person. Most correspondence is done by teleconference and emails. We are in the process of developing the Environmental Information System in order to simplify reporting requirements by allowing the end user to input data into the system directly.
Scope[1]	
1	Focus your EMS on a few aspects; we took on too much.
2	Have an action plan less ambitious than you think. Concentrate, for the first program implementation phases, on activities aimed at the most employees and having an impact on the environment. For our first action plan, more than 57 actions were. This was too ambitious.
3	Start your EMS small, and consider using existing software / process solutions.
Senior Management Buy-In / Corporate Culture[1]	
1	Elevate concepts of EMS for Council and Corporate approval.
2	Restructuring and shifting of the Corporate Environment Office priorities has impacted the Transportation Services Divisions ability to implement elements of the EMS.
3	Set up a motivated team and clarify the authority delegation from the beginning. The success of an EMS implementation depends on employees knowing precisely their new responsibilities and tasks linked with environmental management. The key to success lies in the appropriation of the project by the employees.
4	Key to an effective EMS: work as a team, and have senior management support.
5	It is essential to adapt the EMS to the reality of the organization even if it means adjusting it as we go along. We must keep in mind that it is a continuous improvement approach that requires time and energy.
Implementation[1]	
1	We are proud of our product and wouldn't change it knowing what we know now but not having sufficient resources to ensure that it was properly implemented from the outset has been costly. We thought that putting the EMS in contract documents would ensure implementation by our consultants / contractors - it did not. For the first few years implementation was sporadic at best - now we are finding ourselves fighting hard to ensure it happens. This would have been easier back in the day when it was first introduced. We are now battling complacency with our Service Providers.
2	Complete a pilot project where you can show the benefits and to better determine the resources needed for the completion of the EMS for the entire organization.
3	Most organizations are under the false impression that they already have the tools for an EMS and that they just have to reorganize their material. It is a real eye opener for those organizations that are going for registration - it is a lot more complicated than they think. They are going to face a steep learning curve during the pre-audit. It takes time, money, and commitment - a lot of it.
4	In the beginning the most work should be placed on the foundation of an EMS. Like any structure, the stronger the foundation the longer it will be supported.
5	Do not overload the employees with theoretical aspects and concentrate on the practical side of the environmental management. This way it is easier to reach employees, give a meaning to the project and mobilize employees.
Policy[1]	
1	Implement a: we consider that it is important to set a clear environmental policy environmental policy that determines the frame inside which objectives and aims are set.

[1] *Respondents did not pick the categories; they were developed post-survey.*

Table D.13 Summary - What Would You Recommended as the First 3 Steps in Developing an EMS (Question 20)

First Steps	Number of Agencies With Response	Average Step Ranking
Senior Management Buy-In1		
Obtain strong Senior Management commitment.	7	1.33
Ensure an EMS 'framework' is completed (this is about 33% of each chapter of the manual) then ensure top management approves it again at this stage. This way there should be no surprises from top management as the document is being finalized.	1	2
EMS Framework[1]		
Clearly define the scope of the EMS	3	1.66
Conduct environmental compliance audit / Gap Analysis at the beginning.	2	1
Develop a strong Environmental Policy.	2	2.5
Determine the department's significant aspects.	1	2
Discuss the merits of a registered EMS for the organization.	1	1
Implement training program adapted and structured for the employees.	1	3
Start with a pilot project and roll it out after pilot identifies and fixes problems.	1	3
Resources / Team[1]		
Secure dedicated funding / adequate resources.	4	2
Ensure reasonable expectations.	1	3
Determine reporting structure.	1	2
Bring key people together to plan and develop it (interested, available and knowledgeable) and develop a multi-disciplinary team mandated to operate the project in addition to the coordination team.	2	2
Ensure that for every 50 people in the organization you have an EMS rep that will be the champion for that area. This rep must be available from inception of the manual to completion of the first cycle. This aspect of the reps work will take 0.25 of their FTE. They will be responsible for implementing the EMS in their area and reporting back to you with any potential issues / revisions needed. In short, having the right team from the out set.	1	3

[1] *Respondents did not pick the categories; they were developed post-survey.*

APPENDIX E

LIST OF AGENCIES THAT ARE INTERESTED IN PARTICIPATING IN AN INFORMAL EMS NETWORKING GROUP

PART II – EXAMPLES AND CASE STUDIES

Organization Name	Contact Name	Contact Address	Email Address	Contact Phone Number	EMS Status
Ontario Ministry of Transportation	Jennifer Wittig	301 St. Paul Street, 2nd Floor, St. Catharines, Ontario L2R 7R4	Jennifer.Wittig@ontario.ca	905 704-2215	-
Regional Municipality of Peel	Richard Sparham	11 Indell Lane, Brampton ON L6T 3Y3	richard.sparham@peelregion.ca	905-791-7800	None
Nova Scotia Department of Transportation & Public Works	Christene Almon	1672 Granville St., PO Box 186, Halifax, NS B3J 2N2	almonca@gov.ns.ca	(902)424-0591	Have
PEI Department of Transportation & Public Works	Jeff Keefe	PO Box 2000, Charlottetown PEI, C1A 7N8	jjkeefe@gov.pe.ca	902-368-4199	Have
City of Toronto, Transportation Services	Nazzareno Capano	100 Queen Street, 22nd floor East Tower, City Hall, Toronto, Ontario, M5H 2N2	ncapano@toronto.ca	416-392-7766	Developing
City of Calgary Roads Business Unit	Benjamin Wineberger	PO BOX 2100, Stn. M, #4007 Calgary Alberta Canada T2P 2M5	ben.wineberger@calgary.ca	(403) 268-1033	Have
Ville de Montréal, Direction de l'environnement et du développement durable	Nancy Giguère (514) 280-4423	801 rue Brennan - 8e étage Montréal H3C 0G4	Not provided	(514) 280-4423	Developing
	Jean-François Lesage		Not provided	(514) 872-0161	Developing

City of Hamilton	Melanie Jajko	77 James St. North, Suite 320, Hamilton,. ON, L8R 2K3	Not provided	905-546-2424 ext. 6412	Have
Ministère des transports du Québec Centre de gestion de l'équipement roulant (CEGER)	Suzanne Roy	1650, rue Louis-Jetté Québec (Québec) G1S 2W3	Suzanne.Roy@mtq.gouv.qc.ca	418 643-5430 poste 275	Developing