

Part I: CLASS ENVIRONMENTAL ASSESSMENT

1.0 CONSERVATION AUTHORITY PLANNING CONTEXT

This section describes the overall watershed planning and management activities of Conservation Authorities. The aim is to clarify the relationship between the broader, on-going planning process, routinely carried out by a Conservation Authority, and the remedial flood and erosion control planning process, which is the subject of this Class EA.

The **Conservation Authorities Act**, passed in 1946, provided the means by which the Province and the municipalities of Ontario could join together to form a Conservation Authority within a specified area to undertake programs for natural resource management. Since the passage of the **Act**, 38 Conservation Authorities have been formed. Section 1.1 describes more fully the Conservation Authorities' legislative mandate. Three fundamental strengths of a Conservation Authority are recognized in the legislation:

- i) local initiative and involvement;
- ii) the watershed as a management unit; and
- iii) a provincial/municipal partnership and commitment to resource management.

Conservation Authorities have been formed in response to interest expressed by the residents of a particular jurisdiction. This emphasis on "local initiative and involvement" is reflected in the administrative framework of Authorities, by the election and appointment of municipal representatives to be Members of the Full Conservation Authority Committee and/or Advisory Committees. These committees have the decision-making powers of the Conservation Authority.

Conservation Authorities, for the most part, are established on the basis of watershed boundaries, as opposed to political boundaries, and their jurisdiction may include one or more watersheds. Organization on a watershed basis enables the Conservation Authorities to take into account the natural unity of the watershed and the interdependencies between land and water systems. To clearly identify and carry out their resource management interests, Conservation Authorities prepare watershed plans, policies and programs. These are described in Section 1.2.

As a "provincial/municipal partnership", Conservation Authority funding and program priorities are generated at both the local and provincial level. Section 1.3 discusses the various funding arrangements of Conservation Authorities.

1.1 Legislative Mandate

The **Conservation Authorities Act** (R.S.O. 1990) provides the basic mechanisms for establishing and administering a Conservation Authority and is administered by the Ministry of Natural Resources. Section 20 of the **Act** sets out the mandate of a Conservation Authority:

"The objects of an authority are to establish and undertake, in the area over which it has jurisdiction, a program designed to further the conservation, restoration, development and management of natural resources other than gas, oil, coal and minerals" (R.S.O. 1990, C. 27, s. 20).

As part of this broad mandate, Conservation Authorities are the agency considered to have prime responsibility for water management, in terms of water quantity and related hazards. To carry out their water management responsibility, Conservation Authorities have two types of powers - administrative and regulatory.

1. Administrative

Subsection 21(1) of the **Conservation Authorities Act**, R.S.O. 1990 sets out the administrative powers of a Conservation Authority:

- "(a) to study and investigate the watershed and to determine a program whereby the natural resources of the watershed may be conserved, restored, developed and managed;
- (b) for any purpose necessary to any project under consideration or undertaken by the authority, to enter into and upon any land and survey and take levels of it and make such borings or sink such trial pits as the authority considers necessary;
- (c) to acquire by purchase, lease or otherwise and to expropriate any land that it may require, and, subject to subsection (2), to sell, lease or otherwise dispose of land so acquired;
- (d) despite subsection (2) to lease for a term of one year or less, land acquired by the authority;
- (e) to purchase or acquire any personal property that it may require and sell or otherwise deal therewith;
- (f) to enter into such agreements for the purchase of materials, employment of labour and such other purposes as may be necessary for the due carrying out of any project;
- (g) to enter into agreements with owners of private lands to facilitate the due carrying out of any project;
- (h) to determine the proportion of the total benefit afforded to all the participating municipalities that is afforded to each of them;
- (i) to erect works and structures and create reservoirs by the construction of dams or otherwise;
- (j) to control the flow of surface waters in order to prevent floods or pollution or to reduce the adverse effects thereof;
- (k) to alter the course of any river, canal, brook, stream or watercourse, and divert or alter, as well temporarily as permanently, the course of any river, stream, road, street or way, or raise or sink its level in order to carry it over or under, on the level of or by the side of any work built or to be built by the authority, and to divert or alter the position of any water-pipe, gas-pipe, sewer, drain or any telegraph, telephone or electric wire or pole;
- (l) to use lands that are owned or controlled by the authority for such purposes, not inconsistent with its objects, as it considers proper;
- (m) to use lands owned or controlled by the authority for park or other recreational purposes, and to erect, or permit to be erected, buildings, booths, and facilities for such purposes and to make charges for admission thereto and the use thereof;
- (m.1) To charge fees for services approved by the Minister;
- (n) to collaborate and enter into agreements with ministries and agencies of government, municipal councils and local boards and other organizations;
- (o) to plant and produce trees on Crown Lands with the consent of the Minister, and on other lands with the consent of the owner, for any purpose;
- (p) to cause research to be done;
- (q) generally to do all such acts as are necessary for the due carrying out of any project."

2. **Regulatory**

Under subsection 28(1) of the **Conservation Authorities Act**, Conservation Authorities may make regulations, subject to the approval of the Minister of Natural Resources, including:

- (b) prohibiting or regulating or requiring the permission of the authority for the straightening, changing, diverting or interfering in any way with the existing channel of a river, creek, stream or watercourse, or for changing or interfering in any way with a wetland;
- (c) prohibiting , regulating or requiring the permission of the authority for the development if, in the opinion of the authority the control of flooding, erosion, dynamic beaches or pollution or the conservation of land may be affected by the development.

Commonly referred to as Fill, Construction and Alteration to Waterways Regulations (and to be updated through the Section 28 Generic Regulation under the **CAA**), these regulations control activities in river and stream valleys, waterfronts, and wetlands. These regulations do not control land use, as this is the responsibility of the municipalities and planning boards of Ontario. Conservation Authorities examine the technical feasibility of proposed activities from a water management perspective, while the municipal land use planning process examines proposals from the point of view of relevant social, economic, and environmental matters.

1.2 **Watershed Plans, Strategies, Policies and Programs**

To carry out their mandate under the **Conservation Authorities Act**, Conservation Authorities have devoted considerable effort to identifying the goals and objectives that guide their action and the means of achieving these by preparing watershed plans, strategies, policies and programs.

1.2.1 **Watershed Plans and Strategies**

To fulfil its responsibility under the **Conservation Authorities Act**, each Conservation Authority has prepared a watershed plan for its jurisdiction. The watershed plan contains an inventory of the watershed jurisdiction and documents the goals and objectives of the Conservation Authority in attaining the wise use and management of these resources. Effective implementation of the watershed plan requires the commitment of the local municipalities and other appropriate agencies.

Watershed management planning is an evolving and iterative process to accommodate for changing conditions, both natural and man-made, within the watershed.

Some Conservation Authorities have entered into a process of preparing strategic plans. These are developed, using an open public process, to identify the direction to be taken to protect and enhance watershed health. Watershed and subwatershed planning have emerged as a key recommendation of the strategies that have been completed.

Watershed planning is a process whereby the important physical and biological relationships are considered in conjunction with existing and changing land use, to determine what is necessary to protect or enhance the existing or desired ecology within the watershed. The plan reflects local, regional, provincial and federal interests as well as the environmental, social and economic needs of the municipality and the public.

Subwatershed planning is generally applied in areas that are experiencing significant development pressure. Subwatershed plans result in a much more detailed analysis of issues.

The subwatershed plan could contain recommendations concerning stormwater management facilities, stream corridor rehabilitation, natural areas and linkage protection etc. and as it seems to be triggered by development, the scale of the planning area would be confined to much smaller units such as a catchment basin for a larger watershed.

Conservation Authorities who have jurisdiction on the Great Lakes have also prepared Shoreline Management Plans, which are specific planning documents dealing with the shoreline area. Similar to a watershed plan, these document the goals and objectives of the Conservation Authority in attaining the wise use and management of these shoreline resources.

The watershed plan, and the shoreline management plan or watershed strategy (where applicable) establish each of the 38 Conservation Authorities approach to the implementation of its resource management mandate. Upfront public input into the planning and decision making process for formulating these plans is both desirable and necessary. The public is involved throughout the plan's formulation and plays an important decision making role. The result is a community based vision of what the watershed or shoreline should look like in the future and identifies targets of how to achieve this vision.

It is possible that these broad planning processes may identify a situation potentially requiring remedial flood or erosion control or other environmental enhancement measures. The process as outlined in Section 3.1 of this document must be followed to confirm that the action needed is a remedial flood and/or erosion control measure as described in the definition of the undertakings in Section 2.3. With this confirmation, the Class EA process is initiated. Since the situation was identified through the broad watershed/subwatershed or shoreline planning processes then current Conservation Authority staff and public knowledge (assuming that the Class EA process is initiated within a sufficiently short timeframe) should facilitate the Class EA process.

1.2.2 Policies

To assist in achieving its goals and objectives, each Conservation Authority formulates a set of policies, tailored to the local physical, economic, and social conditions of the Conservation Authority's jurisdiction. As indicated in Table 1.0, there are three general policy areas under which programs are developed: water management policies; water and land management policies, and "other" (relating primarily to recreation and education).

1.2.3 Programs

Programs in the water management policy category have both preventative and protective means by which to achieve their goals. The preventative components of the Flood Control and Erosion Control Programs receive more emphasis, as they are intended to ensure that new development will not be subject to flood and erosion hazards and that new development will not impose flood and erosion hazards on other parts of the watershed (i.e. upstream or downstream). Conservation Authorities use a range of methods to carry out the preventative aspects of these programs, including: a) Fill, Construction and Alteration to Waterways Regulations (to be updated through the Section 28 Generic Regulation under the **CAA**), which are administered from the perspective of water management and related hazards; b) Conservation Authority participation in the municipal plan input and review process as a commenting agency pursuant to applications submitted for approval under the **Planning Act**; c) Land acquisition programs; d) Flood Forecasting/Warning programs; and e) regular on-site inspection programs for structural integrity.

The protective components of the Flood Control and Erosion Control programs address existing

problems. Where flooding or erosion poses a public safety risk to homes or private property, remedial works may be proposed.

Remedial Flood and Erosion Control Projects refer to those projects undertaken by Conservation Authorities, which are required to protect human life and property, in previously developed areas, from an impending flood or erosion problem.

Conservation Services and Wetland Management Programs that support the Water and Land Management Policy Area primarily carry out the Conservation Authorities' land management interests. However, these activities also have direct benefits to the Conservation Authorities' role in water management. Conservation Services projects, such as agricultural soil conservation measures and streambank sediment control, limit the sediment loadings in watercourses, resulting in a potential for improved water quality and aquatic habitat. A reduction in sediment loading to a watercourse also represents a lower potential for flooding, due to the reduced rate of downstream sedimentation and associated reduction in the channel's hydraulic capacity. Other Conservation Services projects involving tree planting and wetland management, benefit terrestrial and aquatic habitat, as well as provide for on site flood storage. Projects under the conservation services and wetland management programs are often planned or designed with significant public\agency involvement and follow an environmental assessment type planning approach.

Through their recreation and education programs, Conservation Authorities attempt to increase public awareness of the benefits of conservation and the hazards associated with flooding and erosion.

1.2.4 Status Under the Environmental Assessment Act

A Conservation Authority is defined as a public body in section 3 of Regulation 334/90 under the **Environmental Assessment Act** (R.S.O. 1990), and as such, its activities must be planned in accordance with the **Environmental Assessment Act**. Table 1.0 indicates the status of Conservation Authority activities under this **Act**. It can be seen that many activities have a regulatory exemption from the **Act**, while others must conform to the requirements of either an Individual or Class Environmental Assessment. Remedial flood and erosion control projects are the subject of this Class EA planning document.

The use of this Class EA is restricted to those undertakings which are remedial in nature and associated with the Water Management Policy in the Flood and Erosion Control Program Areas.

**TABLE 1
CONSERVATION AUTHORITY POLICY CATEGORIES**

I Water Management Policies			
PROGRAM	PROGRAM AREAS	EXAMPLE CATEGORIES	STATUS UNDER ENVIRONMENTAL ASSESSMENT ACT**
Flood Control	Preventative	Plan Input and Review Conservation Authority Regulations Stormwater Management Review Land Acquisition Flood Forecasting Dam Operation & Maintenance*	Exempt Exempt Exempt Exempt Exempt Exempt
	Protective	Remedial Flood Control Projects Floodproofing	Class EA/Individual Exempt
Erosion Control	Preventative	Plan Input and Review Conservation Authority Regulations Stormwater Management Review Land Acquisition	Exempt Exempt Exempt Exempt
	Protective	Remedial Erosion Control Projects	Class EA/Individual
Water Quality	Water Quality Monitoring	Monitoring	Exempt
	Low Flow Augmentation	Research Dam Operation and Maintenance*	Exempt Exempt
II Water & Land Management Policies			
PROGRAM	PROGRAM AREAS	EXAMPLE ACTIVITIES	STATUS UNDER ENVIRONMENTAL ASSESSMENT ACT**
Conservation Services	Rural Land Management	Soil Conservation	Exempt where all related projects cost less than \$50,000 and are under an agreement with a private landowner
	Forest Management Fish and Wildlife Management	Reforestation/Woodlot Management Habitat Management	Exempt Exempt
Wetland Management	Flood Storage Low Flow Augmentation Areas of Ecological Significance	Plan Input and Review Land Acquisition Dam Operation and Maintenance* Research Conservation Authority Regulations Plan Input and Review	Exempt Exempt Exempt Exempt Exempt Exempt
III Other Policy Areas			
PROGRAM	PROGRAM AREAS	EXAMPLE ACTIVITIES	STATUS UNDER ENVIRONMENTAL ASSESSMENT ACT**
Recreation	Niagara Escarpment Parks Regionally Significant Parks Heritage Conservation	Conservation Areas & Campground Development	Exempt where projects cost less than \$1,000,000/Individual
Conservation Education	Community Relations	Education & Interpretive Centres Public Information	Exempt Exempt

* See also Section 8 of this document for further details concerning these activities

** Status as determined in Ontario Regulation 334/90 under the **Environmental Assessment Act**. All staff must refer to Regulation 334/90 for detailed definitions to confirm exemption eligibility.

1.2.5 Status Under the Canadian Environmental Assessment Act (CEAA)

Projects that are subject to this Class EA may also be subject to the requirements of the **Canadian Environmental Assessment Act (CEAA)**. Under the **CEAA**, an environmental assessment is required for all projects for which the federal government holds decision-making authority - whether as a proponent, land administrator, source of funding or exercises a regulatory duty in relation to a project (described in the **CEAA** Law List Regulation). These are known as “triggers” to the **CEAA**. The federal department, agency or Minister whose actions or authority trigger the environmental assessment is referred to as the Responsible Authority (RA).

A project may be excluded from the need to undergo an Environmental Assessment under the **CEAA** when it is carried out in response to an emergency and carrying out the project is in the interest of preventing damage to property or the environment or is in the interest of public health or safety. A project may also be excluded from the **CEAA** if it is described on the Exclusion List, which are undertakings in relation to a physical work considered to have an insignificant impact on the environment, such as simple renovations or routine operations.

The Canadian Environmental Assessment Agency was created to administer and promote the federal environmental assessment process policies and practices. The Agency provides legal, procedural and policy advice, guidance and training to federal departments, proponents, the public and others related to the implementation and requirements of **CEAA**. The Agency should be consulted on federal and provincial EA coordination issues.

The following provides a brief overview of the **CEAA** requirements. This information is not all inclusive and is provided for information purposes only, to aid proponents in identifying and understanding potential **CEAA** requirements. For specific details, refer to the legislation and the Canadian Environmental Assessment Agency’s Responsible Authority’s Guide (November 1994). Copies of the legislation and associated regulations, as well as other helpful reference materials, are found on the Agency’s web site at: <http://www.ceaa-acee.gc.ca> . The Agency also offers training courses on the **CEAA** and the planning and conduct of environmental assessments subject to **CEAA**. Details on these training courses are also found on the Agency’s web site.

Table A in Appendix A provides further details on identifying federal departments who may have an interest in a project subject to this Class EA. These departments should be contacted as early as possible in the project planning process. Detailed contact information can be obtained from the Ontario Region Office of the Canadian Environmental Assessment Agency (see below). In addition, Table B in Appendix A outlines potential **CEAA** triggers, along with an associated listing of RAs. This Table is not all inclusive. It is also the responsibility of the proponent to identify potential triggers and contact the RA.

Where there is a trigger, the federal RA assesses the project in accordance with the requirements of the **CEAA**. Under **CEAA**, it is the RA’s responsibility to establish the scope of the project, the scope of the assessment and the scope of the factors to be considered. Proponents of this Class EA may provide input into the scope of project and the scope of assessment. The RA may agree or require that additional information or issues be addressed.

An objective of the Canadian Environmental Assessment Agency is to ensure that where a project is subject to both federal and provincial environmental assessment requirements, the environmental assessment be coordinated and guided by the principal of one project – one assessment, if appropriate. Therefore, for a project that is subject to this Class EA, and that also requires an environmental assessment in accordance with **CEAA**, the intent is that one

assessment would be undertaken to meet the requirements of both processes where possible. The Ontario Region Office of the Canadian Environmental Assessment Agency should be contacted for further details (see below).

While it is often possible to use the Project Plan or the ESR prepared under this Class EA as the basis for the **CEAA** assessment, it should not be assumed that they will always be sufficient or acceptable in all cases. Some additional information may have to be incorporated depending on what the RA requires to meet **CEAA** requirements. The proponent should, therefore, contact the RA early in the process to confirm requirements for the assessment.

In cases where a permit or licence is required, a trigger may not be confirmed until the later stages of the planning process. Proponents are, therefore, encouraged to contact federal authorities with a potential interest in the project early in the planning process to discuss potential issues related to the environmental assessment.

To determine whether your project is subject to the **CEAA** and to obtain further details on the requirements and implementation of **CEAA**, please contact:

Regional Director
Ontario Region Office
Canadian Environmental Assessment Agency
55 St. Clair Avenue East
9th Floor, Room 907
Toronto, Ontario
M4T 1M2

Phone: 416-952-1576
Fax: 416-952-1573
E-mail: ceaa.ontario@ceaa.gc.ca

The two most common regulatory triggers for **CEAA** involve approvals under the **Fisheries Act** and the **Navigable Waters Protection Act**. Further details on these two pieces of legislation are provided below.

Fisheries Act

Any works which occur in or near water may require authorization under the **Fisheries Act**. The federal **Fisheries Act** provides protection for fish and fish habitat. Under the habitat provisions of the Act, no person shall carry out any work or undertaking that harmfully alters, disrupts or destroys fish habitat, unless authorized by the Minister of Fisheries and Oceans Canada. Authorization under subsection 35(2) of the **Fisheries Act** protects an individual from prosecution under the Act, provided the conditions of the authorization are met. A subsection 35(2) **Fisheries Act** authorization is a regulatory trigger for an environmental assessment under the **CEAA**.

Early in the planning process, contact with the Conservation Authority (CA) staff responsible for implementing the Department of Fisheries and Oceans (DFO)/CA Fish Habitat Agreement [if applicable] and contact with the Ministry of Natural Resources under provincial regulations should identify the need to contact Fisheries and Oceans Canada. Since the Conservation Authority is the proponent for remedial flood and erosion control projects under this Class EA, all projects will be reviewed in accordance with "A Protocol Detailing the Fish Habitat Referral Process in Ontario" (August 2000) as amended.

It should be noted that Fisheries and Oceans Canada can withhold authorization. Therefore, proponents are urged to address this issue early in the Class EA process.

Navigable Waters Protection Act

Any project that has the potential to affect the navigability of a navigable waterway requires a permit under the **Navigable Waters Protection Act**. This in turn would trigger the requirement for an assessment in accordance with the **CEAA**. To determine whether or not a waterway or watercourse is considered to be navigable, proponents should contact the Department of Fisheries and Oceans – Coast Guard.

1.3 Funding and Approval Mechanisms

Funding for Conservation Authorities, as outlined in the **Conservation Authorities Act**, is based upon municipal and provincial funding arrangements and is secured with project approval. There are three basic sources of remedial project funding, including:

- **Provincial Ministry of Natural Resources** Funding comes from the province in the form of grants for which rates vary regionally. Projects are prioritized on a province wide basis for this funding. In this regard, requests for funding are submitted to the Ministry of Natural Resources and are ranked based upon the specific benefits of the remedial project. Not all requests will receive funding in any given year. Where the project involves money granted by the Minister, prior to receiving this funding, technical approval of the project must be received from the Minister of Natural Resources.
- **Municipal Levies** The balance of the funding is generally raised from the member municipalities as a levy. Apportionment of the levy among municipalities is based upon the proportional benefit received. The benefiting municipality(ies) must obtain approval for the remedial project from its (their) Council(s) prior to providing the Conservation Authority with a Special Benefiting Levy.
- **Other Contributions** Remedial projects are in most cases, undertaken by the Conservation Authority in a partnership with the landowner, therefore, Conservation Authorities have arrangements whereby private landowners or local groups may contribute portions of a project's cost. As well, partial funding may be obtained through other federal or provincial government programs for specific aspects of the undertaking (e.g. fisheries improvements).

These funding and approval mechanisms reflect the provincial/municipal partnership that generally must exist for these projects to be undertaken. These approvals would follow the Class EA approval of the undertaking.

2.0 APPLICATION OF THE CLASS ENVIRONMENTAL ASSESSMENT TO REMEDIAL FLOOD AND EROSION CONTROL PROJECTS

This section will discuss the need for remedial flood and erosion control projects and will provide a justification for applying the Class EA approach to such projects. In addition, this section will provide a definition of the kinds of projects that are included in this Class EA.

2.1 Need for Remedial Flood and Erosion Control Projects

Under natural conditions, all lands along watercourses and shorelines are subject to periodic flooding. Bank/bluff instability and erosion (collectively referred to as "erosion" problems in this document) along watercourses and shorelines also occur due to natural causes. Land use practices have tended to aggravate flood and erosion problems. These practices include deforestation, agricultural land clearing, urbanization, and the filling and draining of wetlands. These activities have acted to significantly alter the natural hydrological regime of watercourses. Increase in total volume of surface runoff, in combination with increased flow velocities and flood frequency, in turn have increased the energy available for river valley erosion.

The Provincial Government, Ontario's municipalities, and Conservation Authorities have recognized that these natural processes can pose hazards to public safety and have formulated policies and regulations pertaining to flood plain management and to ensure that land use practices throughout a watershed have regard for water management concerns. To the extent possible under the Conservation Authority mandate, Authorities continue to regulate new development in flood plains and to have flood plains recognized in all components of the municipal land use planning process so as to eliminate the need for future remedial flood and erosion control projects.

Prior to the introduction of flood plain planning concepts which are routinely employed by Conservation Authorities, settlement occurred along watercourses and shorelines. These flood plain areas offered many advantages to early settlers, because they were easily developed and were in close proximity to sources of food, drinking water, power, and transportation routes. Since these historic beginnings, many towns and cities in Ontario have been established, totally, or in part, in river valley flood plains or along lake shorelines.

Flooding and bank instability/erosion can result in the following critical problems:

- risk to human life
- property damage
- damage or disruption of various corridors including roads, highways, bridges, pipelines, storm and sanitary sewers, telephone and hydro lines, etc.

The potential risk to public safety associated with flood and bank instability/erosion is a fundamental concern of the Conservation Authorities of Ontario. Furthermore, Conservation Authorities recognize that flooding and erosion can result in the following ancillary problems:

- sedimentation of watercourses and coastal wetland areas,
- degradation of aquatic habitats, such as fish spawning grounds
- loss of fertile soil, and the destruction of terrestrial vegetation and associated habitat resources
- loss of natural shoreline protective features such as beaches, berms and dunes
- imbalances in natural processes which provide aquatic and terrestrial habitat
- personal hardship and severe social disruption
- loss of cultural features such as bridges, mills, and houses

Preventative aspects of Conservation Authorities' flood and erosion control programs serve to ensure that new development will be safe from flood and erosion hazards. However, given the reality of historical development in close proximity to watercourses or shorelines, preventative aspects of the Conservation Authorities' flood and erosion control programs, such as Fill, Construction and Alteration to Waterways Regulations (to be updated through the Section 28 Generic Regulation under the CAA), planning controls, reforestation, or land acquisition may not be adequate or viable to provide for public safety. Therefore, where existing development is at risk, some form of remedial project may be necessary.

2.2 Justification of the Class Environmental Assessment Approach

Common elements are recognized in addressing flood and erosion problems, not only within a Conservation Authority, but from one Conservation Authority to another. Therefore, one coordinated approach to environmental assessment by all 38 Conservation Authorities is appropriate.

The Class EA approach is considered a suitable means for the planning of remedial flood and erosion control projects, because such projects;

- have a common process of planning, design, approval, construction, operation and monitoring; and,
- have a generally predictable range of effects, which, though significant enough to require environmental assessment, are generally responsive to standard mitigation measures.

Fifteen years of experience have demonstrated that using the Class EA approach for dealing with flood and erosion control projects is an effective way of complying with the EAA requirements. It is the responsibility of the proponent Conservation Authority to ensure that the planning process as set out in the Class EA document is undertaken. The projects that will be assessed are those with predictable environmental effects and proposed mitigation measures will be identified and documented. The Class EA process provides a consistent, streamlined, easily understood process for planning and implementing flood and erosion control projects. The process that is implemented through approval of the Class EA ensures that the intent of the EAA is met by providing for the identification of issues and concerns, and the preferred means of addressing them, with due regard to environmental management, protection, and mitigation measures. The process also provides the flexibility to be tailored to the activity, taking into account the environmental setting, public interest, and unique situation requirements.

2.3 Definition of the Undertakings Within the Class

Remedial Flood and Erosion Control Projects refer to those projects undertaken by Conservation Authorities, which are required to protect human life and property, in previously developed areas, from an impending flood or erosion problem. Such projects do not include works which facilitate or anticipate development. Major flood and erosion control undertakings which do not suit this definition, such as multipurpose projects, lie outside the limits of this Class and require an Individual Environmental Assessment.

The undertakings to which this Class EA applies have been grouped within four problem situations. These problem situations are: riverine flooding, riverine and valley slope erosion, shoreline flooding, and shoreline erosion. Several types of solutions to these problems are non structural in nature and/or do not require capital works. Such solutions are not subject to this Class EA. Table 2.0 provides a summary of the types of solutions to these problem situations which are the subject of this Class EA. These solutions are structural in nature and/or require capital works. Table 2.0 is not exhaustive as it cannot anticipate new, innovative approaches of addressing these four problem situations. A more

detailed description of each of the four problem situations and the alternative methods of addressing them can be found in Part II of this Class EA.

- **Riverine Flooding**

Two main causes of flooding in the riverine system are an increase in water level from a storm event or rapid snow melt, and a result of the formation of ice jams, frazil ice, or other debris in watercourses. Alternative remedial measures to protect areas from flooding include preventing the entry of floodwater to a specific site, or altering the flows through the channel during flood events. Flows can be altered by increasing the hydraulic capacity of the watercourse, diverting water from flood vulnerable areas and increasing upstream storage.

- **Riverine and Valley Slope Erosion**

Riverine erosion is the result of fluvial processes which are determined by the watercourses flow and the sediment mixture of the watercourses bed and banks. Bluff/bank instability problems can also occur along river or stream banks as a result of weathering, internal drainage problems, or the removal of stabilizing vegetation and soil material from the surface of the slope. The soil type, moisture content, and slope geometry are important factors in determining the strength of the slope materials and ultimately the slope stability.

Alternative remedial measures to address channel/riverbank erosion include reducing the erosive energy of the channel flows at the toe of the slope or protecting the toe or channel from this erosive energy. Stabilization of the face of the slope can be achieved through the use of drainage or grading improvements.

- **Shoreline Flooding**

Shoreline flooding varies from a river system because an additional component, that of wave action, must be considered in addition to increases in water levels. The still water level plus the wave action (wave uprush/runup, overtopping, ice accumulation) result in a final storm elevation.

Alternative remedial measures suitable to protect from shoreline flooding include preventing entry of floodwaters at a particular site, or reducing the wave uprush elevations by reducing wave energy offshore.

- **Shoreline Erosion**

The erosion processes along the shoreline differ from those in a riverine system. Erosion is predominantly brought about by waves, currents, shore geomorphology, ice and changes in water levels. Shoreline erosion can result in deterioration of bluffs/banks, dunes, berms and beaches. The eroded sediment is transported along the shoreline as littoral drift. Protection of natural features such as beaches, berms and dunes are necessary in order to stop erosion of the backshore and coast area(bluff/banks).

Protection or creation of coastal wetlands along the shoreline will enhance the natural ecosystem and also provide a buffer against wave action by attenuating wave energy.

The type of shoreline, cohesive (clay, silt, glacial till) or non-cohesive (sandy), is very important in determining the type of erosion processes occurring along the shoreline. The bluff/bank instability problems along the shorelines are generally the same as along riverbanks. Alternative remedial measures suitable to address shoreline erosion include reducing wave energy and enhancing natural processes, protecting from wave energy or stabilizing the slope through drainage or grading improvements.

**TABLE 2
SUMMARY OF CLASS UNDERTAKINGS***

PROBLEM SITUATIONS	ALTERNATIVE REMEDIAL MEASURES	EXAMPLES OF ALTERNATIVE METHODS/DESIGNS
Riverine Flooding	Prevent Entry of Flood Water Increase Hydraulic Capacity of Waterway Modify River Ice Formation and/or Break-up Processes Divert Water From Area Increase Upstream Storage	Berming Bridge and Culvert Alterations Bank Regrading Increase Bank Height Revetments Channel Realignment Dredging Ice Control Booms Bypass Channel Bridge and Culvert Alterations Dry Dams Weirs Wet Dams
Riverine and Valley Slope Erosion	Reduce Erosive Energy of Channel Flows Protect From Erosive Energy Of Channel Flows Stabilize Bank or Slope	Instream Obstacles Decrease Gradient Drop Structures Rock Ramps Soil Bioengineering Deflectors Revetments Channel Realignments Soil Bioengineering Improve Internal Drainage Improve Surface Drainage Regrading of the Slope
Shoreline Flooding	Prevent Entry of Floodwaters Reduce Wave Energy	Artificial Nourishment Dikes Seawalls Revetments Artificial Nourishment Offshore Breakwaters (including Low Crested Breakwaters, and Islands)
Shoreline Erosion	Reduce Wave Energy and Enhance Natural Processes Protect From Wave Energy Stabilize Bank or Slope	Artificial Nourishment Headland Beach System Offshore Breakwaters (including Offshore Low Crested Breakwaters) Groynes Coastal Wetlands Shore Connected Breakwaters Revetments Seawalls Jetty Islands Soil Bioengineering Improve Internal Drainage Improve Surface Drainage Regrading of the Slope

* The alternative ways of addressing each of the four problem situations outlined in this table should be used as a "starting point" only. A full range of alternatives should be considered, including both traditional and innovative measures, in accordance with the Class EA planning process.

It can be seen from Table 1.0 and Table 2.0 that this class of undertakings includes flood and erosion control projects that are of a limited scale and purpose. Furthermore, it should be noted that major flood and erosion control undertakings which do not suit this definition, such as multipurpose projects, lie outside the limits of this class. The impacts of such undertakings and the extent of their effects are not predictable without detailed study. Accordingly, they must be subjected to an Individual Environmental Assessment, rather than this class approach.

2.4 Proponents of the Class Environmental Assessment

The proponents of this Class EA are Conservation Authorities within the meaning of the **Conservation Authorities Act**, and including those listed in the Preface.

A Conservation Authority may enter into an agreement with any party to plan, design and implement an undertaking or undertakings subject to this Class EA. In such cases, each/all of the parties to the agreement will be proponents under this Class EA and will be subject to its requirements but the Conservation Authority is ultimately responsible for ensuring the requirements of this Class EA are met. Additionally, the subject undertaking(s) of such an agreement or agreements will be for the purposes of remediating a flood or erosion control problem and not for the purposes of anticipating or facilitating development.

Where there is a partnership project that meets the definition of an undertaking under this Class EA, and any of the partners' approved Class EAs, such as the "Municipal Class Environmental Assessment" (Municipal Engineers Association, June 2000 - as amended), then the partners will decide which Class EA will be applied. If the decision is to use this Class EA, then the proponent Conservation Authority shall provide written justification for making that decision in the Notice of Filing.

3.0 PLANNING AND DESIGN PROCESS

The previous sections outlined the relationship of remedial flood and erosion control projects to the overall planning and program context of Conservation Authorities. This section describes how potential projects are identified, and the specific planning process which is to be followed once a situation potentially requiring remedial flood or erosion control has been identified. This section begins by outlining the Conservation Authority planning process. It explains how the Class EA process is initiated and documents the environmental planning and design principles that are to be employed in this process. This is followed by a step by step description of the Class EA planning process.

This planning process has been outlined in flowchart form in Figure 1A, 1B and 1C. These figures should be referred to throughout this section. Section 4.0 of this Class EA, which details opportunities and provisions for public involvement in the planning and design process must be consulted while reading this section.

3.1 Conservation Authority Planning Process

Conservation Authorities, in the normal course of their operations, may identify problems relating to flood and erosion control. The following sections outline the means by which this occurs and describes the process which leads up to the initiation of the Class EA process.

3.1.1 Problem Identification

Conservation Authorities are normally alerted to existing or potential flooding or erosion problems by the general public, landowners, municipalities, or other agencies as well as by Conservation Authority staff as a result of watershed inventories, studies, or routine day to day operations.

At the request of the landowners immediately involved, and in consultation with adjacent property owners, the Conservation Authority is called upon to address the problem. To assess the problem and determine what course of action ought to be taken, the Conservation Authority must investigate and evaluate a reasonable range of alternative solutions.

3.1.2 Preliminary Site Analysis

When the Conservation Authority has been requested to address a problem involving existing development which is at risk from flooding or erosion, the problem shall be investigated by staff to determine its cause, level of risk to human life and property, possible solutions, and, if it is serious enough to warrant further Conservation Authority involvement, or whether the problem should be dealt with by an agency other than the Conservation Authority or through a cooperative inter-agency effort.

When it is determined that formal Conservation Authority involvement is warranted, an evaluation of possible program options (i.e. alternative solutions) to deal with the problem and reduce the risk to public safety in the situation shall be completed. It is recommended that an informal site meeting occur with the affected landowner(s) to discuss alternative solutions.

3.1.3 Evaluation of Possible Conservation Authority Program Options

Once it has been determined that Conservation Authority involvement is necessary to deal with the concern, there are different programs by which this problem may be addressed. Regardless of the outcome of this process, it must be demonstrated that the proposed action falls within the scope of the Authority's watershed plan and is consistent with policies and appropriate programs within which the proposed project may be considered to be a part.

3.1.4 Selection of a Preferred Conservation Authority Program Option

There are four possible outcomes of the previous evaluation of Conservation Authority program options. These outcomes, as shown in Figure 1A, include:

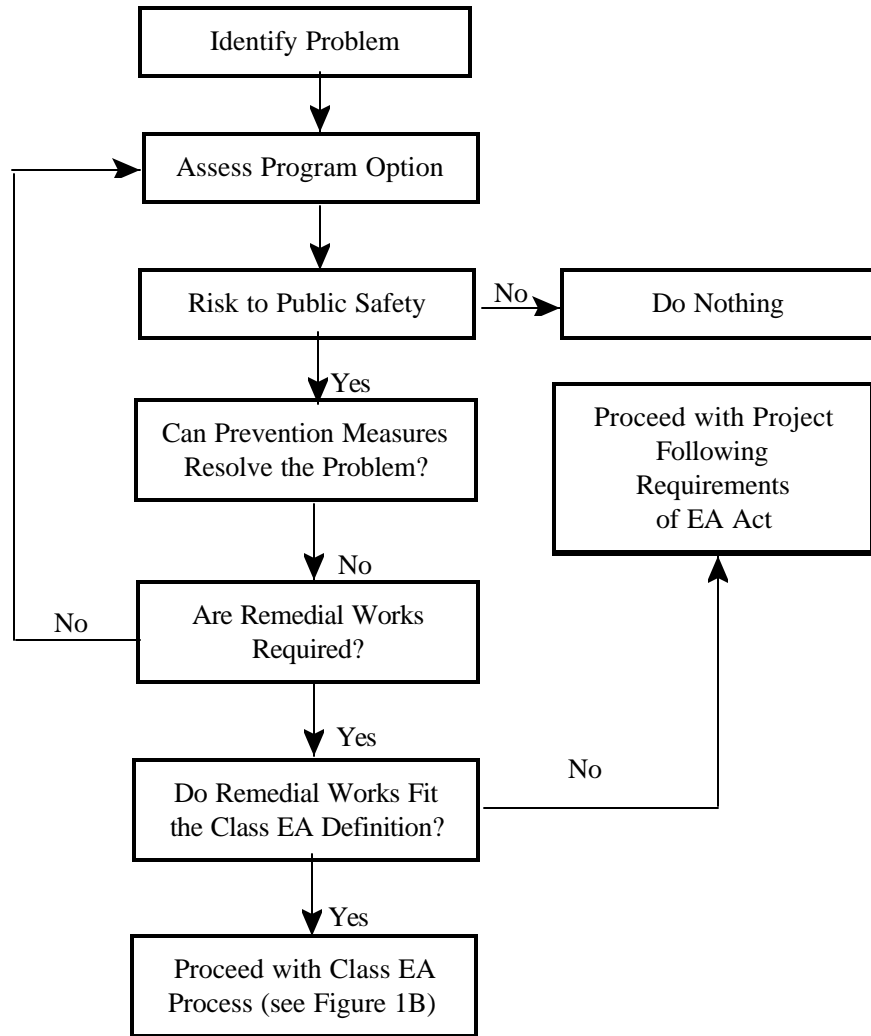
- The Authority may decide that the "do-nothing" option is the best approach at this time. This would be the case in situations where risk to existing development or public safety is determined as minimal, or where the consequences of flooding or erosion are not of the magnitude that require Conservation Authority involvement.
- The Authority may decide that preventative measures can be used to address the problem, or that other protective programs such as land acquisition, or floodproofing are appropriate to deal with the situation. If this is the case, the planning process for such a program, and the requirements of that program in relation to the **Environmental Assessment Act** will be followed.
- The Conservation Authority may decide that a major structural work could potentially be involved in remedying the situation. If the kind of action needed is remedial in nature but one which does not meet the intent of the definition of undertakings within the Class of Remedial Flood and Erosion Control Projects, (see Section 2.3, and Table 2.0), the Authority will begin to prepare an Individual Environmental Assessment.
- **The Authority may determine that the action needed is a remedial flood and/or erosion control measure as described in the definition of undertakings in Section 2.3 and listed in Table 2.0. In such a case, planning shall proceed using the Class EA process described herein.**

3.2 Initiation of the Class Environmental Assessment Process

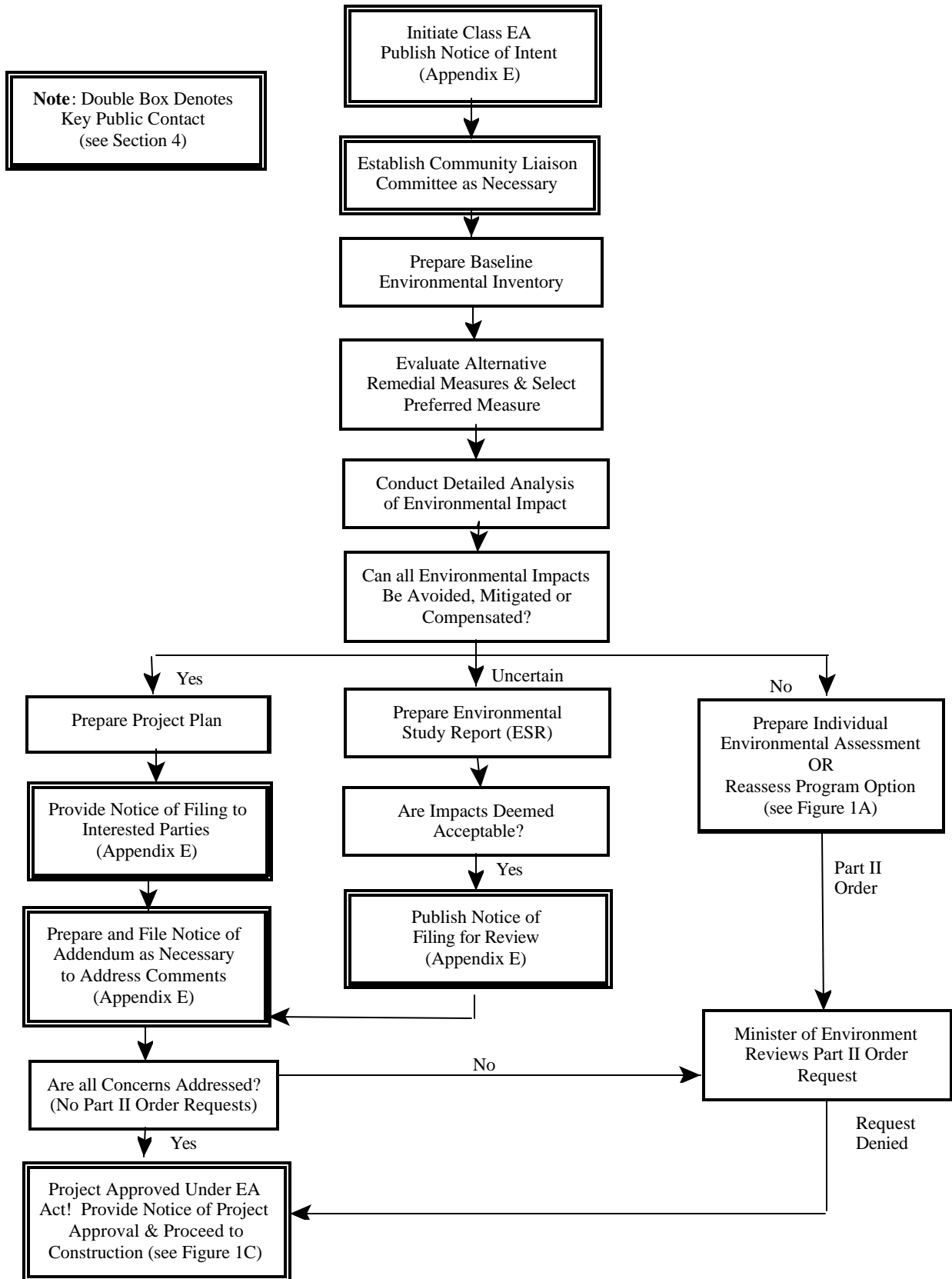
The planning process outlined in the previous section, is one which occurs in Conservation Authorities' day to day activities. When it has been determined that a situation potentially requires a flood or erosion control project, which meets the definition of this class, the Conservation Authority will initiate the planning and design process as outlined in the following sections, and illustrated in Figure 1B. Landowners in the area and those who have been involved in the project's initiation will be encouraged to participate in planning with the Conservation Authority throughout the project's duration.

The process includes all steps which are necessary to plan, design, evaluate, implement, and monitor a project. The decision making in this process must be traceable. Therefore documentation occurs at each step. This documentation will be drawn together in a report detailing the project planning (Section 3.7.2).

**FIGURE 1A
PLANNING AND DESIGN PROCESS
SELECTION OF A PROGRAM OPTION**



**FIGURE 1B
PLANNING AND DESIGN PROCESS
CLASS ENVIRONMENTAL ASSESSMENT**



At this point the first mandatory notice of the intention to undertake a remedial project will be given and copied to Conservation Ontario. As further detailed in Section 4.0 and Appendix E, this public notification process aims to invite local landowners, individuals, groups, organizations, agencies, federal and provincial ministries with an interest in the project to participate in its planning with the Conservation Authority, throughout the planning process.

3.3 Examination of the Environmental Planning and Design Principles

The Conservation Authorities of Ontario, recognize that it is important to ensure that the planning and design of remedial flood and erosion control projects reflect a concern for ecosystems. This requires that emphasis be placed not only on the prevention and mitigation of environmental impacts but also on environmental enhancement. The following principles endeavour to promote these goals. They shall be applied when implementing the planning and design process for remedial flood and erosion control projects.

- Remedial works shall be carried out only for the protection of existing development. These works will not be implemented for the sole purpose of facilitating future development.
- Alternative methods which replicate the natural environment shall be given preference over “hard” alternatives wherever possible, and, all projects should evaluate opportunities for enhancement of terrestrial or aquatic habitats as part of project design.
- Detailed technical design, as well as specific requirements for supervision and monitoring of projects undertaken shall be completed by a multidisciplinary team. Collectively this team should possess all of the necessary qualifications to address technical issues surrounding the implementation of the undertaking.
- Remedial project design shall strive to re-establish, maintain or enhance the natural function (both biological and physical) and appearance of the watercourse or shoreline and associated features (floodplain, valley, wetlands, beaches etc.) while recognizing and preserving existing cultural and archaeological features of significance in the project's study area.
- Remedial measures shall be designed based on a thorough understanding of the biological, physical and hydrologic characteristics of the watercourse or the coastal processes of the lake. Characteristics include ecosystem structures/features, functions, boundaries and thresholds. Where remedial works are necessary in a riverine situation, the solution shall be developed based upon an appropriate river reach or valley system. Likewise, in a shoreline situation, the entire littoral cell will be considered.
- During rehabilitation, provide for the re-establishment of vegetative cover within the shoreline or valley system, particularly adjacent to the watercourse (riparian zone) or shoreline (backshore). Vegetation re-establishment shall be compatible with the existing, local, or disrupted community and efforts should be made to use native species of the local flora.
- The design of remedial works, involving migratory corridors, shall strive to ensure preservation or enhancement of the migratory character of the feature. This includes the valley system, watercourse and shoreline interface both for terrestrial and aquatic fauna.
- In identifying the objectives for the aquatic/terrestrial environments, the potential quality of the ecosystem, as well as its existing condition, shall be considered.

3.4 Review of the Selection of Conservation Authority Program Options

The planning and design process for the Class EA will begin with a review of decisions made in the Conservation Authority planning process. All steps in decision making which led to the selection of a remedial project as the preferred program option, as documented by the Conservation Authority, shall be reviewed by interested government agencies, individuals and members of the Community Liaison Committee (Section 4.1.3). The decision to proceed with the planning and design as a remedial project shall be examined. If not confirmed then the options to be considered, as shown in Figure 1A include:

- Do Nothing
- Pursue another Conservation Authority Program Option
- Prepare an Individual Environmental Assessment

If the decision to proceed with planning a remedial project is confirmed then this documentation will also be included in the report of the project planning (Section 3.7.2).

3.5 Preparation of a Baseline Environmental Inventory

Once a determination has been made that the preferred option is a remedial project, as defined in this class, the planning process continues with the preparation of a baseline inventory. This inventory will provide the information needed to evaluate alternative methods of addressing the problem situation. It will also provide a baseline from which to monitor the effectiveness of the action, once taken, and the types and level of environmental impacts that resulted.

The inventory will involve the examination and documentation of:

- the flooding or erosion problem,
- existing site conditions including physical, biological, cultural, and socioeconomic characteristics;
- engineering/technical aspects to be considered;
- previous protective measures that have been implemented within the study area.

The study area will include both directly affected and indirectly affected environments. The directly affected environment includes the environment within the bounds of the flood or erosion control problem where remedial works would be located, the access or construction route and those properties immediately adjacent to these areas. The indirectly affected environment includes the environment, as identified in the planning and design principles, within which the proposed works are likely to have an impact (e.g., the entire littoral cell and associated shorelands, or river reach, or valley system).

Local landowners and individuals, organizations and agencies, and provincial and federal ministries or agencies with specific expertise relevant to the problem being addressed should be contacted for their input into the inventory process. Information from previous studies that have been undertaken within the study area should also be utilized.

The complexity of inventories will vary greatly from situation to situation. More detail will be necessary for complicated problems where there are design constraints due to limited access or in environments where there is a high degree of ecosystem structure and function. The required level of documentation is specified in Appendix B - Baseline Environmental Inventory. This is intended to be a starting point for the environmental assessment process. The information collected through the baseline environmental inventory will be further used in the process for the evaluation of alternative methods and selection of a preferred method, as well as preparation of a monitoring program.

The inventory methods and results will be documented and included in the report of the project planning (Section 3.7.2).

3.6 Evaluation of Alternative Methods For Carrying Out Remedial Project

With the baseline inventory completed, possible alternative methods of carrying out the remedial project are to be investigated. A full range of alternatives should be considered including both traditional and innovative approaches. It must be demonstrated that no viable measures (see Table 2.0) have been overlooked.

A summary of undertakings within the class and some examples of alternative methods are supplied in Table 2.0. This list shall be used as a starting point in identifying alternative methods.

The evaluation of alternative methods of carrying out the undertaking will include consideration of all applicable legislation, regulations, policies and guidelines (see listing in Appendix C), the Environmental Planning and Design Principles outlined in Section 3.3, and criteria relating to:

- environmental effects, considering the broad definition of environment contained in the Environmental Assessment Act,
- the effectiveness of the method to produce the desired result,
- the technical feasibility of undertaking the method, and
- the associated cost.

The information obtained in completing the baseline environmental inventory will be used in this evaluation of alternative methods and expanded upon as necessary. As outlined in Section 4.0 further consultation with the public, interest groups, and other agencies is strongly recommended.

In considering alternative methods specific consideration must be given to the advantages and disadvantages of each method. This will include an examination of the types and extent of impacts, both positive and negative, that each alternative method would likely have on each of the evaluation criteria. The evaluation of impacts should include evaluation of both temporary impacts during construction of the undertaking, and permanent impacts due to operation and maintenance of the undertaking after construction. Table 3.0 will be used as a reference for the screening of potential effects.

As each method is examined, the net negative impact (that impact which cannot be avoided, reduced or compensated for) of carrying out the undertaking will be determined. This requires consideration of potential mitigation measures. The type and extent of this impact will also be specified.

When this is completed for each alternative method, a comparison of the relative advantages and disadvantages of each method will be undertaken. This will require making judgements about:

- the significance of the expected environmental effects
- the degree of the effectiveness of the method
- the extent of the technical feasibility, and
- the magnitude of the costs

Once these determinations are made, then a judgement must be made regarding the relative importance of the criteria given the results. A matrix or graphic approach may aid in the collection, interpretation, and presentation of this information.

To conduct a meaningful evaluation and assessment, each of the alternative methods will be examined to a level of detail necessary to enable a preferred method to be identified. The level of complexity will depend upon the scope and complexity of the site and of the alternative methods being considered.

TABLE 3

DETAILED ENVIRONMENTAL ANALYSIS - Screening of Potential Effects as negative (-), neutral (NIL) or positive (+) and rating them as relatively high (H), medium (M), low (L) or not applicable (NA)

Screening Criteria	Rating of Potential Effect							
	- H	- M	- L	NIL	+ L	+ M	+ H	NA
Physical								
Unique Landforms								
Existing Mineral/Aggregate Resources Extraction Industries								
Earth Science - Areas of Natural and Scientific Interest								
Specialty Crop Areas								
Agricultural Lands or Production								
Niagara Escarpment								
Oak Ridges Moraine								
Environmentally Sensitive/Significant Areas (physical)								
Air Quality								
Agricultural Tile or Surface Drains								
Noise Levels and Vibration								
High/Storm Water Flow Regime								
Low/Base Water Flow Regime								
Existing Surface Drainage and Groundwater Seepage								
Groundwater Recharge/Discharge Zones								
Littoral Drift								
Other Coastal Processes								
Water Quality								
Soil/Fill Quality								
Contaminated Soils/Sediments/Seeps								
Existing Transportation Routes								
Constructed Crossings (e.g. bridges, culverts)								
Geomorphology								
Other								
Biological								
Wildlife Habitat								
Habitat Linkages or Corridors								
Significant Vegetation Communities								
Environmentally Sensitive/Significant Areas (biological)								
Fish Habitat								
Species of Concern (e.g. species at risk, vulnerable/threatened/ endangered species, conservation priorities - either flora or fauna)								
Exotic/Alien and Invasive Species								
Wildlife/Bird Migration Patterns								
Wildlife Population								
Wetlands								
Microclimate								
Life Science ANSI's								
Unique Habitats								
Other								

DETAILED ENVIRONMENTAL ANALYSIS - Screening of Potential Effects as negative (-), neutral (NIL) or positive (+) and rating them as relatively high (H), medium (M), low (L) or not applicable (NA)

Screening Criteria	Rating of Potential Effect							
	- H	- M	- L	NIL	+ L	+ M	+ H	NA
Cultural								
Traditional Land Uses								
Aboriginal Reserve or Community								
Outstanding Native Land Claim								
Transboundary Water Management Issues								
Riparian Uses								
Recreational or Tourist Uses of a Water Body and/or Adjacent Lands								
Recreational or Tourist Uses of Existing Shoreline Access Locations								
Aesthetic or Scenic Landscapes or Views								
Archaeological Resources, Built Heritage Resources and Cultural Heritage Landscapes								
Historic Canals								
Federal Property								
Heritage River System								
Other								
Socioeconomic								
Surrounding Neighbourhood or Community								
Surrounding Land Uses or Growth Pressure								
Existing Infrastructure, Support Services, Facilities								
Pedestrian Traffic Routes								
Property Values or Ownership								
Existing Tourism Operations								
Property/Farm Accessibility								
Other								
Engineering/Technical								
Rate of Erosion in Ecosystem								
Sediment Deposition Zones in Ecosystem								
Flood Risk in Ecosystem								
Slope Stability								
Existing Structures								
Hazardous Lands								
Hazardous Sites								
Other								

For any component where there is deemed a potential negative effect, describe in detail the cause, the degree of effect and measures to be taken to eliminate or reduce impact.

Note: See Appendix C for further information

3.7 Selection of a Preferred Alternative

The evaluation process must be fully documented to allow traceability of each step of the process. That is, specific criteria examined to assess the alternative methods, the types, extent and significance of net impacts on that criteria, the weighting of the net impacts, and the decision making approach used must therefore be thoroughly documented and included in the report of the project planning (Section 3.7.2)

If, as a result of the consideration of the evaluation criteria, the "do nothing" alternative solution or the use of other Conservation Authority or other agency programs (eg. land acquisition) are deemed to be more acceptable alternative solutions, there will be no further consideration as a remedial flood or erosion control project.

3.7.1 Detailed Environmental Analysis of the Preferred Alternative

Once the preferred alternative method of carrying out the undertaking is selected, then it will be subjected to more detailed study of the net impacts likely to be associated with implementation as previously determined. A further determination can then be made regarding how the potential net negative impacts can be best dealt with at the detailed design level.

To complete this environmental analysis, the information collected in the environmental inventory phase, as well as the assessment of alternative methods, will be used and expanded upon where necessary. As outlined in Section 4.0, further consultation with outside agencies, the public, and interest groups is also strongly recommended.

In the environmental analysis, the same areas of concern (i.e., physical, biological, cultural, socioeconomic and engineering/technical) that were examined in the baseline inventory and the evaluation of alternative methods are examined in greater detail in order to confirm potential impacts, refine methods of mitigation, and identify any unforeseen impacts. The evaluation of impacts should include evaluation of both temporary impacts during construction of the undertaking, and permanent impacts due to operation and maintenance of the undertaking after construction. Table 3.0 will be used again for the screening of potential environmental effects of the preferred alternative.

In many cases, it will be apparent that the project under consideration will likely have no negative impact on the evaluation criteria or will have a positive impact. For each case where there is a possibility that the remedial work will have negative impacts, this possibility will be documented. Specific measures of avoiding, reducing, or compensating for the impact are to be described in greater detail. Refer to Appendix C for examples of "mitigation required" and "legislation/approvals/information" for addressing a range of impact situations. Those agencies, groups, and individuals that have expressed an interest in this matter will be notified and consulted. Discussions regarding suitable means to avoid, reduce, or compensate for these impacts will be held. If it is concluded that mitigation is possible to avoid all negative impacts this and the agreed upon methods to do so will be documented.

This process will systematically identify all areas of concern. It will include documentation of all methods of mitigation required to address these concerns and outline any concerns that cannot be resolved through mitigation methods. This process will be fully documented and included in the report of the project planning (Section 3.7.2) **The analysis is not complete until all identified potential negative impacts are examined and documented in this fashion.** A proposed monitoring program will be outlined and it will be commensurate with the predicted environmental impacts and mitigation/enhancement documented in this analysis.

3.7.2 Selection of Documentation Level

The detailed environmental analysis of the preferred alternative can lead to one of four possible conclusions, either:

1. It is apparent that all concerns of the Conservation Authority and reviewers can be addressed, that is, all possible negative impacts can be avoided, mitigated or compensated for satisfactorily. Those consulted by the Authority during the environmental analysis concur with these findings and conclusions. (This is most likely to be the case for flood and erosion problems of a relatively limited scale/scope in non-sensitive environments.) or,
2. It is uncertain whether concerns regarding impacts can be resolved without further study or it is determined that negative impacts will occur that cannot be mitigated and consideration must be given to the trade-offs associated with the impact and the carrying out of a remedial work. (This is likely to be the case for more complex flooding and erosion problems or problems occurring in environments with a high degree of ecosystem structure and function or which are in some way sensitive to human intervention.) or,
3. It is determined that there are likely to be negative impacts which were not foreseen and cannot be mitigated, and concerns on the part of interested individuals, groups and agencies will be difficult to resolve without intensive study, and a more rigorous planning process should be applied, or
4. It is determined that the negative impacts of a remedial project are of a magnitude that further consideration as a remedial project will cease.

Each of the above conclusions will require a different documentation process to be followed.

3.7.2.1 Project Plan (Conclusion 1 of the Environmental Analysis).

A Project Plan is prepared for remedial works for which it has been demonstrated that there are no negative impacts or outstanding concerns held by the Conservation Authority or reviewers. The file that has been established for inclusion in this report of the project planning will include documentation relating to:

- the situation or problem to be addressed including the causes of the problem (identifying, where possible, if the problem is the result of post-1992 development), the history of the problem (identifying if the problem is affecting pre or post 1992 development) and the level of risk,
- the alternatives considered and the justification for remedial work,
- the baseline environmental inventory,
- the review and assessment of alternative methods of carrying out remedial work,
- the rationale underlying the selection of the preferred alternative method of carrying out the remedial work,
- the identification of potential impacts,
- individuals, groups and agencies consulted,
- issues and concerns that have been raised,

- the identification of methods for avoiding or mitigating negative impacts,
- information on construction timing and what construction guidelines will be used, and
- proposed effects monitoring.

This information, together with a written description of initiatives for enhancement, shall be brought together in a project plan (Sample format is provided in Appendix D). For very minor projects, the project plan may simply entail the Conservation Authority project file with brief responses to the bullet point items in Appendix D. Notice shall be sent to all parties who have expressed an interest in the remedial work, of the availability of the plan for review.

This project plan shall be filed and made available at the Conservation Authority office and other suitable locations such as the local Municipal Office or Public Library, for review for a 30 day period. If, for unforeseen reasons, a concern is raised in this review that cannot be resolved through consultation, or negotiation, the Authority shall consider preparation of an Environmental Study Report for the project. Alternatively, any party may make a request, with reasons, to the Minister of the Environment for a Part II Order. A Part II Order (previously called a bump-up) requires that a proponent comply with Part II of the **Environmental Assessment Act** before proceeding with a proposed undertaking which has been subject to Class EA requirements (see Section 7).

If no concerns are raised during a 30 day review period, the project is considered approved under the **Environmental Assessment Act**, and with the receipt of all other necessary approvals, implementation shall proceed. Notification that the project is approved shall be sent to all parties who have expressed an interest in the remedial work and to the Conservation Ontario office (see sample in Appendix E). Within 30 days of the “Notice of Project Approval”, the “Proponent Conservation Authority Evaluation Form: Part A” (Appendix F) will be completed and submitted to Conservation Ontario.

3.7.2.2 **Environmental Study Report** (Conclusion 2 of the Environmental Analysis).

An Environmental Study Report (ESR) is prepared for projects for which it has been demonstrated that negative impacts will occur, and tradeoffs must be made, in choosing among alternative methods of carrying out the proposed remedial work. An ESR may also be prepared in response to concerns that arise in the preparation and/or review of a Project Plan.

The ESR must meet the requirements of subsection 6.1(2) of the **Environmental Assessment Act**, which reads;

“...the environmental assessment must consist of,

- (a) a description of the purpose of the undertaking;
- (b) a description of and a statement of the rationale for:
 - (i) the undertaking
 - (ii) the alternative methods of carrying out the undertaking, and
 - (iii) the alternatives to the undertaking;
- (c) a description of:
 - (i) the environment that will be affected or that might reasonably be

- (ii) expected to be affected, directly or indirectly, the effects that will be caused or that might reasonably be expected to be caused to the environment, and
- (iii) the actions necessary or that may reasonably be expected to be necessary to prevent, change, mitigate, or remedy the effects upon or the effects that might reasonably be expected upon the environment, by the undertaking, the alternative methods of carrying out the undertaking and the alternatives to the undertaking; and
- (d) an evaluation of the advantages and disadvantages to the environment of the undertaking, the alternative methods of carrying out the undertaking and the alternatives to the undertaking; and,
- (e) a description of any consultation about the undertaking by the proponent and the results of the consultation.”

The file documented for inclusion in this report on the project planning will be the source of the required information for the ESR. It shall include the same documentation as for a Project Plan and also information relating to options for dealing with unresolved concerns (See sample format in Appendix G).

The major issue to be decided in determining whether to proceed with the proposed undertaking is whether the net impact is acceptable given the merits of the project. Thus, the ESR will document the decision making process and the value judgements made in selecting a preferred course of action. **Criteria used in resolving this issue should be made explicit and developed proactively with concerned individuals, groups and agencies.**

In this regard, a second mandatory notice will be given, stating that an ESR has been prepared for the project and filed at the Conservation Authority office, and other suitable locations such as the local Municipal Office or the Public Library. This notification process is further outlined in Section 4.0. Following this filing of the ESR a review period will extend for 30 days. If concerns raised in this review cannot be resolved through consultation, negotiation, or revisions to the ESR, the Authority shall consider preparing an Individual Environmental Assessment. Alternatively, any party may make a request, with reasons, to the Minister of the Environment for a Part II Order requiring that a proponent comply with Part II of the **Environmental Assessment Act** before proceeding with a proposed undertaking which has been subject to Class EA requirements (see Section 7).

If concerns are resolved through the preparation and review of the ESR, or if the Minister denies any Part II Order requests, the project is considered approved under the **Environmental Assessment Act** and with the receipt of all other necessary approvals, implementation may proceed. Notification that the project is approved shall be sent to all parties who have expressed an interest in the remedial work and to the Conservation Ontario office (see sample in Appendix E). Within 30 days of the “Notice of Project Approval”, the “Proponent Conservation Authority Evaluation Form: Part A” (Appendix F) will be completed and submitted to Conservation Ontario.

3.7.2.3 Individual Environmental Assessment (Conclusion 3 of the Environmental Analysis).

An Individual Environmental Assessment is prepared for projects for which it has been determined that net impacts will occur and concerns cannot be easily resolved and which does not meet the definition set out in Section 2.3 of this Class EA. This Individual Environmental Assessment process includes a formal government review of the project's planning and may lead to a formal hearing where approval to proceed is granted or denied. The need for an Individual Environmental Assessment will, in most circumstances, be recognized early in the planning process, but may, in unforeseen circumstances, occur as a result of the review of the Environmental Study Report.

In such cases, the procedures set out in this Class EA do not apply. Instead, the Authority shall adhere to the procedures and the information requirements set out in the **Environmental Assessment Act** and Ontario Regulation 334/90 for approvals of individual undertakings. Proponent Conservation Authorities engaging in individual Environmental Assessments should contact the Environmental Assessment and Approvals Branch of the Ministry of the Environment for information respecting the requirements of the **Environmental Assessment Act** before initiating a planning process.

3.7.2.4 Reconsideration of Remedial Project (Conclusion 4 of the Environmental Analysis)

In circumstances where it is determined that the negative impacts of a remedial project are of a magnitude that were unforeseen, and other Conservation Authority Programs such as land acquisition are deemed more appropriate, further consideration as a remedial project will cease, and other options will be explored.

3.8 Addenda to Environmental Study Reports and Project Plans

Comments raised in the 30 day public/agency review of an ESR or a project plan, or the passage of time, or a change in the environmental setting, or other unforeseen circumstances, may necessitate a change to the proposed undertaking. In such circumstances, where it is determined by a Conservation Authority in consultation with the undertaking's Community Liaison Committee and affected parties that the change is significant, an addendum to the ESR or Project Plan shall be prepared by the proponent Conservation Authority. During this time, no work will be undertaken which might adversely affect that part of the project being addressed by the proposed addendum. Where it is determined that the change is significant enough, in consultation with all who expressed an interest in the project, then a Conservation Authority may volunteer to prepare a new project plan or a new Environmental Study Report rather than an addendum.

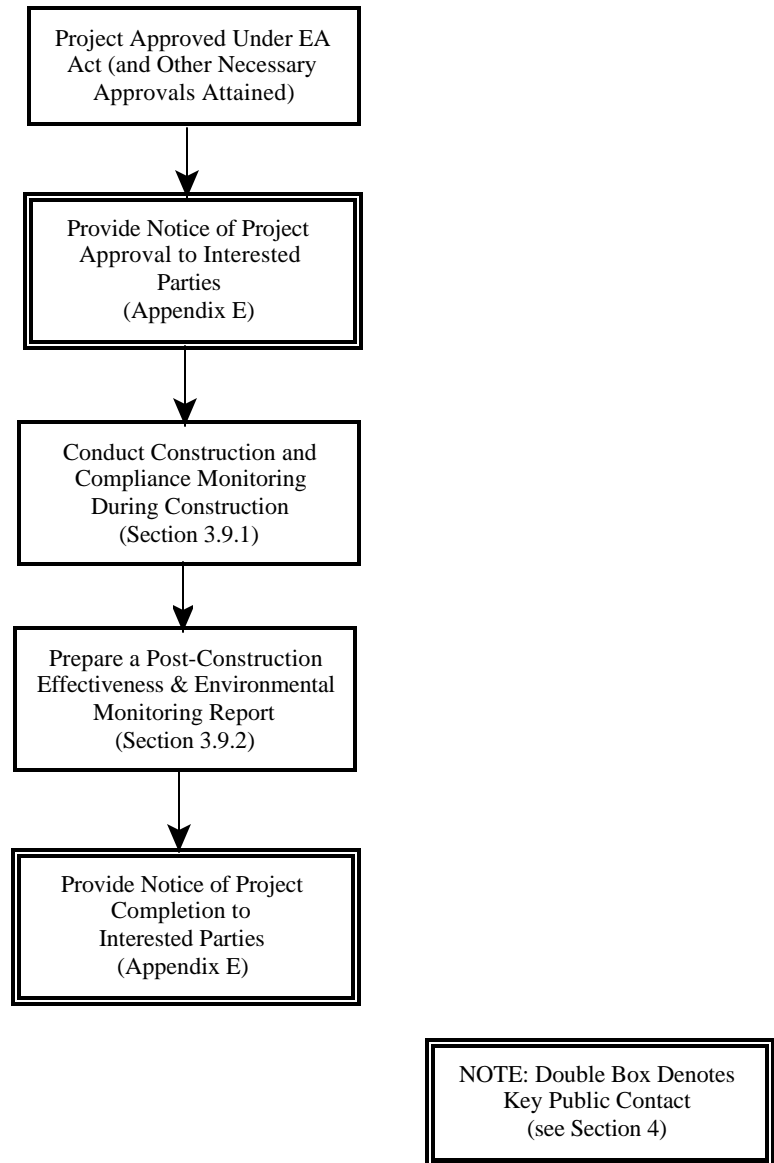
The addendum shall describe the circumstances necessitating the change, the environmental implications of the change and what mitigation methods will be employed to mitigate negative environmental effects of the change. The addendum shall be filed with the ESR or the Project Plan and a Notice of Filing of Addendum (see Appendix E) shall be issued in the same manner as the Notice of Filing for the ESR or Project Plan of the undertaking.

A period of 15 days following the issuance of a Notice of Filing of Addendum shall be provided by the proponent for public and agency review of the addendum. During this 15 day period, it may be

requested that the undertaking, as documented in the addendum, be subject to a Part II Order, in accordance with the procedures set out in Section 7.0 of this Class EA.

When the proposed change is in response to an emergency situation during construction of the undertaking or where a delay in the implementation of the change would result in detrimental environmental effects, the change would be implemented without delay and affected parties would be contacted. An addendum would subsequently be prepared for significant changes to the undertaking.

**FIGURE 1C
PLANNING AND DESIGN PROCESS
CONSTRUCTION AND MONITORING**



3.9 Effects Monitoring

Monitoring is an integral part of any flood and erosion control project. It will be a part of the implementation of all projects approved under this Class EA, regardless of the kind of report prepared. While it is recognized that effects monitoring must be individually tailored to the specific flood or erosion control project, the following sections outline general monitoring requirements.

3.9.1 Construction Monitoring and Requirements for Follow-up:

This form of effects monitoring includes general construction supervision as performed by staff of the Conservation Authority, or agents thereof. This is completed to ensure methods identified for addressing concerns and environmental enhancement are carried out as planned, and that any problems which may arise during construction are addressed properly.

Supervision of project construction shall be under the direction of the Conservation Authority site supervisor and ultimately is the responsibility of senior staff of the Conservation Authority. Responsibility includes ensuring adherence to the approved design and monitoring requirements documented in the detailed environmental analysis of the preferred alternative (Section 3.7.1), as well as, any conditions requiring monitoring that are imposed on a project as part of a Minister's denial of a Part II Order request (Section 7.0, #8). Where the work is not directly undertaken by staff, and construction contracts are awarded, provisions will be included in the contract stipulating adherence to the approved design and monitoring requirements. All construction activities proceeding under this Class EA will be conducted in accordance with the guidelines, policies, regulations, and statutes listed in Appendix C.

Senior staff and the site supervisor will be responsible for ensuring that every effort is made to safeguard the terrestrial and aquatic environments. If monitoring identifies any deficiencies in the installation of the designed measures, prompt actions must be taken to ensure that they function effectively to prevent any potential adverse impacts to the environment. Senior staff and the site supervisor will be responsible for ensuring that procedures are followed which will include, but are not limited to the following:

- inspections to ensure that the necessary measures for addressing concerns are properly in place (e.g., fencing of sensitive features, location of access routes and stream crossing, etc.)
- meetings with project construction staff to ensure that all staff involved understand why and how environmental features are to be protected
- providing direction when unanticipated circumstances arise, and to ensure no adverse impacts to the receiving environment
- rectifying deficiencies promptly and as necessary
- approving each phase of project construction prior to proceeding with the next phase
- making additional recommendations as the project proceeds.

Concerned agencies and individuals may be invited to visit construction sites to gain a better understanding of the construction process and to make their own assessment of the construction impacts of these undertakings. Please note that visits must be scheduled in advance to ensure full compliance with all safety requirements under the **Occupational Health and Safety Act**.

3.9.2 Post Construction Monitoring

For each project implemented under this Class EA, a Post Construction Monitoring Report will be prepared by the Conservation Authority within one year of project construction unless the approved project's monitoring program specifies otherwise. Notification that the project is completed shall be sent to all parties who have expressed an interest in the remedial work and to Conservation Ontario (see sample "Notice of Project Completion" in Appendix E). In addition to the notice, a copy of the Post Construction Monitoring Report shall be sent to each public or government reviewer who expressed a concern during the planning and design process of the undertaking. Within 30 days of the date on the "Notice of Project Completion", the "Proponent Conservation Authority Evaluation Form: Part B" (see Appendix F) will be completed and submitted to Conservation Ontario.

This form of effects monitoring includes post construction inventories and studies which will be used to evaluate the success of the project for its intended purpose, as well as the success of mitigative techniques and enhancement features incorporated in the project. The level of detail in the Post Construction Monitoring Report will be commensurate with the predicted environmental impacts and mitigation/enhancement documented in the detailed environmental analysis of the preferred alternative (Section 3.7.1). It will report on the monitoring program outlined in the approved Project Plan or approved Environmental Study Report.

Thus, the Post Construction Monitoring Report will include, as appropriate:

- an assessment of the effectiveness of the undertaking in achieving its desired goals;
- documentation of follow-up maintenance as necessary;
- a summary of the baseline inventory for the site with reference to applicable factors where impacts were anticipated and identified in Table 3: Detailed Environmental Analysis;
- documentation of changes in baseline site conditions, including a photographic record, identifying positive and negative changes and any changes that can be attributed to the remedial work itself as opposed to natural processes or other "causes";
- measures that have been or will be taken to address these impacts; and,
- a schedule for ongoing monitoring (e.g. annual site inspections).

The proponent Conservation Authority is encouraged to transfer new knowledge obtained through the Post Construction Effects Monitoring Reports to all Conservation Authorities (see Section 10.0 and Section 11.1).

4.0 OPPORTUNITIES/PROVISIONS FOR INVOLVEMENT

The planning and design process, as outlined in the previous section, has been developed to provide avenues through which the public, local interest groups, non-government organizations and federal and provincial government agencies can participate. The purpose of this section is to outline the opportunities and provisions for public participation in the Class EA process for remedial flood and erosion control projects. The notice provisions and some of the opportunities/provisions for involvement are highlighted in Figures 1B and 1C, as included in the previous section. For more detailed descriptions of consultation methods and techniques, reference can be made to the most current consultation guide prepared by the Ministry of the Environment.

Conservation Authorities, by their nature, are fully accountable to the public. Members of the Authorities are elected or appointed by the member municipalities and all Conservation Authority Board meetings are open to the public. Therefore, any person or interest group can, at any time, provide input to and seek information from their local member, Conservation Authority staff, or by attending a meeting of their local Conservation Authority.

4.1 Opportunities for Participation

In carrying out their duties as planners and designers of remedial flood and erosion control projects, Authority staff can benefit from the participation of individual citizens, non-governmental groups and associations, and other government agencies. This Class EA offers several opportunities for participation, each reflecting different levels of intensity or commitment of time and energy on the part of the public. They include opportunities to participate as a member of the general public, as a member of the Conservation Authority contact group, and as a member of a community liaison committee.

First Nations and Aboriginal Communities

Relations between Aboriginal communities and the Government of Ontario and its agencies (including Conservation Authorities), are informed by the Aboriginal Policy Framework (APF). The overall goal of the APF is to help build the capacity of Aboriginal communities to develop stronger economies, to become more self-reliant, and to exercise greater responsibility for their well being, while maintaining balance and stability in relations between Aboriginal communities and other residents in the province.

Consistent with this overall goal, where Conservation Authorities are considering or planning flood or erosion control measures, potentially affected First Nations and Aboriginal communities will be identified, and will be approached directly for the purposes of informing community members about the works being considered, and for identifying their concerns. The proponent Conservation Authority will work with Aboriginal representatives to attempt to resolve any concerns about the proposed undertaking.

In the event the primary contact, a First Nation, an Aboriginal community, or an Aboriginal organization identifies a land claim issue during the consultation process, the Conservation Authority or proponent shall contact Ontario Native Affairs Secretariat (ONAS) for advice and information on claims against Ontario, and Indian and Northern Affairs Canada (INAC) for advice and information on claims against Canada.

4.1.1 General Public Participation

The general public shall be invited to participate in the planning and design of remedial flood and erosion control projects by notices placed in local newspapers, in accordance with the notification procedures set out in Section 4.2.

Interested individuals may participate by:

- reviewing copies of reports and documents produced by the Authority in compliance with the planning requirements of this Class EA;
- providing oral and/or written comment to Authority staff;
- attending information sessions to obtain a better understanding of the proposal for a remedial work and to have questions answered;
- meeting with Authority staff to discuss concerns;
- having their names added to the Conservation Authority mailing list to be directly notified of future projects and, in so doing, become a member of the Conservation Authority contact group (Section 4.1.2); and
- requesting to be a member of the Community Liaison Committee (Section 4.1.3).

4.1.2 Conservation Authority Contact Group Participation

Members of the Conservation Authority's contact group are defined as parties who have expressed interest in past Conservation Authority undertakings and have requested to be directly notified of future projects. This group can include individuals or representatives from local government agencies, public organizations, naturalist groups, fish and game clubs, boating federations, ratepayers associations, municipal Local Architectural Conservation Advisory Committees, or Ecological and Environmental Advisory Committees, Remedial Action Plans, business interests, agricultural organizations, etc. This group should include any relevant agencies identified through Section 3.6 "Evaluation of Alternative Methods for Carrying out Remedial Projects" since the evaluation includes consideration of applicable legislation, regulations, policies and guidelines.

Individuals from this contact group list shall be invited to participate in the planning, design and evaluation of remedial flood and erosion control projects by direct mailing of notices according to the notification procedures outlined in Section 4.2. As well, Conservation Authorities will make direct contact with the most directly affected members of the public (e.g. neighbouring landowners).

Members of the contact group may participate by:

- reviewing copies of reports and documents produced by the Authority in meeting the planning requirements of this Class EA;
- helping to disseminate information about the Authority's remedial work planning and design efforts to other members of their group;
- providing oral and/or written comment to Authority staff;
- attending information sessions to obtain a better understanding of the proposal for a remedial work and to have questions answered;
- meeting with Authority staff to discuss concerns;
- sharing knowledge and information they may have relating to the flood and/or erosion problem, the environment concerned, potential impacts, possible impact prevention and mitigation measures, and possible environmental enhancement methods; and
- requesting to be a member of the Community Liaison Committee.

4.1.3 Community Liaison Committee Participation

In an effort to facilitate more on-going public involvement at the project level, the Conservation Authority shall, based on its contact group mailing list and expressions of interest from local landowners, members of the general public, interest groups, or agencies, establish a Community Liaison Committee to assist the Authority by obtaining additional public input concerning the planning and design process of an individual flood and/or erosion control project, and to review information and provide input to the Conservation Authority throughout the process. The Conservation Authority shall strive to ensure that the membership of the Community Liaison Committee is representative of all views respecting a proposed remedial flood and erosion control project.

As noted in Section 4.2, a Community Liaison Committee shall be established, on a project by project basis, once it has been determined that a remedial work of some kind is necessary to deal with a specific flood and/or erosion situation and the public have been notified of the intent to undertake a remedial project. The Committee may assist with more than one remedial work project but shall normally remain in place only as long as the Class EA planning and design process is being implemented. Once the project is approved or if a decision is made not to proceed with the project, the Committee will normally be disbanded. The Authority may decide to maintain the Community Liaison Committee for a period during the post-construction phase, when monitoring is being undertaken, or to draw upon the Committee's assistance in the preparation of an Individual Environmental Assessment.

Participation in a Community Liaison Committee is the most intensive form of public involvement. Involvement would demand more of a commitment of time and energy from its members, than either the contact group or general public participation.

In certain circumstances there may not be substantial public interest in a proposed undertaking. In such circumstances, the structure and composition of the Community Liaison Committee may be less formal, based on the discretion of the Conservation Authority and the interested parties. Where no parties have expressed an interest in a proposed undertaking following the publication/ mailing of a Notice of Intent, the Conservation Authority may plan its undertaking without creating a Community Liaison Committee.

As the name implies, the function of the Community Liaison Committee, in the Class EA process, will be to assist the Conservation Authority to reach out and maintain contact with community residents, groups, associations and organizations. The Community Liaison Committee will provide direct input to the process. At the end of the process the entire committee will have been exposed to the entire process, will have understood how decisions have been reached and will have had their questions answered during the process.

To fulfil its function, the Community Liaison Committee will:

- identify items of public concern with regard to the impact and design of proposed flood reduction alternatives,
- provide direct input on these concerns to the Conservation Authority to be utilized throughout the planning and design process,
- co-host, with Authority Staff, meetings organized by the Authority to facilitate the resolution of concerns relating to a proposed remedial work;
- review any Part II Order requests made by members of the public and attempt to resolve the issues of concern between the Part II Order requesters and the Conservation Authority before the request gets referred to the Minister of the Environment for a

decision.

- where appropriate, submit an assessment to the Conservation Authority, upon project completion, commenting on the effectiveness of the Class EA process for meeting public concerns for the specific project and, where relevant, identify possible improvements (An example format for this report is found in Appendix H).

Guidelines for the administration and operation of the Community Liaison Committees are outlined in Appendix I of this Class EA.

4.2 Public Notification Requirements

In following the planning and design process for remedial flood and erosion control projects, there are points at which public notification must be given. The purpose of this section is to outline these requirements. Some key points in the process where public contact is required are shown in Figures 1B and 1C and Appendix E provides sample notices. It must be noted, however, that these are the minimum requirements only. In addition to publishing notices in the local press, other methods of notifying the public include radio/TV announcements, notices posted in community facilities, notices posted at the site of the project and on the Conservation Authority and/or other WEBSITE(s). Each Authority must determine for itself, on a project by project basis, whether and how to expand these requirements. It is recommended that consideration be given to special timing requirements (e.g. frequency of meetings) identified by groups/associations wanting to participate in the process.

The first mandatory notification occurs when the Class EA process is initiated. At this point, public notification includes:

- A Notice of Intent to Undertake a Remedial Project shall be published in the local press. (A sample of this notice is contained in Appendix E.)
- A Notice of Intent to Undertake a Remedial Project shall be sent by direct mail to the Conservation Authority contact group mailing list and sent to the Conservation Ontario office.
- Conservation Authority staff shall cause a Community Liaison Committee to be formed, taking into account interest expressed by the landowners who initiated the project and individuals notified through these activities.

The second mandatory notification occurs when the report on the project planning is filed. For those projects which involve preparation of a Project Plan, the second mandatory point of notification occurs when the Project Plan is filed for review.

- Notice of filing of this plan for review shall be sent to all parties contacted in the first notification process who expressed an interest in the remedial work and sent to the Conservation Ontario office.

With regard to projects that involve preparation of an Environmental Study Report, the second mandatory notification occurs when the Environmental Study Report is filed for review. Issuance of a Notice of Filing of the ESR will involve the following:

- The Notice of Filing of an ESR shall be published in the local press. (A sample of this notice is contained in Appendix E.)
- The Notice of Filing of an ESR shall be sent by direct mail to the Conservation Authority contact group mailing list, sent to all who expressed an interest in the remedial work and sent to the Conservation Ontario office.
- The Community Liaison Committee shall meet to discuss the ESR before the Notice of Filing to

provide input and afterwards to address any comments received.

As necessary to address comments and/or changes to the Project Plan or ESR, a Notice of Filing of Addendum (see Figure 1B and Section 3.8) shall be issued in the same manner as the Notice of Filing for the ESR or Project Plan of the undertaking (see samples in Appendix E).

In the interest of good project management and as per Figures 1B and 1C, a Notice of Project Approval and a Notice of Project Completion shall be sent to all parties who expressed an interest in the remedial work and sent to the Conservation Ontario office (see samples in Appendix E).

It is the responsibility of the proponent Conservation Authority to explain to the public the rights given to the public under this *Class Environmental Assessment for Remedial Flood and Erosion Control Projects (Class EA)*. This includes, but is not limited to, the provision to request a Part II Order (see Section 7), and the availability of detailed information (e.g. *Class EA*, the Project Plan and documentation, the Environmental Study Report and documentation) at public location(s) for review by those who request it and when the study is being discussed with the public.

5.0 PROVISION FOR PHASING IN OF ONGOING UNDERTAKINGS

Conservation Authorities cannot suspend work on flood and erosion control projects, while awaiting completion of this Class EA. Where such works have been identified as necessary, Authorities have been following the requirements of the 1993 Class EA.

Accordingly, prior to the date of the Minister's approval of this Class EA, any Conservation Authority which has complied with the 1993 Class EA's planning and design process, up to the point in Phase 3 when the preliminary preferred solution was selected, may continue to do so according to the 1993 Class EA. As with other Class EA documents, these provisions shall apply only for a period of five years from the approval of this document. If construction has not commenced within five years from the approval of this document then the Conservation Authority must comply with the planning and design process of this Class EA.

6.0 DURATION OF PROJECT APPROVALS

It is recognized that for a variety of reasons, considerable time may lapse between the completion of the planning and design process of the Class EA (i.e. issuance of the Notice of Project Approval) and the implementation of the undertaking. During such a delay, the proposed solution may no longer retain validity or site conditions may change. Therefore, as with other Class EA documents, if a Class EA project has been approved, but construction has not been initiated within five years of that project's approval, the project shall be reviewed in accordance with the planning and design process of this Class EA, and new documentation shall be prepared.

7.0 PROVISION FOR CHANGING PROJECT STATUS (PART II ORDER)

It is recognized that the planning and design process, as outlined, is one which allows for concerns to be identified and resolved through the course of the project's planning. In some circumstances, however, it is possible that issues may be raised during public review of a project that cannot be easily accommodated. In cases where concerns are raised it is the Conservation Authority's obligation, as proponent, to use all reasonable means available to them to resolve these concerns. In circumstances where individuals, groups, or public agencies feel that these efforts have not been made, they may seek to have the proposed undertaking made subject to a more rigorous planning, design and documentation procedure. In the case of an undertaking for which a project plan was prepared for example, a Conservation Authority may volunteer to prepare an Environmental Study Report to address the concerns of the public/agencies.

The Part II Order is the legal mechanism whereby the status of an undertaking can be elevated from an undertaking within a Class EA to an Individual Environmental Assessment. According to subsection 16 of the **EAA**, the Minister may by order require a proponent to comply with Part II of the **EAA** before proceeding with a proposed undertaking to which a Class EA would otherwise apply. It is the responsibility of the proponent Conservation Authority to advise the public of their right to request a Part II Order in public notifications (see Appendix E). Any individual, group or public agency may request the Minister to issue a Part II Order within the public review period for a Project Plan, Environmental Study Report or an Addendum.

The purpose of this Section is to outline the details surrounding a Part II Order request :

1. An individual, group or public agency with a concern would bring the concern to the attention of the Conservation Authority.
2. If the concern cannot be resolved by any means employed by the Authority and the Community Liaison Committee, the individual, group or public agency may formally request that the Authority submit the undertaking to a more rigorous review (i.e. ESR or individual environmental assessment).
3. If the Conservation Authority considers elevation of the undertaking's status to be inappropriate and the individual, group or public agency with the concern, wishes to pursue the issue, he/she may request within 30* days the "Notice of Filing" that the Minister of the Environment issue a Part II Order.

* 15 days in the case of "Notice of Addendum"

The request to issue a Part II Order must be made to the Minister of the Environment in writing and must address the following issues as they relate to the identified concerns:

- environmental impacts of the project and their significance
- the adequacy of the planning process
- the availability of other alternatives to the project
- the adequacy of the public consultation program and the opportunities for public participation
- the involvement of the person or party in the planning of the project
- the nature of the specific concerns which remain unresolved
- details of any discussions held between the person or party and the proponent
- the benefits of requiring the proponent to undertake an individual environmental assessment
- any other important matters considered relevant

The requester shall forward a copy of the request to the proponent at the same time as submitting it to the Minister.

4. The Environmental Assessment and Approvals Branch (EAAB) will advise the proponent and Conservation Ontario of the receipt of the request and the proponent may make a submission addressing the request for a Part II Order. The EAAB has 45 days, from the time that the 30* day public review lapses, to review the information and to prepare a report with recommendations for the Minister's consideration. The Director of Environmental Assessment and Approvals Branch may request additional documentation from the proponent Conservation Authority. If there are critical deficiencies in the documentation submitted by the proponent, the Director may require the proponent to submit additional information. Within 21 days of receipt of satisfactory additional information, the EAAB shall make a recommendation to the Minister .

Negotiations should continue between the requester and the Conservation Authority to successfully resolve the concerns locally. To provide this opportunity, the 30* day review period may be extended for a period of time that is mutually acceptable between the Conservation Authority and the requester, and with notification to the Environmental Assessment and Approvals Branch. If the proponent satisfies the concerns of the requester, it is the requester's responsibility to withdraw the request for a Part II Order. Such withdrawals should be in writing to the Minister and should be copied to the proponent. The Director of the Environmental Assessment and Approvals Branch may accept and may act upon such withdrawals on behalf of the Minister.

*15 days in the case of "Notice of Addendum"

5. The Minister considers the views of both the Authority and the person requesting the Part II Order and may consult other government agencies before making a decision. The Minister, within 21 calendar days of receiving the Environmental Assessment & Approval Branch's recommendations will decide, with reasons;
 1. To require the Proponent to comply with Part II of the **EA Act** by one of the following:
 - preparing a Terms of Reference and an individual EA that will be submitted to the Minister for government review and approval, or
 - completing an individual EA, where documentation has satisfied the requirements for preparing a Terms of Reference, for provincial review and approval, or
 - submitting the Class EA documentation, where it is determined that it fulfills the individual EA requirements, for provincial review and approval.
 2. To refer the matter to mediation
 3. To deny the request
 4. To deny the request with conditions

In considering a request, the Minister shall give consideration to, but not be limited to, the following issues:

- the purpose of the **EAA**
- extent and nature of public concern
- potential for significant adverse environmental effects
- need for broader consideration of alternatives by the proponent
- consideration of urgency
- participation of the requester in the planning process

- nature of request (i.e. substantiation of claims with regard to identification of factors that suggest that the proposed undertaking differs from other undertakings in the class to which the Class EA applies)
 - degree to which public consultation and dispute resolution have taken place
 - any reasons given by a person who requests the order
 - the mediator's report, if any
 - the timeliness of the request and the timeliness of the requester raising the issues and/or concerns with the proponent Conservation Authority
 - any other important matters as the minister considers appropriate
6. If the Minister agrees to issue a Part II Order, then he/she gives notice, with reasons, to the Conservation Authority, Conservation Ontario, and the individual, group or public agency requesting the Part II Order. The Authority shall then adhere to the Order if it wishes to pursue implementation of the undertaking.
 7. If the Minister refers the matter to mediation then he/she gives notice, with reasons, to the Conservation Authority, Conservation Ontario, and the individual, group or public agency requesting the Part II Order, and to such other persons as the Minister considers appropriate. Provisions of section 8 of the **EA Act** will apply including the appointment, by the Minister, of one or more neutral persons to act as mediators, a report by the mediator to the Minister within 60 days of appointment, and payment of the fees and reasonable expenses of the mediators by the proponent.
 8. If the Minister does not require an individual EA, he/she gives notice, with reasons, to the individual, group or public agency requesting the Part II Order, the Conservation Authority and Conservation Ontario. The Conservation Authority then continues to plan and implement the undertaking under this Class EA. Any conditions which the Minister might apply to the decision to deny the Part II Order request must be adhered to by the proponent Conservation Authority when implementing the project.

The Part II Order request may be initiated during the 30 day public review period following the filing of the Project Plan or ESR. It is expected, however, that anyone or any agency having a concern would bring this to the Authority's attention early in the planning and design process when the Conservation Authority has maximum flexibility to deal with the concern. The provisions for public participation and notification, set out in this Class EA, are intended to facilitate such early identification of concerns.

8.0 OPERATION, MAINTENANCE OR RETIREMENT

Conservation Authorities shall endeavour to review all opportunities for incorporating environmental enhancements as part of project operations, maintenance or retirement activities (e.g. using materials of equal or better properties, etc.).

For the purposes of this Class EA, the term "operation" refers to operating a structure where the purpose, use, capacity and location remain the same as approved under this Class EA or its predecessor. In this case, operation is considered to be a part of the approved project and is not independently subject to the planning and design process of this Class EA.

The term "maintenance" refers to the upkeep, repair and the replacement and/or upgrading of a structure, or its performance where the objective, and application remain unchanged, and the volume, size or capability of the structure does not change from that approved for the undertaking under this Class EA or its predecessor. In this case, maintenance is considered to be a part of the approved project and is not independently subject to the planning and design process of this Class EA.

The approval under the *Environmental Assessment Act* as a maintenance activity does not preclude all other forms of approval necessary. A maintenance activity of special concern is dredging to maintain the efficiency of a structure. Various approvals may be required for dredging, transport and disposal from the Ministry of the Environment and other agencies and government bodies having jurisdiction. For dredging activities, as a minimum, the staff in the local Regional Office of the Ministry of the Environment will be contacted for consultation.

"Retirement" refers to a situation in which the purpose or use of a structural or capital work as approved under this Class EA or its predecessor, is no longer necessary and its operation is cancelled. Some retirement activities may involve the demolition of a structure or a change in the purpose, use, capacity or location of a structure which could result in potentially significant environmental effects. Such retirement activities shall be planned in accordance with the planning and design process.

"Retirement" of activities which only involve relinquishment of rights, such as operating or maintenance responsibilities, shall be completed without following the planning and design process of the Class EA, provided that the party assuming responsibility undertakes to continue to operate and maintain the structure or facility in the same fashion as in the past (i.e., the activities fall within the definition of operations/maintenance). Where a change in operation or maintenance is anticipated by the second party, the transfer shall not be made unless the second party meets all necessary requirements under the **Environmental Assessment Act**.

If works are proposed that do not fall within the definitions of "operation," "maintenance", and "retirement" as above, they will be considered as new undertakings and subject to the planning and design process described in this Class EA.

9.0 EMERGENCY MEASURES

In the case of a natural disaster such as flooding, sudden or accelerated soil erosion or slippage, situations may arise where a Conservation Authority must take immediate action to safeguard human life and mitigate damage to buildings, structures, or services. When such emergencies arise, necessary remedial measures shall be undertaken immediately.

The Conservation Authority shall notify the affected members of the public and affected government agencies, including the nearest Regional and District Office of the Ministry of the Environment and the Environmental Assessment and Approvals Branch of the Ministry that emergency measures are about to be undertaken. If this is not possible, the appropriate contacts shall be made as soon as possible after the emergency has been addressed.

It is also the responsibility of the Conservation Authority to forward a written report of the emergency to the nearest Regional and District Office of the MOE, and the Environmental Assessment and Approvals Branch of the MOE, within 14 working days following completion of actions taken to alleviate or correct the emergency situation.

The written report shall describe the following:

- the location and nature of the emergency;
- the physical, biological, socioeconomic and/or cultural effects of the emergency;
- actions taken to resolve the emergency;
- effectiveness of the actions taken (stop-gap, longer term, etc.) and;
- anticipated future remedial works required, if any.

Where further remedial work is necessary to ensure effectiveness of these emergency measures, the planning and design process described in this Class EA shall apply. However, it is possible that an emergency-specific planning process to meet time concerns may evolve from discussions with affected parties or agencies, the nearest MOE Regional Office and the Environmental Assessment and Approvals Branch of the MOE.

10.0 CLASS ENVIRONMENTAL ASSESSMENT EFFECTIVENESS MONITORING AND REPORTING

It shall be the responsibility of the Conservation Authorities collectively, through Conservation Ontario, to monitor the effectiveness of the Class EA process to ensure sound environmental planning for remedial flood and erosion control projects and to ensure that the Class EA remains current and relevant.

The Class EA process is a self assessment process and it is the responsibility of the proponent Conservation Authority project manager to ensure that the planning process as set out in the Class EA document is undertaken. If concerns arise regarding the effectiveness of the Class EA process in addressing such things as, but not limited to, protection of the environment or participation in the process then the Conservation Authority must raise these concerns with Conservation Ontario for collective discussion and resolution. If deficiencies are noted, Conservation Ontario shall undertake to address the issue by amending the Class EA document (Section 11.0) either immediately or at the time of the five year review.

On an annual basis, Conservation Ontario will compile information on the projects that have been undertaken in accordance with this Class EA. An Annual Effectiveness Monitoring Report will be produced to determine:

- the number and types of projects initiated, planned and/or implemented in accordance with this Class EA;
- the problems that are experienced at the Class EA project level; and,
- the degree of effectiveness of the Class EA planning and design process in enabling environmental protection and encouraging participation.

The effectiveness of the Class EA will be identified by proponent Conservation Authorities directly with Conservation Ontario and/or through the "Proponent Conservation Authority Evaluation Form" (Appendix F). Conservation Ontario will submit the Annual Effectiveness Monitoring Report to the MOE's Director of the Environmental Assessment and Approvals Branch ("Director"). This annual report will be submitted no later than January 31 for projects initiated, planned and/or implemented during the previous calendar year. Conservation Ontario will provide MOE with the following information:

- a summary table listing all projects initiated, planned and/or implemented under the Class EA during the previous year. The summary table will include: the proponent Conservation Authority*, location of the undertaking*, name of undertaking*, year initiated*, status (Notice stage: Intent-I; Filing-F, date; Addendum-ADD, date; Approval-A, date; Completion-C, date)**, the documentation level (i.e. Project Plan or Environmental Study Report)***, Part II Order Requests (y/n), Outcome Part II Order Request (granted-G, denied-D, denied with conditions-DWC)****.
- *as obtained from Conservation Ontario's copy of the project's Notice of Intent (Appendix E)
**as obtained from Conservation Ontario's copies of Notices (Appendix E)
***as obtained from Conservation Ontario's copy of the project's Notice of Filing (Appendix E)
****as obtained from Conservation Ontario's copies of Part II notices from MOE (Section 7.0, #4, 6, 7, and 8)
- a statement indicating those projects undertaken using the Class EA for which Part II Order requests were made to the Minister and the proponent; and of these, the number and percentages of requests that were granted, denied or denied with conditions
 - identification of any problems, changes or actions that need to be considered in the five year review, or sooner and a statement of effectiveness of the Class EA in providing an effective and efficient planning process and in protecting the environment based upon:
 - responses to the "Proponent Conservation Authority Evaluation Form" (Appendix F);
 - documentation of any implementation concerns or improvements brought to Conservation Ontario's attention in the previous year which may require amendments;

- assessment of conditions imposed on a project as part of the Minister's denial of a Part II Order request (Section 7.0, #8).
- a compliance statement for the Class EA:
 - summarizing statements of compliance made by proponent Conservation Authorities in the "Proponent Conservation Authority Evaluation Form (Appendix F)
 - addressing any terms and conditions in the **Environmental Assessment Act** Notice of Approval (Order in Council) of the Class EA. A copy of the Notice of Approval will be attached.
 - addressing any "Notice of Amendment" issued by the Minister (Section 11.0).

In light of the fact that this Class EA is used infrequently (i.e. few projects per year) common process inefficiencies and other problems may not be identifiable at the end of a one-year period. Conservation Ontario will conduct a five-year review of the Class EA, for the lifetime of the approval, which will provide a larger sample of projects upon which to base recommendations (Section 11.1).

Conservation Authorities will retain on file copies of all documentation required for an undertaking under this Class EA for the purposes of the five year review described in Section 11.1.

11.0 **CLASS ENVIRONMENTAL ASSESSMENT AMENDING PROCEDURE**

The purpose of the amending procedure is to allow for modifications to the approved Class EA after experience with its application has been gained. The reasons for such modifications may include:

- Clarification of ambiguous areas of the document and procedure;
- Improvement or streamlining of the planning and design process in areas where problems may have arisen;
- Extension of the Class EA to undertakings that were not previously included;
- Withdrawal of the Class EA from undertakings which were previously included.

Conservation Ontario or any other party, including the Minister, who feels that an amendment to the Class EA should be made will bring the particular concern to the attention of the Minister. In doing so, they shall set out the specific concern, the reason for that concern, and the proposed change. If the Minister finds the proposed change necessary, he or she shall issue a public Notice of Proposed Amendment and allow for public and agency review comments to be directed to the Ministry for a 30 day period. Based upon the comments received, the Minister may approve, deny, or revise the proposed changes to the Class EA document, and may do so in consultation with Conservation Ontario. If the amendment is approved by the Minister, he or she shall issue a Notice of Amendment to all parties who provided comments in response to the Notice of Proposed Amendment. The Minister may also choose to declare this proposed change to be a new undertaking, in which case a new Class EA would have to be submitted for review and approval under subsection 5(1) and 5(2) of the **Environmental Assessment Act**.

11.1 **Five Year Review of Class Environmental Assessment**

Regardless of the amendments which may be made to the Class EA, every five years from the date of the Notice of Approval, Conservation Ontario will undertake a review of this Class EA to ensure that the environmental assessment is still compliant with legislative requirements and planning practices and continues to satisfy the purpose of the **Environmental Assessment Act**.

One year prior to this five year cycle, all Conservation Authorities will be asked to confirm the level of activity under the Class EA (including “nil” responses) and whether any amendments are deemed necessary.

The five year review will be prepared in a format which is similar to and will combine with the Annual Effectiveness Monitoring Report in every fifth year. In addition, it will synthesize the information reported in the previous annual monitoring reports. The following information will also be provided:

- if applicable, findings and recommendations of any Conservation Authority-internal audit or regulatory/third party independent audit
- outcomes of “Proponent Conservation Authority Evaluation Form” (Appendix F) and identification of any common issues/deficiencies experienced that suggest the need for an amendment to the Class EA, including changes to proponents’ practices and procedures that would serve to improve the Class EA itself or its administration
- if applicable, the specific proposed amendments to address the identified issues/deficiencies
- a statement of compliance that Conservation Ontario has undertaken the commitments made in Sections 10 and 11.

As indicated above, the Five Year Review Report will use information from the following sources:

- Conservation Ontario's Annual Effectiveness Monitoring Reports (Section 10.0)
- Responses to the "Proponent Conservation Authority Evaluation Form" (Appendix F)

Based upon the Five Year Review Report, Conservation Ontario will make a written submission to the Director, recommending one of the following:

- a) consolidate the recommended amendments and amend the Class EA (following procedure described in Section 11.0)
- b) prepare a wholly new Class EA (following full review and approval process under **Environmental Assessment Act**)
- c) continue use of this Class EA

The Director will indicate his/her acceptance or rejection (with reasons) of the recommendation in writing to Conservation Ontario. In the case of rejection the Director will also provide alternative recommendations for proceeding with this Class EA. In the case of a) this letter will be copied to all those who provided comments during the amending procedure (Section 11.0).

PART II: DESCRIPTION OF UNDERTAKINGS WITHIN THE CLASS

There are four situations in which remedial flood and erosion control projects may be undertaken. These are:

- I Riverine Flooding
- II Riverine and Valley Slope Erosion
- III Shoreline Flooding
- IV Shoreline Erosion

This section describes the alternative methods that may be considered for carrying out a specific remedial undertaking once it has been determined that nonstructural Conservation Authority program options will be ineffective in addressing the identified problem. The alternatives are not necessarily interchangeable. In some cases one or more of the alternatives may be inadequate and several of the alternatives may be required in combination to solve the problem.

I **RIVERINE FLOODING**

In a riverine situation where flooding is occurring, there are several alternatives to address the problem. These include, but are not limited to:

i) Prevent Entry of Floodwater

To prevent floodwater from entering a specific area, berms (dikes) may be installed.

C **Berming**

Generally constructed by mounding earth, and seeding or planting to promote soil stabilization, berms act as a barrier to the entry of floodwater on a property. The height is selected to protect to the design storm.

ii) Modify River Ice Formation and/or Break-up Processes

Where high water due to the formation and deposition of frazil ice or ice jams presents a risk of flood damages, it may be possible to modify the ice formation and break-up process to reduce the risk. Ice control booms can be effective to promote the formation of an earlier ice cover on a river, reducing the area of open water and frazil ice generation. Ice booms can also be used to hold an ice cover in place during break-up, so as to reduce the total volume of ice moving downriver into locations which are prone to the formation of ice jams.

iii) Increase Hydraulic Capacity of Waterway

In the case where the floodplain has been historically developed it may be necessary to alter the flow through the channel during flood events. One way of doing this is to increase the hydraulic capacity of the waterway, thereby allowing lower levels of water to overflow onto the floodplain. This may be accomplished using the following methods:

- **Bridge and Culvert Alterations**
Bridges or culverts in smaller watercourses may significantly reduce the hydraulic capacity of the waterway. The adverse effect of these smaller structures may be eliminated by increasing the size of the waterway opening.
- **Bank Regrading**
Regrading may be used to widen the channel, thereby increasing its capacity during flooding events. Regrading in this case would be designed to produce a stable slope. Further forms of protection may be necessary to ensure against erosion.
- **Increase Bank Height**
Hydraulic capacity of the waterway can be increased by increasing bank height. Bank height can be increased by adding a berm on the top of the existing bank or by installing concrete or sheet pile walls. Local drainage must be accommodated in the design.
- **Revetments**
Revetments refer to a bank protection or retaining structure located at the land/water interface. These protect the channel of the waterway from additional sediment load and maintain channel capacity. These can be constructed of log cribs, rip rap, armour stone, gabion baskets, concrete or sheet pile walls or interlocking brick.

- **Channel Realignment**
Relocation of the waterway may be used to increase its capacity. The new channel is designed and constructed to hold a higher capacity and then water is relocated to this new route.
- **Dredging**
Excavation of accumulated sediments from the bottom of the waterway will increase the hydraulic capacity of the channel. Dredged material should be removed from the floodplain.

iv) Divert Water From Area

Potentially damaging floodwater is intercepted at a point upstream of the floodprone reach and routed to a point remote from the floodprone area. This may be accomplished by construction of a:

- **Bypass Channel**
A bypass channel is created which normally contains water only when the capacity of the natural waterway is breached. This channel then carries water away from the floodprone area.

v) Increase Upstream Storage

In the case where flooding damages are occurring in a river reach it may be possible to reduce this damage by detaining floodwater upstream. This may be accomplished by using one of the following methods.

- **Bridge and Culvert Alterations**
In smaller watercourses, these openings may be used to restrict flow through a floodprone section. Water may be held upstream or diverted from the main channel into a bypass channel.
- **Dry Dams**
Dry dams are used to retain water only during a specified design high flow event. During periods of normal flow, the reservoir remains empty.
- **Weirs**
Weirs are water control structures which discharge water flow over the crest height. Flows in this case cannot be manipulated.
- **Wet Dams**
Water control structures fitted with control gates or other control mechanisms that allow adjustments to be made to control the quantity of flow. In flooding events water is held upstream from the floodprone area. These dams retain some volume of water throughout the year.

II RIVERINE AND VALLEY SLOPE EROSION

In a riverine situation where erosion is occurring, there are several alternatives to address the problem. These alternatives include, but are not limited to:

i) Reduce Erosive Energy of Channel Flows

Protection of eroding banks can be achieved by reducing the erosive energy of the waterway. This reduction in the water's energy can be achieved by the following means.

- **Instream Obstacles**

In situations where drop structures are not possible because of restrictions to fish passage, instream obstacles may be placed over a longer distance of stream to reduce the water's energy. Generally large boulders or armour stone are used to accomplish this objective.

- **Decrease Gradient**

Energy from the waterway may be reduced by decreasing the gradient within the reach where erosion is occurring. To decrease the gradient the length must be increased. The addition of meanders to the watercourse is generally used to accomplish this.

- **Drop Structures (Weir, check dam, rock ramps)**

On smaller streams it is sometimes feasible to reduce the erosive energy of flowing water. This can be accomplished by constructing drop structures, which consist of one or a series of erosion-resistant steps which dissipate energy.

ii) Protect From Erosive Energy of Channel Flows

When a bank is experiencing erosion it may be possible to provide protection from the erosive energy by applying treatments to the land/water interface.

- **Soil Bioengineering**

Vegetation can be used to stabilize soil, slow runoff and dissipate its erosive energy and filter sediment from runoff. Soil Bioengineering combines live plant materials with structural measures in order to stabilize the slope face and toe. The proponent Conservation Authority shall endeavour to use plant species which are native and compatible with the local flora. Temporary measures will be used to ensure that the site is not washed out under flood conditions prior to the establishment of a protective root system and vegetation ground cover.

- **Deflectors**

Deflectors are used to direct water away from banks which are eroding. They are built instream generally from timber or through placement of large boulder material. The proponent Conservation Authority shall endeavour to avoid the use of chemically treated timber in favour of untreated rot resistant wood (e.g. western red cedar, hemlock, white cedar, douglas fir, etc.) if a longer service life is required.

- **Revetments**

Revetments refer to a bank protection or retaining structure located at the land/water interface. These can be constructed of rip rap, armour stone, gabion baskets, concrete or sheet pile walls or interlocking brick.

- **Channel Realignment**
Relocation of the stream channel may be necessary where lateral bank cutting is critical and slope stabilization impractical. Channel realignments should be designed with **consideration for** natural channel processes including sediment transport and fluvial geomorphology.

iii) **Stabilize Bank or Slope**

In order to provide a stable slope and deter further erosion of the bank above the low flow channel, the following methods may be used.

- **Soil Bioengineering**
Vegetation can be used to stabilize soil, slow runoff and dissipate its erosive energy and filter sediment from runoff. Soil Bioengineering combines live plant materials with structural measures in order to stabilize the slope face and toe. The proponent Conservation Authority shall endeavour to use plant species which are native and compatible with the local flora. Temporary measures will be used to ensure that the site is not washed out under flood conditions prior to the establishment of a protective root system and vegetation ground cover.
- **Improve Internal Drainage**
In situations where internal drainage is causing bank erosion and instability, this drainage can be improved through the use of french drains, interceptor drains, or tile drains.
- **Improve Surface Drainage**
Surface drainage on a slope can be improved by either directing water away from the slope, or by providing an erosion resistant swale which directs the water down the slope in a controlled manner.
- **Regrading of Slope**
In cases where the bank is unstable, the slope may be adjusted through filling and/or cutting to a stable angle. If the slope is susceptible to deep-seated failure, a toe berm may also be necessary. This is often combined with an internal drainage system and soil bioengineering.

III **SHORELINE FLOODING**

Alternative remedial measures suitable to protect from shoreline flooding include preventing entry of floodwaters at a particular site, as well as reducing the wave uprush elevations by reducing wave energy offshore.

i) **Prevent Entry of Floodwaters**

The structural protection that can be built to hold the floodwaters back is an impermeable dike, seawall or revetment. The elevation of such a structure must take into account the increase in the water level and the wave action during an extreme storm event.

The following methods can be used to prevent the inundation of floodwaters.

- **Artificial Nourishment (Beach, Berm and Dune)**
This method of flood control allows the natural features to remain as effective wave energy dissipaters. Artificial nourishment or strengthening provides natural material to areas where there is a deficiency in the sediment supply. It usually requires continuous applications unless

combined with other protection methods which protect from erosion processes.

- **Dikes**
The dike is typically built in the water to provide protection around a low-lying area against the inundation of floodwaters during extreme events. The purpose of the structure is to hold the land/water boundary and is not designed to protect the neighbouring shoreline
- **Seawalls**
The seawall can be used for flood protection of the upland area. It is a hard, impermeable structure, built parallel to the shore, designed to withstand extreme wave action. It is often built of armour stone or concrete, at the land/water interface. Seawalls protect the area behind the structure and not the adjacent areas.
- **Revetments**
The revetment can be used for flood protection of the upland area. It is a method of protection which prevents the waves or currents from reaching the embankment, scarp or shoreline behind the structure. They are typically built at the land/water interface and are usually sloped structures built of armour stone or rip rap. Revetments protect the area behind the structure and not the adjacent areas.

ii) **Reduce Wave Energy**

The wave action that reaches the shoreline can be reduced by building coastal structures (offshore and submerged breakwaters or barriers) but the still water level can not be reduced. Therefore, the structures must be designed for a combination of both the extreme water elevation and the wave action rather than just the high water level as is done on the riverine systems. The following list contains some of the common methods used to reduce the incoming wave energy. One or a combination of these may be used.

- **Artificial Nourishment (Beach, Berm, Dune)**
This method of flood control allows the natural features to remain as effective wave energy dissipaters. Artificial nourishment or strengthening provides natural material to areas where there is a deficiency in the sediment supply. It usually requires continuous applications unless combined with other protection methods which protect from erosion processes.
- **Offshore (Detached and Continuous) Breakwaters**
Offshore breakwaters are barriers which are built to protect the area behind the structure by the promotion of a beach system which dissipates the wave energy. Offshore breakwaters are built a distance offshore and parallel to the shore. They can be continuous or detached. Islands are a variation of offshore breakwaters. They reduce but do not eliminate the wave action and create a calm area behind the structure. The wave diffraction is used to assist holding a beach in the lee of the structure.
- **Offshore Low-Crested Breakwaters**
Low-crested rock structures are built offshore, parallel to the shoreline. Energy is lost on the front side as waves overtop the structure. The top and backside of the structure must be designed to withstand the energy of the overtopping waves. There are three main types of structures; the reef, statically stable low-crested and submerged breakwater.

The reef breakwater consists of a pile of stones that are dumped leaving the waves to shape the material. The statically stable low-crested breakwater is not designed for constant overtopping,

but does allow energy to dissipate and pass over the top of the breakwater. The submerged breakwater is designed for waves to constantly overtop the structure.

IV SHORELINE EROSION

Alternative remedial measures suitable to address shoreline erosion include; reducing wave energy and enhancing natural processes, protecting from wave energy and stabilizing the slope through drainage or grading improvements.

i) Reduce Wave Energy and Enhance Natural Processes

Various methods can be used to encourage development of a beach system. A new beach system can be developed through structural means or the existing beach system can be enhanced with artificial nourishment. The following list contains some of the common methods used to reduce the incoming wave energy and enhance the natural processes.

- **Artificial Nourishment (Beach, Berm and Dune)**

This method of erosion control allows the natural features to remain as effective wave energy dissipaters. Artificial nourishment or strengthening provides natural material to areas where there is a deficiency in the sediment supply. It usually requires continuous applications unless combined with other protection methods which protect from erosion processes.

- **Headland/Beach System**

Headland/beach systems use large, armouring or concrete, hard points to anchor beaches or bay areas. They retain a reservoir of material in their beaches for use during an extreme storm event. The wave diffraction around the headlands is used to hold the beach in the lee of the structure. The headlands consist of sloping structures with a rubble core, rip rap layers and armour stone on the external sides.

Beach nourishment will be used to fill the area with either sand or cobble material. If artificial nourishment is not used to fill the beach areas then natural drift material may be taken out of the regional system and will cause a deficiency downdrift. Depending on the wave energy and direction an equilibrium plan shape will be attained for the beach.

- **Offshore (Detached and Continuous) Breakwaters**

Offshore breakwaters are barriers which are built to protect the area behind the structure by the promotion of a beach system which dissipates the wave energy. Offshore breakwaters are built a distance offshore and parallel to the shore. They can be continuous or detached. Islands are a variation of offshore breakwaters. They reduce but do not eliminate the wave action and create a calm area behind the structure. The wave diffraction is used to assist holding a beach in the lee of the structure.

- **Offshore Low-Crested Breakwaters**

Low-crested rock structures are built offshore, parallel to the shoreline. Energy is lost on the front side as waves overtop the structure. The top and backside of the structure must be designed to withstand the energy of the overtopping waves. There are three main types of structures; the reef, statically stable low-crested and submerged breakwater.

The reef breakwater consists of a pile of stones that are dumped leaving the waves to shape the material. The statically stable low-crested breakwater is not designed for constant overtopping,

but does allow energy to dissipate and pass over the top of the breakwater. The submerged breakwater is designed for waves to constantly overtop the structure.

- **Coastal Wetlands**

Land where the water table is at, near, or above the land surface long enough to promote the formation of wet soils or to support the growth of aquatic plants.

Where physical conditions are suitable, creation or restoration of coastal wetlands should be considered in conjunction with the construction of the offshore breakwaters. Aquatic plants may be established to increase the productivity and diversity of these areas for aquatic organisms as well as attenuate wave energy.

- **Groynes**

Groynes are structures which are placed perpendicular to the shoreline to create an accumulation reservoir of material in a beach system to dissipate the wave energy during an extreme storm event. Groynes can be permeable or impermeable and are commonly made of armour stone, concrete, timber and steel.

Beach nourishment should be included along with the construction of groynes in order to minimize the up and down-drift effects of the placement of the groyne system. The beach gradient of the nourishment material should be similar to the existing material if the same beach profiles are desired.

ii) **Protect Shore From Wave Energy**

Another method of protecting the shoreline is to build structures that are able to resist the natural forces and processes. The following list contains some of the common methods used to protect the shoreline from wave energy.

- **Shore-Connected Breakwaters (Sheet-Pile, Conventional, Naturally Armouring)**

Breakwaters are hard barriers which are built to protect land or water areas behind the structure from wave attack. The shore-connected breakwaters provide shelter in their lee, the area behind the structure. The commonly used breakwaters are rubble mound breakwaters and caisson type breakwaters

- **Revetments (Naturally Armouring, Armour)**

The revetment can be used for erosion protection of the upland area. It is a method of protection which prevents the waves or currents from reaching the embankment, scarp or shoreline behind the structure. They are typically built, at the land/water interface and are usually sloped structures built of armour stone or rip rap. Revetments protect the area behind the structure and not the adjacent areas.

- **Seawalls**

The seawall can be used for erosion protection of the upland area. It is a hard, impermeable structure, built parallel to the shore, designed to withstand extreme wave action. It is usually built of armour stone or concrete, at the land/water interface. Seawalls protect the area behind the structure and not the adjacent areas.

- **Jetty**

Jetties are built at the mouths of rivers to improve navigation, stabilize and keep the channel

entrance open. They are placed perpendicular to the shoreline in the breaker zone and can be built of armour stone, concrete, and steel.

iii) **Stabilize Bank or Slope**

In the coastal area, erosion of the bluff or bank is usually a result of wave action at the toe of the slope or loss of the natural protective features such as dunes, berms and beaches fronting the shoreline. For this reason the forces due to the wave action must be addressed first before slope stability can be achieved. Therefore the slope stability solutions must be carried out in combination with the coastal protection measures.

The bluff/bank instability problems along the shorelines are generally the same as along the river banks. Protection of natural features such as beaches, berms and dunes are necessary in order to stop erosion of the backshore and coast area(bluff/banks). In order to provide a stable slope and deter further erosion of the bank, the following methods may be used.

- **Soil Bioengineering**
Vegetation can be used to stabilize soil, slow runoff and dissipate its erosive energy and filter sediment from runoff. Soil Bioengineering combines live plant materials with structural measures in order to stabilize the slope face and toe. The proponent Conservation Authority shall endeavour to use plant species which are native and compatible with the local flora. Temporary measures will be used to ensure that the site is not washed out under flood conditions prior to the establishment of a protective root system and vegetation ground cover.
- **Improve Internal Drainage**
In situations where internal drainage is causing bank erosion and instability, this drainage can be improved through the use of french drains, interceptor drains, or tile drains.
- **Improve Surface Drainage**
Surface drainage on a slope can be improved by either directing water away from the slope, or by providing an erosion resistant swale which directs the water down the slope in a controlled manner.
- **Regrading of Slope**
In cases where the bank is unstable, the slope may be adjusted through filling and/or cutting to a stable angle. If the slope is susceptible to deep-seated failure, a toe/gravity berm may also be necessary. This is often combined with an internal drainage system and soil bioengineering.