

The Niagara Tunnel Project
Project Execution Plan

April 8, 2005

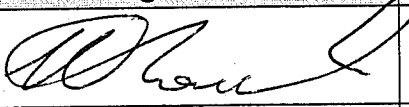
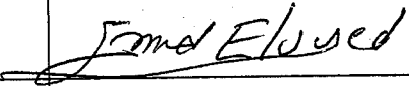

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The Niagara Tunnel Project

Project Execution Plan

Approvals

Title	Signature	Date
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OPG Project Director		April 13/05
OPG Project Sponsor		April 13/05

The Niagara Tunnel Project

Project Execution Plan

Project Team acknowledgement of participation in preparation of the Project Execution Plan

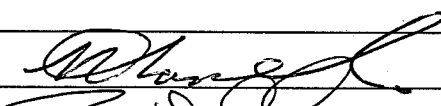
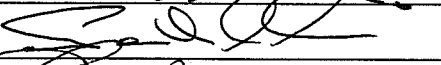
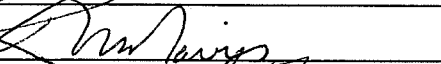
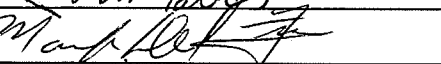
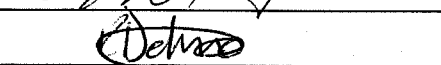
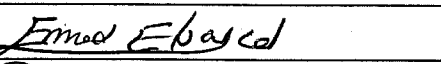
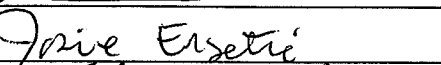
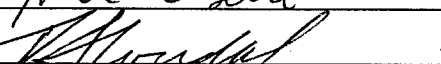

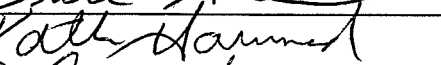

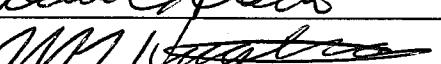
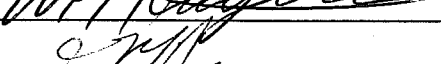
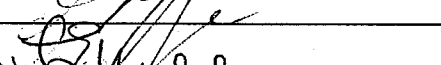

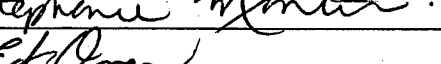
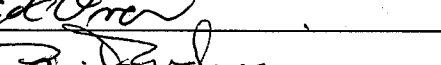
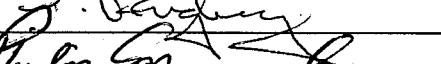
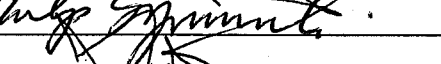
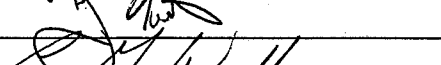
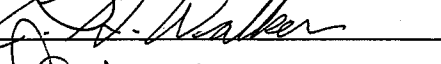
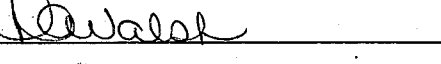
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1 Introduction and Background

Ontario Power Generation Inc. (**OPG**) is planning the construction of a water diversion tunnel (the **Niagara Tunnel Project** or the **Project**) in Niagara Falls, Ontario. This tunnel is part of the Niagara River Hydroelectric Development (**NRHD**), planned by OPG in the 1980s and submitted for environmental assessment (**EA**) approval in 1991. EA approval for the entire undertaking, consisting of two diversion tunnels, a power plant and transmission facilities, was obtained October 14, 1998. OPG has decided to proceed with construction of one diversion tunnel at this time. The Project has a current estimated cost of \$735 million with completion targeted for late 2009.

The Project Charter, outlining the need and justification for the Project as well as Project objectives, deliverables, budget, management approach and the authority of the Project Director, is included as Appendix A of this document. The Project Charter has been signed by the Project Sponsor, the Project Director and the Manager of the Niagara Plant Group as the project customer.

A Memorandum of Understanding (MOU) will be signed by the Niagara Plant Group and by the Project Team. This MOU will elaborate on the relationship between the Niagara Plant Group and the Project Team, and confirm the role of the Niagara Plant Group in the Project. It is expected this MOU will be signed by the end of May 2005.

The Niagara Exchange Agreement, referred to in the Project Charter, is addressed in a separate Project Execution Plan. The Niagara Tunnel Facility Project refers to the Design/Build portions of the Project, specifically the diversion tunnel.

The Project will be implemented in two distinct phases, namely,

- Phase 1 – Planning and Procurement Phase
- Phase 2 – Design/Construction and Commissioning Phase.

In 1998, OPG obtained a number of bids from construction consortia for the design and construction of the diversion tunnel. OPG did not proceed with the project at that time. A Project Close-Out Report was prepared in 1999 to document the procurement process and to identify actions to be taken in the event of project re-activation.

This Project Execution Plan (**PEP**) is prepared to ensure that all issues important to the success of the project are identified, defined and understood at the earliest possible stage in development of the undertaking. The PEP also provides the project team members, end users and line authority with a common understanding of the project.

Developed in consultation with the project team members, the PEP identifies project objectives, scope, responsibilities, strategies, constraints, processes and mechanisms to be employed in managing and controlling the project. The PEP is intended to be a living document. It will be reviewed every 6 months and updated as necessary during the execution of the project, or whenever there are significant changes to the project configuration.

It is the responsibility of the Project Manager (provided by Owner's Representative ["**OR**"]) to facilitate development and to maintain the PEP with the support, and in consultation with the project participants. Each section of the PEP is assigned to a section owner (see Appendix B) who will be responsible for collecting updates for that section for submission to the Project Manager.

Project execution will be periodically audited against the PEP by the Project Director, to ensure that the plan is being followed.

This edition of the PEP, although focused primarily on Phase 1 of the Project, contains elements related to Phase 2. Additional information, related to Phase 2 of the Project will be included in the PEP when requirements for that phase are better defined.

2 Purpose of Project and Objectives

2.1 Project Purpose

The proposed tunnel is intended to facilitate efficient utilization of available water in the existing Sir Adam Beck generating facilities, increasing the average annual energy production by about 1.6 TWh. At an estimated Levelized Unit Energy Cost (LUEC) of approximately 3.5 ¢/kWh, the Project provides a competitive alternative for meeting the needs of the Province.

2.2 Objectives

The objective of the project is the successful design and construction of a diversion tunnel to divert an additional nominal 500 m³/s of flow from the Upper Niagara River to the Sir Adam Beck generating complex at Queenston, executed in a safe, environmentally responsible, economic and timely manner as described below and to the extent practical and possible, in a manner that reflects and meets the requirements of the primary stakeholders.

2.2.1 Safety

OPG considers safety as a primary objective with a project goal to maintain a safe working environment that results in completion of the project with zero fatalities, zero critical injuries, and zero lost time injuries while maintaining the safety of the public at all times. In OPG's "Owner Only" capacity on this project, the contractor will be responsible for safety within its controlled areas. For Part Project Area (as described below) activities carried out at the International Control Works (INCW) however, OPG will assume the role of "constructor" at which times the contractor will follow OPG's safety requirements.

2.2.2 Environmental Protection

The project is to be executed to meet the commitments contained in the Environmental Assessment (EA) and the conditions of the EA Approval, all legislated environmental and mitigation requirements and to provide at project completion, minimal long-term environmental obligations to the OPG Niagara Plant Group.

2.2.3 Quality

The project is to achieve a high overall quality of design and construction and meet all performance requirements. It is intended that the design and construction of the project provide for a 90-year service life for key elements of the facility such as the tunnel, intake structure and outlet structure, and will not result in any forced outages during that period. Other components of the project will be designed and constructed to meet existing legal requirements. The contract will require the tunnel contractor to specify and meet a measured flow through the tunnel at completion under a specific set of hydraulic conditions, the Guaranteed Flow Amount (GFA). Should the GFA not be met, the contractor will be liable for liquidated damages or if it is exceeded, a bonus will be available.

2.2.4 Cost and Schedule

The project is to be maintained on schedule and within the approved budget. Decisions regarding any deviation from approved budget and/or schedule will be based on the net business impact, considering the tradeoff between project cost and business revenue.

The budget for the Project has not been approved at this time. A partial release of \$10 million for Phase 1 work was approved by the OPG Board of Directors on June 24, 2004. The preliminary cost estimate for the project is \$735 million for completion of Phases 1 and 2.

A preliminary in-service date of the fourth quarter of 2009 is projected. This will be updated once the contractor's schedule is submitted.

2.2.5 Working Relationships

Priority will be given to maintaining good working relationships with stakeholders, contractors, and the affected public during planning and construction of the Project.

A key objective is to minimize project impact on the ongoing operations of Niagara Plant Group. Measures of this objective include

- zero Treaty violations concerning Falls flow
- zero International Niagara Board of Control (INBC) Directive violations concerning Grass Island Pool (GIP) operation
- zero ice management incidents
- zero forced outages at existing diversion and generation facilities
- optimal planned outages coordinated with Niagara Plant Group outage plans
- maintenance of positive relationships with regulators and host communities
- maintenance of ISO 14001 registration
- maintenance of BSA 18000 registration.

3 Project Scope

The proposed project includes the planning, design, construction, commissioning and placing into service of an approximately 10- km long diversion tunnel with a nominal 12.7-m internal diameter, including all associated facilities and enabling work. The tunnel will divert a nominal 500 m³/s of the Niagara River flow from an intake located under the **INCW** structure, located upstream from Niagara Falls, to an outlet that will discharge into the existing canal system that feeds the existing Sir Adam Beck hydroelectric plants at Queenston, Ontario. The project will be executed in two phases as follows:

Phase 1

This phase includes project activation, project planning, conceptual design, certain permitting/approvals submissions, and procurement of a Design/Build tunnel contract. The planning and design of enabling work such as road improvements and power hookups is also part of this phase.

Key deliverables include contractor pre-qualification, contractor selection, executed Design/Build contract, certain applicable permits/approvals and third party agreements, designs for enabling work, a Release Quality Estimate (RQE) and Business Case for Phase 2 and Project approval by OPG's Board of Directors.

Phase 2

This phase for the project includes obtaining applicable permits/approvals, detail design, construction, construction management, testing and commissioning of the diversion tunnel and construction and installation of enabling works.

Key deliverables include permits/approvals, detailed design and construction of the diversion tunnel and associated facilities, tunnel commissioning and placing into service, performance testing and project closeout including a closeout report.

The scope of the project work is summarized and illustrated by the Work Breakdown Structure (WBS) in Exhibit 3.1. The WBS establishes a systematic, hierarchical approach for identification of all the work elements in the project. The WBS for the Niagara Tunnel project provides a logical breakdown of the work and retains flexibility to accommodate adjustments to the project configuration.

3.1 Third Party Requirements

Third Party requirements include items that are not part of the Design/Build contract work but are required to be implemented prior to, or during the course of, the Niagara Tunnel Project work. The majority of these requirements relate to meeting the commitments contained in the EA and the conditions of the EA Approval and permits required to be completed prior to the start of construction. Section 7 provides detail of these requirements.

3.2 Tunnel Contract

Procurement of a Design/Build contract includes the following key components:

- Expression of Interest (EOI) development
- EOI process
- Proponent pre-qualification
- contracting strategy
- establishing invitation process for Design/Build proposals
- Contract Terms and Conditions (T&C)
- construction labour agreements
- honorarium details
- insurance requirements
- bonding requirements
- Geotechnical Baseline Report (GBR) A preparation
- tunnel flow requirement and contracting strategy – GFA, liquidated damages and bonuses
- alignment options analysis (St. Davids Gorge)
- Concept drawings
- drafting of Design/Build Invitation document
- Site meetings and tours
- technical proposal analysis
- commercial proposal analysis
- proposal analysis report
- GBR C negotiation and agreement with contractor
- contract negotiation and agreement with contractor.

3.3 Tunnel Construction

The horizontal tunnel alignment generally follows the line of the two existing tunnels, under the City of Niagara Falls. In conjunction with the project, additional subsurface rights will be obtained. The subsurface rights to be obtained will include those necessary for the new tunnel as well as those which may be necessary if a fourth tunnel is constructed in the future. A tunnel boring machine (“**TBM**”) will be utilised to construct the tunnel. Tunnel construction will commence from the outlet.

3.3.1 Intake Area

The Intake Area will include development of a suitable area for the contractor’s lay down area, shops and offices. The area available for the contractor will be on both sides of the Niagara Parkway. To ensure separation of construction traffic from the tourist traffic, access to the construction yard will be along a new separate access road constructed out to Portage Road. Temporary signalization will be required at both Portage Road and the Niagara Parkway.

At certain times, the contractor will require access to the INCW bridge deck and within the river to perform work including in-water excavation of the intake channel, installation and removal of the cofferdam, removal of the existing ice accelerating wall and construction of a new wall, closure of the downstream of Bay 1 and construction of portions of the intake approach wall. During these periods of work, OPG will assume the role of the “constructor” under the Occupational Health and Safety Act for work performed within the INCW “Part Project Area”.

3.3.2 Outlet Area

The main construction facilities will be on OPG's lands, located between the PGS Reservoir and the existing Sir Adam Beck 2 canal. Access will be provided by a new road connection to Stanley Avenue. Temporary signalization will be required at the intersection with Stanley Avenue.

3.3.3 Intake Structure

The intake structure is a reinforced concrete structure and is to be constructed underneath the INCW, located upstream from the Niagara Falls. The design of the intake (through the use of numerical and physical models) has been examined extensively to optimize flow conditions and minimize ice entrainment. The structure will house sectional service gates for closure of the diversion tunnel at the upstream end.

The majority of the intake excavation will be done within a cofferdam that must be completed prior to the break-through of the TBM. Prior to cofferdam construction a new accelerating wall, used to facilitate ice management at the intake, will be constructed and the existing accelerating wall will be demolished. Following completion of the concrete works, the cofferdam will be removed.

It is expected that extensive grouting will be required of the upper rock formations to minimize water inflows into the tunnel during the TBM drive through these formations. In addition, underwater excavation of an intake channel is required upstream from the intake structure and beyond the confines of the cofferdam.

3.3.4 Diversion Tunnel

The tunnel is to be excavated from the downstream end through limestones and shales using a TBM to be supplied by the contractor. The tunnel is to be lined with a structural pre-cast or cast-in-place concrete liner. The excavated diameter of the tunnel is expected to be in the 14-m range.

The tunnel will cross various geological formations. Additional information on the geological formations, conditions and other related data is provided later in this document. Tunnel lining design will address time dependent deformation characteristics of the host strata.

On completion of the tunnel and following tunnel water-up, a flow test will be performed to establish that the tunnel meets the GFA. The testing will be done by a tester provided by the contractor with oversight by an independent Chief of Tests provided by OPG. The Chief of Test will determine the final GFA for the Project on which liquidated damages or bonuses will be based.

3.3.5 Outlet Structure and Channel

The outlet structure is a reinforced concrete structure, housing the closure gate and provisions for sectional service gates for closure of the diversion tunnel.

Water from the diversion tunnel will be discharged into the existing canal system feeding the Sir Adam Beck hydroelectric plants.

PGS operation will need to be constrained to facilitate removal of the rock plug and removal of the PGS Dewatering Structure.

3.4 Enabling Activities and Miscellaneous Construction

A number of enabling activities must be performed prior to commencement of the tunnel work, including the following:

3.4.1 Determine Expropriation Rights

Expropriation rights have been made available to OPG through Bill 100, Electricity Restructuring Act, Section 53.6. Advice regarding expropriation matters will be provided by external legal counsel (Torys).

3.4.2 Real Estate Mapping

An external land surveyor (The Larocque Group) has been hired by OPG Real Estate to determine the location of property required for the tunnel(s). The surveyor will provide reference plans identifying the location for all properties where rights are required.

3.4.3 Third Party Real Estate

With respect to privately-owned property, OPG Real Estate may acquire the necessary property rights from private property owners where underground rights are required.

3.4.4 City Right-of-Way Acquisitions

With respect to municipally owned property, OPG Real Estate may acquire the necessary property rights from the City of Niagara Falls and the Regional Municipality of Niagara Falls where property instances are primarily road crossings.

3.4.5 NPC Real Estate Acquisitions

With respect to property owned by the Niagara Parks Commission, OPG Real Estate will acquire the necessary property rights from the Niagara Parks Commission where property rights are required.

3.4.6 Stanley Avenue Road Improvements

The section of Stanley Avenue, between Whirlpool Road and Niagara Townline Road will be widened to improve access to the main construction site at the outlet. Road improvements will include utility relocates and sewage and water connections for the Outlet area. The roadwork will be carried out by the Regional Municipality of Niagara (RMON) on behalf of OPG under the terms of the Community Impact Agreement.

3.4.7 Pre-Construction Condition Surveys

A number of structures in the vicinity of the site will be surveyed before commencement of construction to establish a basis for determining if the structure has been affected by the construction activities and to determine responsibility for repair, if necessary. The pre-construction survey work will be undertaken by a third-party consultant, retained by OPG. The contractor will be required to endorse the pre-construction survey before commencement of construction.

3.5 Project Management

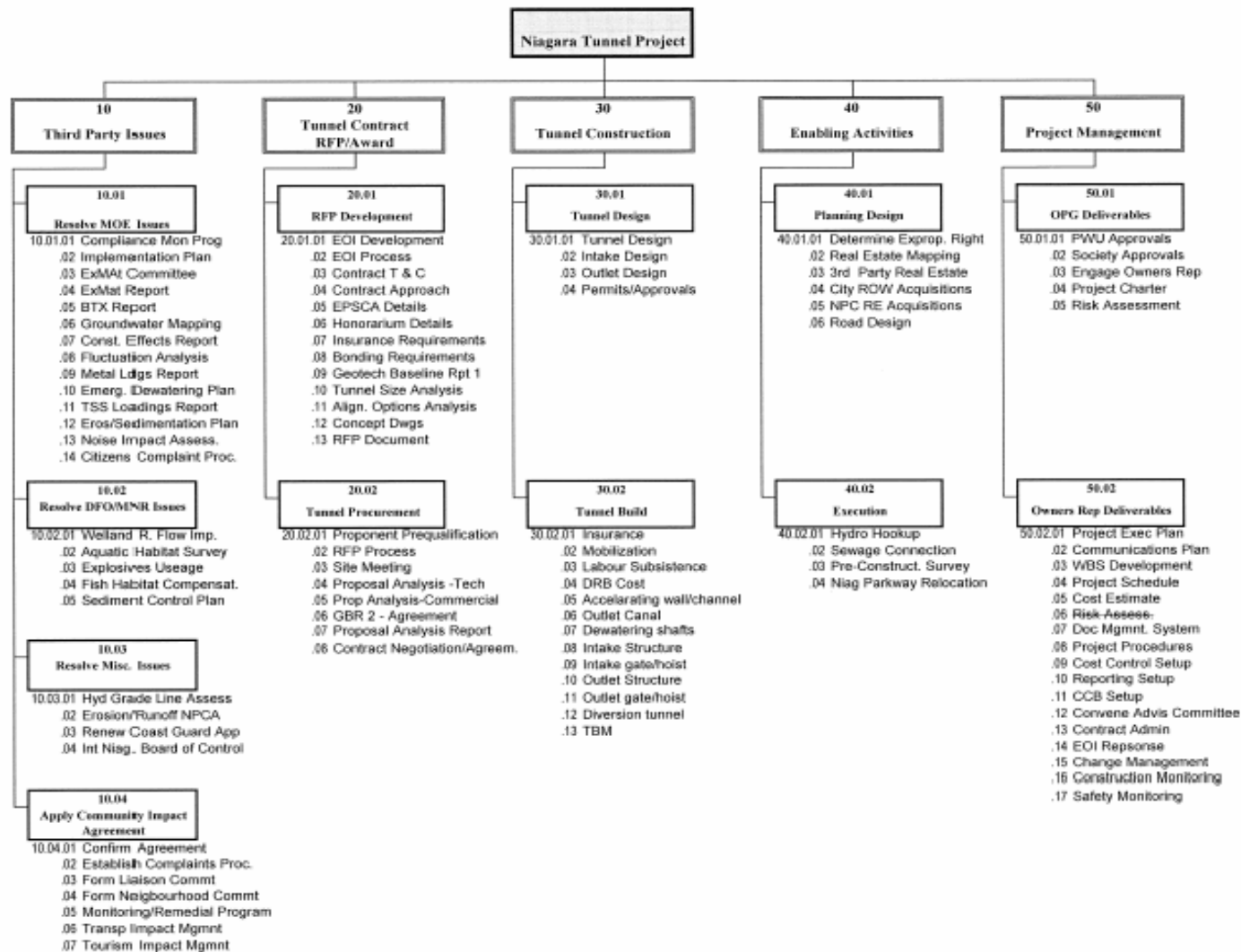
Management of the Project will be the combined responsibility of OPG and the Owner's Representative. These two parties will work together as a team to enable the successful completion to the Project. Management activities will be assigned to one of the parties as the primary responsible party. The other party may provide specific support or may be consulted on certain activities as indicated in the Table 8.2. In either case, all parties will be informed of the activities of the other, as appropriate. The Project activities will be implemented through a single Project Director.

3.6 Exclusions

The following are not included in the project scope:

- dewatering pumps for tunnel
- sectional service gates at outlet
- permanent closure of the adit excavated for geotechnical investigation purposes.

Exhibit 3.1 – Work Breakdown Structure



4 Project Authorization

The Minister of Energy announced the Niagara Tunnel Project in Niagara Falls on June 25, 2004. The Provincial Government's Bill 100, The Electricity Restructuring Act, was the catalyst for this announcement. OPG anticipates that the regulations passed under Bill 100 will enable OPG to fully recover the costs of the project through its regulated rates. OPG intends to finance the Project on this basis.

In June 2004, the OPG Board approved a budget of \$10 million to initiate the implementation process for the Niagara Tunnel Project (Phase 1). Board approval will be required before proceeding with award of the Design/Build contract for the tunnel (Phase 2).

5 Health and Safety Management

From a health and safety perspective, other than in connection with work performed on the INCW Part Project (as described below), OPG will be the “Owner” for this project, with the Design/Build Contractor designated as the “Constructor” under the Occupational Health and Safety Act (OHSA). OPG will be fulfilling its responsibilities under OHSA through the Owner’s Representative, acting on OPG’s behalf, in the relationship with the Contractor.

5.1 Overview

The health and safety objective for the Niagara Tunnel Project is an accident-free workplace. Associated metrics include zero fatalities, zero permanent disabilities and zero lost time accidents. Project health and safety, including public safety, will be managed in accordance with OPG’s Health and Safety Policy, OPG’s Corporate Safety Rules and OPG’s Contractor Management Process. These policies require contractors and their subcontractors maintain a level of safety equivalent to that of OPG employees while working at OPG workplaces. OPG, its representatives and its contractors will meet all applicable health and safety legislative requirements.

OPG will designate a “construction island” within which the Design/Build Contractor will be responsible for health and safety, security and public safety. The Contractor will be the “Constructor” as defined under OSHA, except as outlined below. The Contractor will be required to prepare, implement and maintain comprehensive project site specific health and safety and security, public safety and emergency response plans. The Contractor will be required to have these plans reviewed by OPG prior to initiating any construction activities. For work where OPG will be “Constructor” of a Part Project, OPG will provide input, including specific procedures to be followed, where necessary, and approve the site specific safety and site security, public safety and emergency response plans developed by the Contractor.

Ongoing operational requirements by OPG will constrain Contractor activities associated with some planned construction work in the intake and outlet areas. The need for OPG to operate control gates at the International Niagara Control Works (INCW) for ice, flow and water level management will constrain in-water work at the INCW and construction activities utilizing the access to and along the INCW structure. For this aspect of the Project (the INCW Part Project), OPG will be the “Constructor” under the OHSA, with the Owner’s Representative fulfilling OPG’s obligations in this regard.

5.2 Owners Safety Oversight

Other than with the INCW Part Project, OPG will have an “Owner-Only” relationship with the Contractor. OPG and its Owner’s Representative will exercise the role of a prudent Owner in the following ways.

5.2.1 Risk Assessment

Strategic safety risks will be incorporated into the project risk assessment according to Electricity Production’s “Project Risk Management” standard (EPS-PMO-STD-08) to identify strategic factors that could impact both workplace safety and OPG’s meeting all regulatory (e.g.,

poor Contractor compliance with its safety program, the Site Specific Safety Plan or other contractual safety requirements, impact of the project on public safety, interface with OPG personnel, etc) and OPG's plan to mitigate these risks.

5.2.2 Pre-Qualification of Contractors

Only organizations that are pre-qualified by OPG will be allowed to submit a proposal for the Design/Build Contract. The pre-qualification process, managed by OPG's Supply Chain, will evaluate three aspects of the prospective organizations' safety performance: external safety performance (WSIB data, regulatory compliance, etc) safety performance at all OPG sites and the contractor's overall Safety Program obtained from a detailed OPG Contractor Pre-Qualification Questionnaire.

5.2.3 Project Safety Plans

Each proponent will be required to include a preliminary Project Specific Site Safety Plan and a preliminary Site Security, Public Safety and Emergency Response Plan for all project activities including those of subcontractors as part of their proposal to ensure that their plans demonstrate appropriate key safety management processes (e.g., Hazard Identification and Control, Safe Work Planning, Supervision, Workplace Inspections, Senior Management auditing, Subcontractor management, Incident Management, Housekeeping, Emergency Management, Safety resources, etc), meet OPG's expectations and will mitigate all major operational safety risks. These plans must be sufficiently robust to provide assurances to OPG, as the "Prudent Owner", that the Contractor can fulfill all safety obligations during the project. These plans will be evaluated by Owner's Representative and OPG's Project Director with input as necessary from other OPG safety resources. This assessment of the submitted safety plans will form a portion of the bid evaluation process with a pre-defined weighting assigned to this criteria. Each proponent will also be required to prepare equivalent safety plans for the INCW Part Project.

The Contractor will be required to submit final Safety Plans after signing the Agreement and these will be reviewed against the outline plans submitted with their Proposal. OPG will have the right to perform periodic audits to ensure compliance with the safety plans and take action, including termination of the contract, if safety management and performance is unacceptable. OPG, as "Constructor", will have the right to require changes to the safety plans applicable to the INCW Part Project.

5.2.4 Contract Management Plan

A Contract Management Plan will be developed describing how OPG will fulfill its role as "Prudent Owner" in monitoring the execution of the contract from a safety perspective, being mindful of not taking on the role of Constructor except where OPG will be the "Constructor" of the INCW Part Project. The purpose of these activities is to ensure that contractual obligations are being met. This plan will include how OPG will

- communicate OPG's safety expectations at all stages of the project ensuring that expectations are high level and general in nature where the Contractor is "Constructor" and OPG is "Owner-Only" (providing specific direction on how to manage safety could potentially confuse OPG's role except where OPG is "Constructor" for the INCW Part Project)
- establish lines of communication with the Contractor to discuss non-compliance with contractual safety requirements, ensuring that discussions avoid OPG, or its Owner's

Representative, approving or suggesting specific control measures to a hazard, except where OPG is “Constructor” of the INCW Part Project

- monitor the *overall* safety performance of the Contractor and contractual compliance through periodic site tours, periodic audits, Contract Review Meetings, Safety Reports, and similar high level review
- when OPG is the Owner-Only, manage (avoid or minimize) all interfaces with OPG employees and assess any potential hazards to OPG employees or the public resulting from the Project
- communicate any new hazards to the Contractor as a result of OPG's operation or activities.

6 External and Internal Stakeholders

6.1 External Stakeholders

A large number of external (non-OPG and non-OR) stakeholders will be engaged during implementation of this project. Table 6.1 provides a listing of these stakeholders and their interests in the project. Communications with the public are addressed in Section 18.

Early and sustained engagement of external stakeholders will be critical to the successful outcome of the Project. The potential for adverse project impacts cannot be overstated if the project execution approach is not aligned with stakeholder requirements. External stakeholders will be updated by means of meetings, presentations and other mechanisms.

Table 6.1 External Stakeholders

Stakeholder	Statement of Interest
International Joint Commission - Foreign Affairs - International Niagara Board of Control	IJC gave approval in April 1999 for the construction of one tunnel. They had no concerns regarding water levels or trans-boundary concerns. IJC to be provided with project update for information.
Fisheries and Oceans Canada, Department of Fisheries and Oceans	Authorizations under Fisheries Act
Canadian Coast Guard	Navigable Waters Project Act regarding exemption for intake structure work Operation in non-navigable water
Ontario Ministry of the Environment	Conditions of EA Approval
	Certificates of Approval – Air; Industrial Sewage
Ontario Ministry of Natural Resources	Conditions of EA Approval; Conditions under Fisheries Act Authorizations
	Work Permits
Ontario Ministry of Energy	Energy production/rate impact
Ontario Ministry of Finance	Project Financing ORST
Ontario Independent Electricity System Operator (IESO)	Addition of electrical energy to provincial grid Outage coordination and approvals AGC operation
Ontario Ministry of Labour	Notices of Project
Niagara Parks Commission	Use of NPC land for Intake Works Yard/access road. Disruption to Niagara Parkway. Groundwater monitoring location.
Niagara Escarpment Commission	Encouragement of reuse of Queenston shale
Niagara Peninsula Conservation Authority	Conditions of EA Approval assessing Welland River issues. Erosion and sediment control plans

Table 6.1 External Stakeholders

Stakeholder	Statement of Interest
Regional Municipality of Niagara	Community Impact Agreement (CIA) – compensation issues
	Transportation Plan Implementation
	Liaison Committee
	Reuse of excavated materials
City of Niagara Falls	Community Impact Agreement (CIA) – compensation issues
	Transportation Plan Implementation
	Liaison Committee
Town of Niagara-on-the-Lake	Community Impact Agreement (CIA) – compensation issues
City of Welland, City of Thorold, Town of Pelham, Town of Wainfleet, Township of West Lincoln	Condition 7.5 of EA Approval – regarding effects of Welland River water levels and fluctuations
Niagara Falls Tourism Industry	Community Impact Agreement
Affected property owners	Subsurface rights
Fortis Ontario	Subsurface rights?
Marineland	Subsurface rights?
Building Trade Unions	Jurisdiction
Hydro One	Construction power supply Outage coordination
Niagara Falls Hydro	Construction power supply

6.2 Internal Stakeholders

A large number of internal (OPG and non-OR) stakeholders will be engaged during implementation of this Project. Table 6.2 provides a listing of these stakeholders and their interests in the Project.

Early and sustained engagement of internal stakeholders will be critical to the successful outcome of the Project. The potential for adverse project impacts cannot be overstated if the project execution approach is not aligned with stakeholder requirements. Internal stakeholders will be updated by means of meetings, presentations and other mechanisms.

Table 6.2 Internal Stakeholders

Stakeholder	Statement of Interest
Niagara Plant Group/ Electricity Production	<ul style="list-style-type: none"> - Landlord - Client - Operate existing facilities - Facilitator for local contacts - Liaison with Niagara Region, City of Niagara Falls and Town of Niagara-on-the-Lake - Liaison with Niagara Parks Commission - Operating Restrictions and Outage Coordination - Design Review (outlet gate, hoist and controls and Intake service gates including handling and storage) - Administration of Work Protection Code - Contract Admin and Monitoring (monitoring well installation) - Records retrieval and permanent retention - Coordination on Site Security, Public Safety and Emergency Response - Commission new facilities/systems (Outlet Gate) - Transfer of Control of affected property and facilities - Review security, public safety and emergency response plans - Review commitments for ongoing post-project requirements - Waste disposal - Reuse Committee
Energy Markets	<ul style="list-style-type: none"> - Operating Restrictions and Outage Coordination - Marketing Incremental Energy and ancillary products
The Society	<ul style="list-style-type: none"> - Purchased Services Agreement regarding external engineering and professional resources
Power Workers Union	<ul style="list-style-type: none"> - Purchased Services Agreement consultation regarding external trades, drafting and clerical resources - Trades Work assignment under Chestnut Park Accord Addendum (CPAA)
Board of Directors/ Major Project Committee	<ul style="list-style-type: none"> - Project approvals, direction and oversight

7 Approvals and Third Party Requirements

The identification of permits, approvals or third party requirements is the responsibility of the Contractor. However, OPG has done significant work to advance the permitting process prior to award of the Design/Build Agreement. Tables 7.1A and 7.1B provide a preliminary list of permits, approvals and third party commitments required to implement the Project. This is part of a more detailed database which is used to track progress and report on the status of approvals. Additional permits, approvals and third party requirements are entered in the tracking database when they are identified. The following sections provide brief description of the main permits, approvals and third party requirements.

The abbreviations in Tables 7.1A and 7.1B have the following meanings:

- P = Primary responsibility for preparing and submitting required documentation, obtaining and implementing Approvals, as applicable
- P1 = Primary responsibility for preparing and submitting initial documentation, and reviewing and submitting final documentation and obtaining Approvals
- P2 = Primary responsibility for finalizing documentation and submitting to OPG for review, and supporting obtainment of Approvals
- S = Support to the Party with primary responsibility for developing documentation and obtaining Approvals including collecting and providing data and information, and attending meetings.

7.1 EA Approval Conditions

On October 14, 1998, the Minister of the Environment approved the Environmental Assessment (EA) for the Niagara River Hydroelectric Development (NRHD) submitted by Ontario Hydro (now OPG). Attachment A (referred to as the EA Conditions of Approval or Conditions) to that approval contains a number of conditions that must be met before, during and after construction of the Project. It should be noted that since the EA approval covers the entire NRHD, some of the conditions are not applicable to the current single-tunnel Project.

Table 7.1A only identifies applicable conditions. Because the EA was issued to OPG, it will be OPG/OR's responsibility to interact with MOE to obtain all necessary clearances of Conditions of the EA Approval. Certain of these conditions have already been cleared by MOE (conditions having received approval include Conditions 1.4, 1.6, 1.8 and 8.2, Table 7.1A). Certain of these clearances require considerable involvement by the Contractor (in particular, Conditions 2.3.1, 3.1, 5.1, 7.2 and 9.4). The Contractor will be provided with the draft submissions made to date to MOE, including all comments received from MOE, and asked to provide all relevant technical detail to be able to finalize the documents. The Contractor will be required to attend meetings with MOE or other approving agencies to ensure all issues are addressed and will prepare submission material for OPG/OR to submit to MOE.

7.2 Community Impact Agreement

A community impact agreement (CIA) was concluded between the local municipalities (City of Niagara Falls, Regional Municipality of Niagara and the Town of Niagara on the Lake) and Ontario Hydro (now OPG) on December 23, 1993. The agreement defines how the

municipalities will be compensated for disruptions that might occur during construction of the Project. It details payments required for use of certain services such as potable water, sewage and road improvements.

The CIA also provides a framework during project implementation for

- keeping the municipalities and local community informed of activities during construction
- co-ordination of emergency service needs
- development of a transportation management plan
- tourism impact management.

7.3 Fisheries Act Authorizations

Authorizations under the Sections 32 and 35(2) of the Fisheries Act were approved January 1995 with a number of conditions that had to be met prior to project implementation. These initial authorizations were valid until January 31, 2000. A subsequent amendment was valid until December 31, 2005. A second amendment received approval October 14, 2008. An extension to the validation period has been requested as well as a consolidation of the conditions to be addressed under the Authorization for Works or Undertakings Affecting Fish Habitat Section 35(2), Fisheries Act. OPG has confirmed that all major outstanding issues arising from the Section 35(2) Authorization have now been addressed except for execution of a habitat compensation plan and those issues related to construction activities which will be addressed through the MNR Works Permit to be obtained. Alternative compensation plans for loss of fish habitat have been accepted by Fisheries and Oceans Canada (DFO). OPG's preferred plan at this time is to assist with the Draper's Creek Restoration Project as this Project is the most advanced from a permitting/public involvement perspective. OPG/OR will have to meet any compliance monitoring which is imposed by DFO as part of the condition of approval.

The Fisheries Act Authorization under Section 32 of the Fisheries Act (Authorization to Destroy Fish by any Means other than Fishing) details conditions for blasting and will be the contractor's responsibility to follow.

7.4 Canadian Coast Guard

An OPG request for exemption under the Navigable Waters Protection Act has been approved and no further action is required, other than updating the Canadian Coast Guard on the status of the project.

7.5 International Joint Commission (IJC)

A report was received from the IJC April 30, 1999, recommending that the first tunnel could be constructed with no concerns. Formal acknowledgement will be requested by OPG that no further action is required.

7.6 Other Permits and Approvals

Table 7.1B is a list of other permits and approvals to be obtained. Most of these are related to construction activities and will be the Contractor's responsibility.

Table 7.1A

EA Condition Number	Summary of Condition	Responsibility for Developing Documentation and Obtaining Approvals	
		Owner	Contractor
1.1	Compliance with EA		
1.2	Delay to construction		
1.3	Expiration of Approval		
1.4	Implementation Plan for Phased Construction	P	
1.6	Compliance Monitoring Program	P	
1.8	Implementation Plan for Undertaking	P	
1.9	Procedure for Amending EA	P	
1.10	Notification Procedure for Minor Amendments	P	
1.11	Facilitate information flow requirements under the Community Impact Agreement	P	
1.12	Provision of public record documents	P	
2.1	Establish Re-Use of Excavated Materials Committee	P	
2.2	Preparation of Re-Use of Excavated Materials Report	P	
2.3.1	Submit plan for disposal of excavated materials on OPG lands	P1	P2
3.1	Disposal Monitoring and Contingency Plan for BTX	P1	P2
4.1	Hydrogeology – groundwater mapping	P1	P2
4.2	Hydrogeology – groundwater monitoring plan	P1	P2
5.1	Construction effects of tunnel and shafts	P1	P2
7.1	Documentation of the effects of flow changes on a number of components	P	
7.2 a	Documentation on effectiveness of mitigation measures to address TSS loadings	P1	P2
7.2 c	Erosion and Sedimentation Control Plans	P1	P2
7.4	Assessment of the effects of reduced flows in the lower Welland River to fish habitat and to adjacent properties/users	P	
7.5	Demonstration that hydraulic grade line in Welland River will remain within present range and not reduce sediment carrying capacity	P	
8.1	Ontario Hydro Noise Protocol to be followed		
8.2	Reassessment of Noise assessment	P	
9.2	Citizen Complaints Procedure	P	S
9.4	Erosion and storm water runoff plan	P1	P2
9.5	Carry out Community Impact Agreement	P	S
10.1	Aquatic habitat survey and habitat compensation if applicable	P	
10.2	Verification of design to limit fish entrainment at intake	P	

Table 7.1B

Approval	Key Agency	Responsibility	
		OPG	Contractor
International Niagara Diversion Treaty, 1950	International Joint Commission, External Affairs Canada	P	
Navigable Waters Protection Act	Fisheries and Oceans Canada (Canadian Coast Guard) now Transport Canada (Marine)	P	S
Transportation of Dangerous Goods Act	Transport Canada		P
Temporary magazine licence	Natural Resources Canada, Minerals and Metal		P
Authorization of destruction of fish by means other than fishing	Fisheries and Oceans Canada	P	S
Authorization for harmful alteration, disruption or destruction of fish habitat	Fisheries and Oceans Canada	P	S
Work Permits (under Lakes and Rivers Improvement Act, and Public Lands Act)	Ministry of Natural Resources		P
Permit to take water (construction)	Ministry of the Environment		P
Certificate of Approval (AIR)	Ministry of the Environment		P
Certificate of Approval for an Industrial Sewage Works	Ministry of the Environment	S	P
Generator Registration	Ministry of the Environment		P
Dust Suppressant License	Ministry of the Environment		P
Tree Cutting By-Law	Regional Municipality of Niagara		P
Liaison Committee	Regional Municipality of Niagara, City of Niagara Falls, Town of Niagara-on-the-Lake, OPG	P	S
Transportation Impact Management	Regional Municipality of Niagara/City of Niagara Falls	P	S
Tourism Impact Management	City of Niagara Falls, Town of Niagara-on-the-Lake	P	S
Emergency Services	City of Niagara Falls, Town of Niagara-on-the-Lake, Regional Municipality of Niagara	P	S
Municipal Services	City of Niagara Falls, Regional Municipality of Niagara	P	S
Municipal Approvals	City of Niagara Falls, Regional Municipality of Niagara	S	P

8 Execution and Delivery Strategy

8.1 Project Phasing

As indicated in Section 1 of this plan, the Niagara Tunnel Project will be executed in two distinct phases as follows:

- **Phase 1 (Planning and Procurement Phase)** – Project reactivation, procurement of construction and service contracts, liaison and coordination with approving agencies and others, agreements with stakeholders.
- **Phase 2 (Execution Phase)** – Detail design and construction of the diversion tunnel and related works, commissioning of the tunnel and project closeout.

8.2 Project Resources

The Niagara Tunnel Project will be designed and constructed by a Design/Build Contractor. OPG has not designed or constructed hydroelectric facilities, including major diversion tunnels, for several decades and as a result the specialist skills required for this work are not available within the organization. Therefore, for this project, some of the Owner's activities will be assigned to an outside consultant, acting as Owner's Representative. It may be necessary for the Owner's Representative to engage specialist contractors to perform specific assignments.

OPG has labour agreements with the Power Workers Union and the Society of Energy Professionals. These collective agreements include requirements for OPG to gain agreement and/or to engage in discussions with the union representatives to contract out work. For Phase 1 of this project, approval/discussions to contract out this work have been completed with both unions. Prior to the start of Phase 2 work, agreements/discussions will be pursued to contract out the remainder of the required specialist work to complete the project.

8.3 Contracting Approach

OPG had previously determined that the diversion tunnel be implemented through a Design/Build Contract. This approach has been reviewed and refined based on lessons learned on other projects, current contracting practices, the latest information on tunnel technology, and the objectives of the Project. The Design/Build approach will be maintained in order to maximize the degree of certainty of cost outcome due to single point accountability for both design and construction. The Design/Build approach also permits OPG to canvass the design creativity of the marketplace instead of being restricted to a single design. This may result in cost or schedule savings. The contract will be structured to reward early project completion, and better than target tunnel flow performance while providing for competitive pricing from the contractors. Further details regarding the contracting approach will be developed by OPG Procurement with support from OR.

8.4 Division of Work

A coordinated and sustained multi-disciplinary effort by OPG staff, the Owner's Representative and the contractor will be essential for the successful execution of the Project. The division of functional responsibility must be clearly understood and adhered to by all project participants. Table 8.1 provides a summary of the proposed allocation of project functions and Table 8.2 elaborates on project management responsibilities.

Table 8.1 Functional Division of Project Work

Function	Responsibility		
	OPG	Owner's Representative	Contractor
Project Direction and Oversight	P		
Project Management (see table below)	S	P	
Risk Assessment	P	S	
Risk Management	A	P	
Legal – Corporate and Project	P		
Legal – Real Estate	P	S/C	
Contract Execution and Other Commitments	P	S	
Insurance and Bonding	P	S	
Procurement – Policy/Strategy	P	S	
Procurement – Execution	C	P	
Real Estate Acquisition	P	S	
Functional Requirements (engineering)	R/A	P	
Geotechnical Baseline Report Preparation	R	P	S
EA Approvals	S/C	P	S
Third Party Liaison	S/C	P	
Third Party Agreements – Liaison	S/A	P	
Community Impact Agreement	P	S	
Public and Media Relations/Shareholder Contact	P	S	S
Approvals Coordination	C	P	
Permit Applications		S	P
Preliminary/Detail Design	C	R	P
Construction			P
Construction Monitoring including environmental	C	P	
Construction Safety			P
Start Up and Commissioning		R	P
Safety Monitoring/Audit	C	P	
Contract Administration	S/C	P	
Project Cost Estimate	R/A	P	
Project Scheduling	A	P	
Contract Scheduling	A	R	P
Financial Modelling Economic Evaluations/ Business Case	P	S	
Project Approvals to allow Proposal invitation	P	S	
Project Controls including Change Control	S/A	P	
Project Accounting	P	S	
Project Payments	P	S	
Project Reporting	R/S	P	
Project Closeout Documentation	R	P	S
Project Execution Plan	S	P	
Document Management	S	P	
Action Tracking	S	P	
Engineering Support to OPG	S	P	
Evaluation of Proposals	S	P	
<i>P = Primary Responsibility S = Support Function A = Approval Function</i> <i>C = Consultation R = Review</i>			

Table 8.2 Project Management Responsibilities

Project Management Activity	OPG	OR
Engage Owner's Representative and administer contract	P	
Project Charter	P	S
Real estate services	P	S
Legal support	P	
OPG union agreements	P	
Insurance/bonding/tax requirements	P	C
Financial modeling	P	S
Financial reporting requirements	P	S
Public communications support	P	
Communication plan	P	
Project Execution Plan	S	P
WBS development	C	P
Project schedule		P
Cost estimate		P
Reporting setup	S	P
EOI response	S,C	P
Design/Build contract administration		P
Coordination of proposal invitation process		P
Action tracking	C	P
Engineering/technical support		P
Risk assessment and management plan	S	P
Change Control Board (CCB) setup	S	P
Convene Advisory Committee	S	P
Change management		P
Construction monitoring		P
Safety monitoring/auditing		P
Quality monitoring		P

Legend:

- P = Primary responsible party for preparation, revision management and implementation
- S = Support to the Primary responsible party
- C = Consultation with the Primary responsible party

8.5 Risk Allocation

At the time that this Project was re-activated in June 2004, OPG management intended to pursue a fixed price contract Board approval that allocated the risk of differing site conditions (subsurface geological) to the Contractor. Following significant discussion on this subject, including review of industry "norms", it was concluded that such risk should be borne by OPG. Other risk allocation decisions were determined through extensive discussed between OPG, Owner's Representative and outside legal counsel.

A Geotechnical Baseline Report (GBR), initiated during the proposal stage and finalized prior to contract award, will form the basis for evaluating claims for Differing Site Conditions (DSCs).

An innovative multi-step process has been adopted for the preparation of the GBR. An initial GBR-A will be prepared by OPG/OR and included with the proposal invitation. Proponents (contractors) are required to submit their responses to the document (GBR – B) with their proposal. The contract GBR (termed GBR-C) will then be negotiated between OPG and the Contractor to document the agreed baseline.

8.6 Insurance

OPG will use internal insurance expertise and advice from Marsh, its insurance broker, to determine an appropriate insurance program for the Project. It is anticipated that OPG will provide an Owners Controlled Insurance Policy (OCIP) to cover the entire undertaking.

8.7 Bonding and Security

OPG will work with Marsh to determine appropriate bonding for the Project. It is anticipated that OPG will require the Contractor to obtain a 50% Performance Bond and a 50% Labour and Materials Payment Bond, as well as letters of credit.

9 Organization, Roles and Responsibilities

9.1 General

This section of the PEP identifies the organizational approach envisaged for overall management of the Project and describes roles and responsibilities for key members of the project team.

A functionally integrated project management team, consisting of OPG and consultant staff, will be formed to manage the project. This management team will be empowered with adequate authority and have access to appropriate resources to successfully execute the project. They will be responsible for accomplishing Project goals by undertaking project planning and project configuration and by overseeing and monitoring all aspects of design, construction, commissioning and project closeout.

9.2 Organizational Approach

9.2.1 Phase 1 Organization

At its highest level, the organizational and reporting structure for the Project during Phase 1 is illustrated in Exhibit 9.1.

OPG's Project Director, who is ultimately responsible for project execution, reports to the Project Sponsor who in turn reports to OPG's President and CEO and ultimately to OPG's Board of Directors and its Major Projects Committee. The Project Director is supported by the Owner's Representative team, by a team of OPG support staff and by external consultants, including legal counsel.

Exhibit 9.2, which further elaborates on the OR team, illustrates the key functions provided by this group during Phase 1, namely, Project Management Advice and Support, Project Controls, Engineering Support, Third Party and EA Support and Contracts and Construction Support.

Exhibit 9.3 illustrates the key support functions provided by OPG staff such as, Real Estate, Legal, Procurement, Finance, Public Affairs and Risk Management and those functions provided by third party consultants.

Exhibit 9.4 shows the total project organization.

OPG oversight of the project team activities is provided by the Project Director. One of the key roles of the Project Director is to ensure the effective integration of internal and external resources with the appropriate mix of skills and experience. Another key responsibility of the Project Director is to facilitate effective and timely communications between the project team and other internal and external stakeholders.

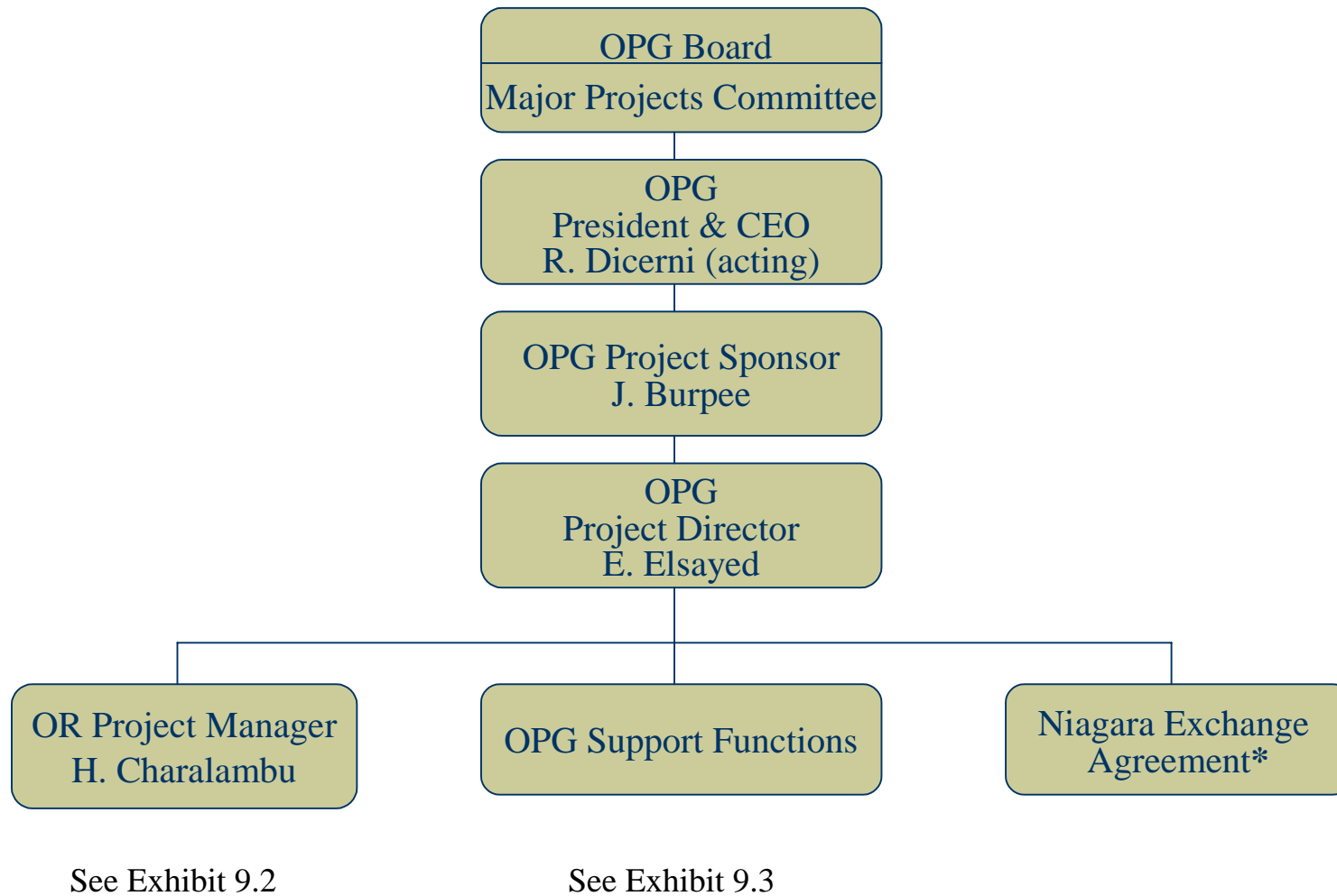
9.2.2 Phase 2 Organization

The organizational structure during Phase 2 of the project will be added once it is sufficiently defined.

9.3 Roles and Responsibilities

Table 9.1 identifies the roles of the key project team members and provides a listing of their responsibilities.

Exhibit 9.1 – Summary Organization Chart – Phase 1



*This component of the Niagara Tunnel Project, which involves the transfer of Toronto Power and Ontario Power generating stations to the Niagara Parks Commission, is independent of the rest of the project and is addressed in a separate Project Execution Plan

Exhibit 9.2 – Owner’s Representative Organization – Phase 1

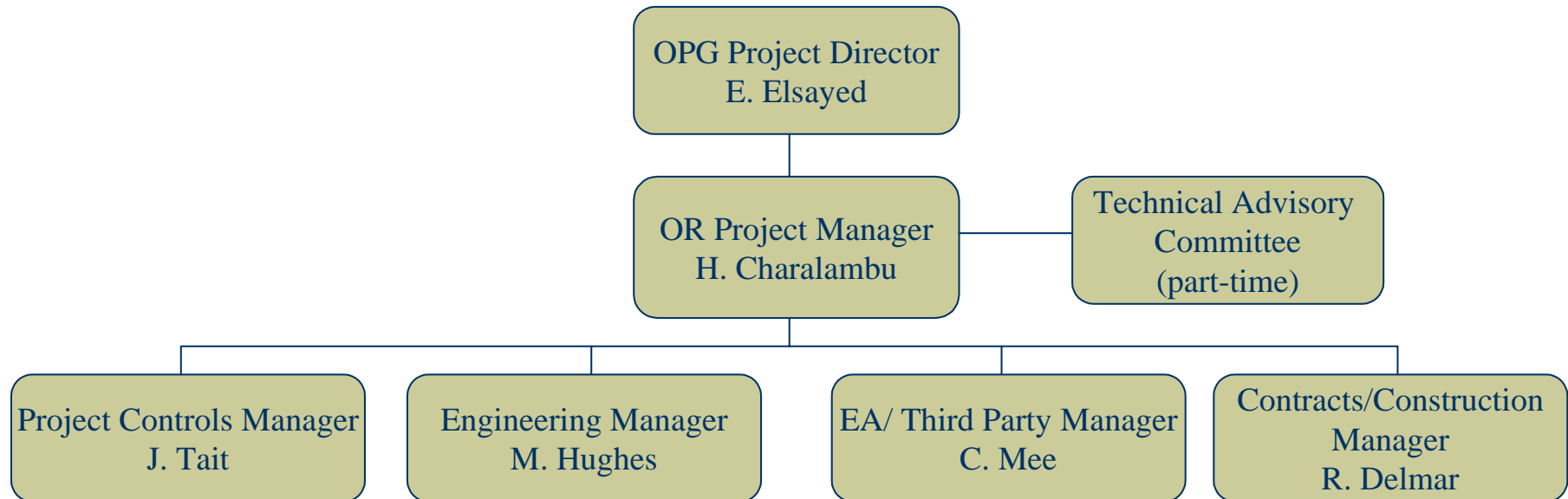


Exhibit 9.3 – OPG Support Organization – Phase 1

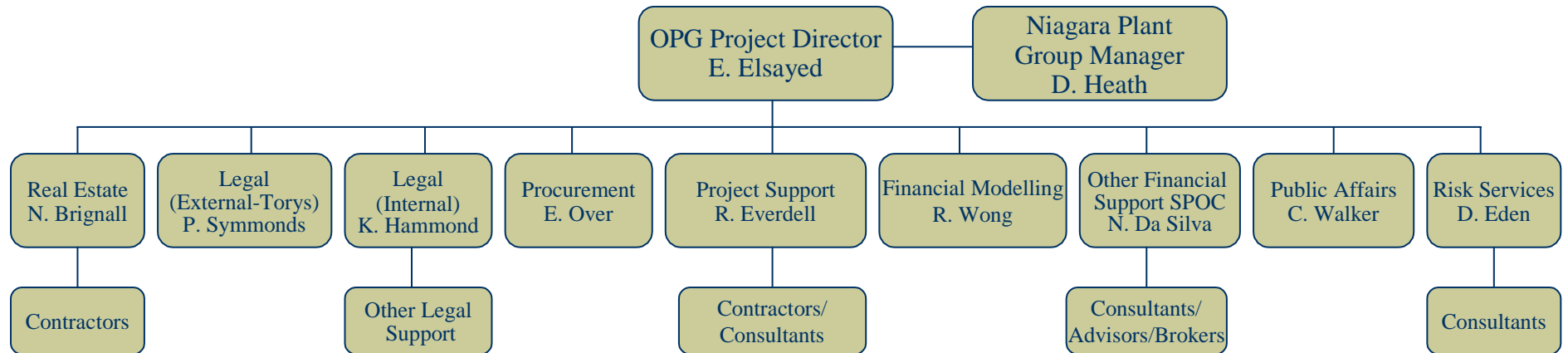


Exhibit 9.4 – Overall Project Organization – Phase 1

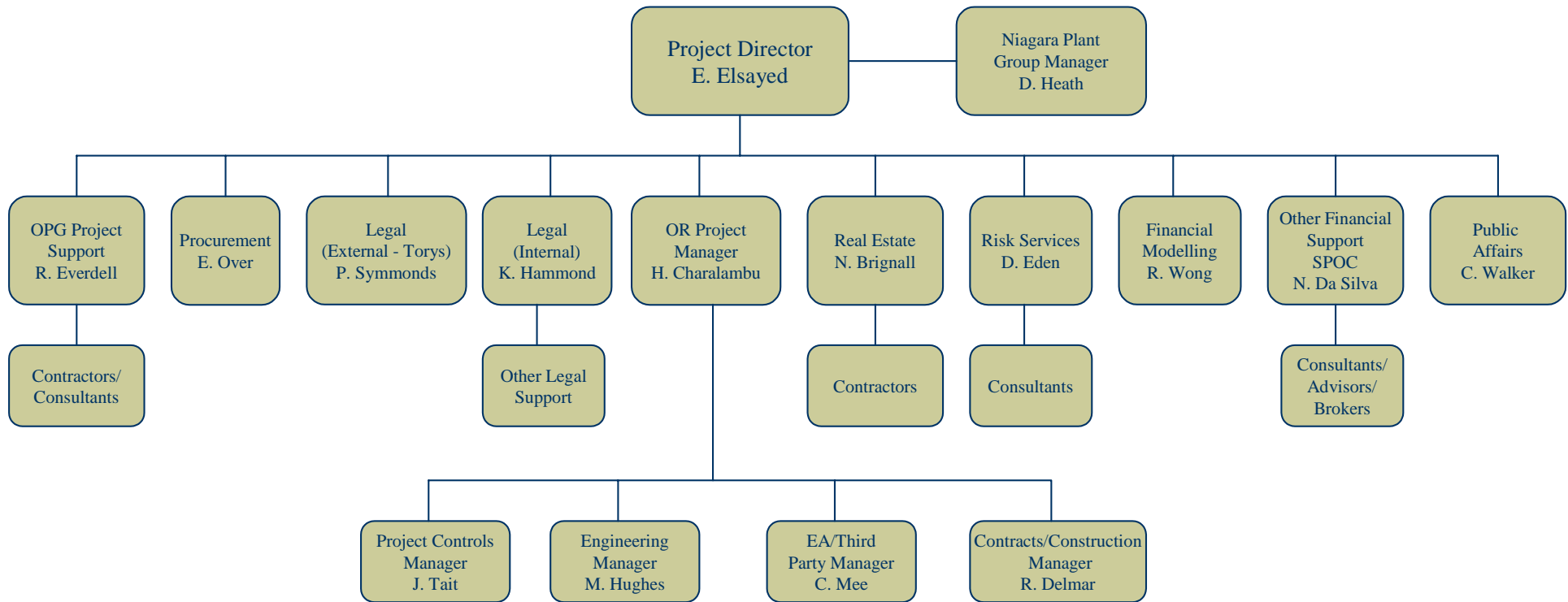


Exhibit 9.5 - Summary Organization Chart – Phase 2

CHART TO FOLLOW

Table 9.1 – Key Roles and Overview of Responsibilities

Position or Function	Reports To	Overview of Responsibilities
OPG Board	Ontario Government	<ul style="list-style-type: none"> • Establishes strategic objectives for the project • Approves project scope, budget and schedule • Provides oversight of advocacy and government relations activities • Monitors overall project performance
OPG Major Projects Committee	OPG Board	<ul style="list-style-type: none"> • Overview of project execution approach and advice regarding planning and configuration of project • Overview of project team performance • Provides strategic advice regarding project delivery • Advises OPG Board on project delivery issues
OPG President and CEO	OPG Board	<ul style="list-style-type: none"> • Provides senior management oversight • Provides guidance in terms of corporate direction, priorities and business drivers • Provides the project link to the OPG Board and shareholder (the Ontario Government)
OPG Project Sponsor (Senior Vice President)	OPG President and CEO	<ul style="list-style-type: none"> • Project Sponsor • Provides senior management oversight, as member of OPG's Executive Committee • Issues the Project Charter • Member of the Change Control Board • Reviews and endorses Project Execution Plan and Project Communication Plan • Reviews project Risk Management Plan for adequacy • Updates OPG Board/Major Projects Committee/Executive Committee • Facilitates funding approval

Table 9.1 – Key Roles and Overview of Responsibilities

Position or Function	Reports To	Overview of Responsibilities
OPG Project Director	OPG Project Sponsor	<ul style="list-style-type: none"> • Accountable for the overall delivery of project in accordance with safety, cost, schedule, and quality objectives • Integrates OPG's work activities with those of the Owner's Representative (OR) and other project participants • Reviews and facilitates approval of project cost estimates, budgets and timelines • Oversees negotiation of the tunnel Design/Build Contract • Develops responsibility matrix with OR project manager • Approves OR project delivery team • Ensures availability of appropriate OPG resources • Resolves OPG organizational impediments to project success • Member of the Change Control Board • Facilitates communication between project team and other internal and external stakeholders • Oversees public communications efforts for the Project • Oversees liaison with external stakeholders • Ensures information distribution within OPG • Monitors ongoing performance of project participants (OR and OPG staff) and others • Oversees the preparation of the Business Case Summary for project approval • Manages the execution of the Niagara Exchange Agreement • Manages OR contract

Table 9.1 – Key Roles and Overview of Responsibilities

Position or Function	Reports To	Overview of Responsibilities
Niagara Plant Group Manager	Senior Vice President (Electricity Production)	<ul style="list-style-type: none">• Identifies Plant Group requirements (as the internal OPG customer for the project)• Provides input to the project team regarding interface issues between the project and the Plant Group• Provides support to the project as required• Participates in team meetings• Provides the project interface with local stakeholders• Signs off on physical characteristics depicted in the proposal invitation documents• Accepts the project facilities upon completion

Table 9.1 – Key Roles and Overview of Responsibilities

Position or Function	Reports To	Overview of Responsibilities
Project Manager (OR)	OPG Project Director	<ul style="list-style-type: none"> • Supports Project Director with respect to communications and government agency relations • Provides oversight and monitoring of the tunnel Design/Build Contract to facilitate achievement of the Project's safety, cost, schedule and quality objectives • Oversees project controls and reporting functions • Prepares and updates Project Execution Plan • Supports the development of project Communications Plan and Contracting Strategy Approach • Develops responsibility matrix with Project Director • Selects OR project delivery team • Oversees preparation of project cost estimates, budgets and timelines • Directs preparation and updating of the project Risk Management Plan • Supports preparation of Project Risk Register and oversees its maintenance • Chairs Change Control Board • Oversees preparation of project status reports • Review and acceptance of Design/Build Contract and preparation of all technical schedules to the Design/Build Contract • Reviews bids and proposals and provides recommendation(s) for contract award • Supports negotiation of tunnel contract • Approval of third party invoices and contractor applications for progress payments

Table 9.1 – Key Roles and Overview of Responsibilities

Position or Function	Reports To	Overview of Responsibilities
OPG Project Support Manager	OPG Project Director	<p>Supports the OPG Project Director in the following areas:</p> <ul style="list-style-type: none"> • Interface with the Niagara Plant Group on project related issues • Facilitate project support from OPG groups as required • Coordinate/integrate internal OPG project requirements (e.g., business planning, budgeting, reporting, presentations, BCS preparation) • Conduct internal studies/reviews in support of the project • Act as OPG's representative in dealings with regulatory agencies as assigned (e.g., MOE meetings, re-use committee, etc) • Establish/communicate internal OPG requirements pertaining to the project (e.g., records management) • Act as OPG's primary contact for Team Building initiative • Participates in proposal/bid evaluations • Supports contract negotiations, as required • Acts as the Project Director delegate as required
Controls Manager (OR)	Project Manager (OR)	<ul style="list-style-type: none"> • Responsible for establishing and utilizing appropriate procedures and systems to monitor, control and maintain project cost and schedule within set objectives • Development of project timelines • Development of project cost estimate • Preparation of overall project status reports • Provision of project cost data for input to OPG SAP system • Member of the Change Control Board • Review of third party invoices and contractor applications for progress payments • Provides contract administration for construction and other contracts • Develops and maintains project Action Tracking database

Table 9.1 – Key Roles and Overview of Responsibilities

Position or Function	Reports To	Overview of Responsibilities
Engineering Manager (OR)	Project Manager (OR)	<ul style="list-style-type: none"> • Overall responsibility for the engineering requirements of the project • Management of activities of OR engineering staff • Preparation of necessary engineering studies to support the project • Preparation of technical documentation for inclusion in contract documents • Overall responsibility for meeting the cost, schedule and quality objectives for project engineering support provided by OR • Development and management of the design review process for the contractor's submissions • Reviews bids and proposals and provides recommendation(s) for contract award • Supports negotiation of tunnel contract
Contracts/Construction Manager (OR)	Project Manager (OR)	<ul style="list-style-type: none"> • Provides support with regard to construction and constructability issues • Supports development of the project cost estimate • Supports discussions with regulatory authorities • Leads technical evaluation for proponent pre-qualification • Provides advice with respect to contract formation • Supports development of concept design and proposal invitation with respect to construction and constructability issues • Reviews bids and proposals and provides recommendation(s) for contract award • Supports negotiation of tunnel contract

Table 9.1 – Key Roles and Overview of Responsibilities

Position or Function	Reports To	Overview of Responsibilities
Third Party Manager (OR)	Project Manager (OR)	<ul style="list-style-type: none"> • Provides the main point of contact between the project and external stakeholders including approving and permitting authorities with support from the Niagara Plant Group for local initiatives • Development and maintenance of the Permits/Approvals tracking database • Development of a timeline for obtaining of approvals and permits in a manner consistent with the project schedule • Identification of responsibilities for obtaining of permits and approvals • Coordinates transportation management plan and road upgrades/infrastructure requirements • Reviews outline environmental management plans • Submission of clearances for Conditions of EA Approval • Audit compliance monitoring and contractor's environmental monitoring plans • Compliance with monitoring requirements for Fisheries Compensation Plan • Submission of annual compliance monitoring reports to MOE • Attendance at Liaison Committee Meetings and provision to committee of all compliance monitoring reports • Response to any citizen complaints relate to the Niagara Tunnel Project

Table 9.1 – Key Roles and Overview of Responsibilities

Position or Function	Reports To	Overview of Responsibilities
OPG Legal – External	OPG Project Director	<ul style="list-style-type: none"> • Provides legal advice on risk allocation and commercial best practices • Preparation of Design/Build Contract (excluding technical schedules) • Provides/oversees specialty legal support (e.g., construction litigation, health and safety, environment, real estate, water rights) • Review of communications with third parties, as required • Provides general legal advice to the project • Legal support regarding claims and disputes, as required • Participates in proposal evaluations • Supports negotiation of tunnel contract
OPG Legal – Internal	OPG Project Director	<ul style="list-style-type: none"> • Provides general legal and business assistance to the project • Provides/coordinates specialty legal support (e.g., construction litigation, health and safety, environment, real estate, water rights) • Participates in proposal evaluations • Supports negotiation of tunnel contract • Review of communications with third parties, as required • Legal support regarding claims and disputes, as required
OPG Procurement	OPG Project Director	<ul style="list-style-type: none"> • Support to all procurement activities required for project execution • Definition of applicable OPG Procurement Policies and strategies for the Project • Receives proposals • Coordinates preparation of proposal evaluation criteria • Participates in proposal evaluations • Supports negotiation of tunnel contract • Administers OR contract

Table 9.1 – Key Roles and Overview of Responsibilities

Position or Function	Reports To	Overview of Responsibilities
OPG Finance – Financial Modelling	OPG Project Director	<ul style="list-style-type: none"> • Conduct financial modeling/evaluations • Participate in proposal evaluations • Support the preparation of project Business Case Summary for OPG Board approval
OPG Finance - Other	OPG Project Director	<ul style="list-style-type: none"> • Establish and maintain Project in SAP system • Review/audit of project cost data in SAP system • Identification of internal reporting requirements • Apply Goods Receipt status for payment of invoices approved by project team • Provide/facilitate input/advice on Finance related matters (e.g., insurance, taxes, credit, bonding etc)
OPG Real Estate	OPG Project Director	<ul style="list-style-type: none"> • Identification of real estate acquisition requirements for the Project • Negotiation and acquisition of real estate required for project execution • Provision of legal surveys and property plans
OPG Risk Services	OPG Project Director	<ul style="list-style-type: none"> • Prepares project Risk Register • Supports and reviews maintenance of Risk Register and Risk Management Plan • Provides risk-related advice to project team
Technical Advisory Committee	Project Manager (OR)	<ul style="list-style-type: none"> • Peer review of project details • Advice to project team re technical and contractual aspects of project
OPG Public Affairs	OPG Project Director	<ul style="list-style-type: none"> • Develop and implement plans for project related communications to the public and OPG employees • Coordinate response to public/media inquiries • Organize public forums, as needed

10 Authority Levels

Through the Project Charter and OPG's Organizational Authority Register (OAR), the Project Director is authorized to approve project in-scope expenditures up to approved Phase 1 funds (\$10 M), and to commit OPG, in discussions/negotiations with regulatory agencies and other stakeholders with respect to satisfying the EA Conditions of Approval.

At the appropriate time, and subject to approval of Phase 2 of the Project by OPG's Board of Directors, this section will be amended to include authority levels for the construction and commissioning phase of the Project (Phase 2).

A copy of the Organizational Authority Register is included in Appendix C.

11 Schedule and Milestones

There are certain key target dates set for the successful execution of the Niagara Tunnel Project.

These key targets are listed below:

Activity	Target Date
Phase 1	
Issue Expression of Interest Documentation	July 21, 2004
Receive Expressions of Interest	August 26, 2004
Issue Proposal Invitation Documents	December 22, 2004
Receive Tunnel Design/Build Proposals	May 13, 2005
Board approval	July/August 2005
Award Tunnel Contract	August 2005
Phase 2	
Tunnel Contract Completion	October 2009
Project Completion and Closeout	January 2010

Summary Gant Chart

Description	2004	2005	2006	2007	2008	2009	2010
Issue EOI Docs	•						
Receive EOI	•						
Issue Proposal Invitation Documents	•						
Receive D/B Proposals		•					
Board Approval		••					
Award Tunnel Contract		•					
Tunnel Contract							
Tunnel Contract Completion						•	
Project Closeout Phase							
Project Completion							•

There are no specified construction milestones in the tunnel Design/Build proposal invitation document.

12 Project Cost Estimate

12.1 Cost Breakdown Structure

The cost breakdown structure (CBS), establishes a systematic, hierarchical approach for identification of all the work elements in the Project. The CBS for the Niagara Tunnel Project provides a logical breakdown of the work and retains flexibility to accommodate adjustments to the Project configuration. The Project schedule incorporates the CBS providing the linkage between the work elements and the periods during which the work elements will be executed.

The CBS is composed of a hierarchical arrangement of elements having superior and subordinate elements as follows:

- Level 1 – Project Summary
- Level 2 – Area Summary
- Level 3 – Work Element or Package
- Level 4 – Component
- Level 5 – Activity.

Exhibit 12.1 illustrates a summary CBS to Level 3 with Level 4 added for the Design/Build Contract only.

12.2 Cost Estimate

The Cost Estimate for the Niagara Tunnel Project will follow the CBS described above.

The Project Controls Manager will seek input from the entire Project team in their particular areas of expertise in order to assemble the cost elements forming part of the estimate.

The Cost Estimate will incorporate the Design/Build Contract fixed price from the successful proponent and all other costs will be estimated to fit the requirements of that particular proposal. As part of its proposal, the Design/Build Contractor is required to deliver a schedule of values breaking down the fixed price in keeping with Level 4 of the CBS.

An appropriate level of contingency will be added. This level will be based on the quantitative risk analysis for the Project.

When completed, and approved by the OPG Project Director, the Cost Estimate (including contingency) will be put forward for approval and acceptance by the OPG Board as the Approved Project Budget. This will be the upper limit for completion of the Project scope within the Project schedule.

The Project Cost Estimate will include a statement of the following parameters:

- current status or phase
- estimate type
- purpose of the estimate
- basis of the estimate

- assumptions, constraints and known risks
- summary of the estimate value.

There should be a clear statement of the intent and purpose for which the estimate has been prepared. This information is to be used during the approval process to ensure that the estimate is not being approved for a purpose that is different from the intended purpose.

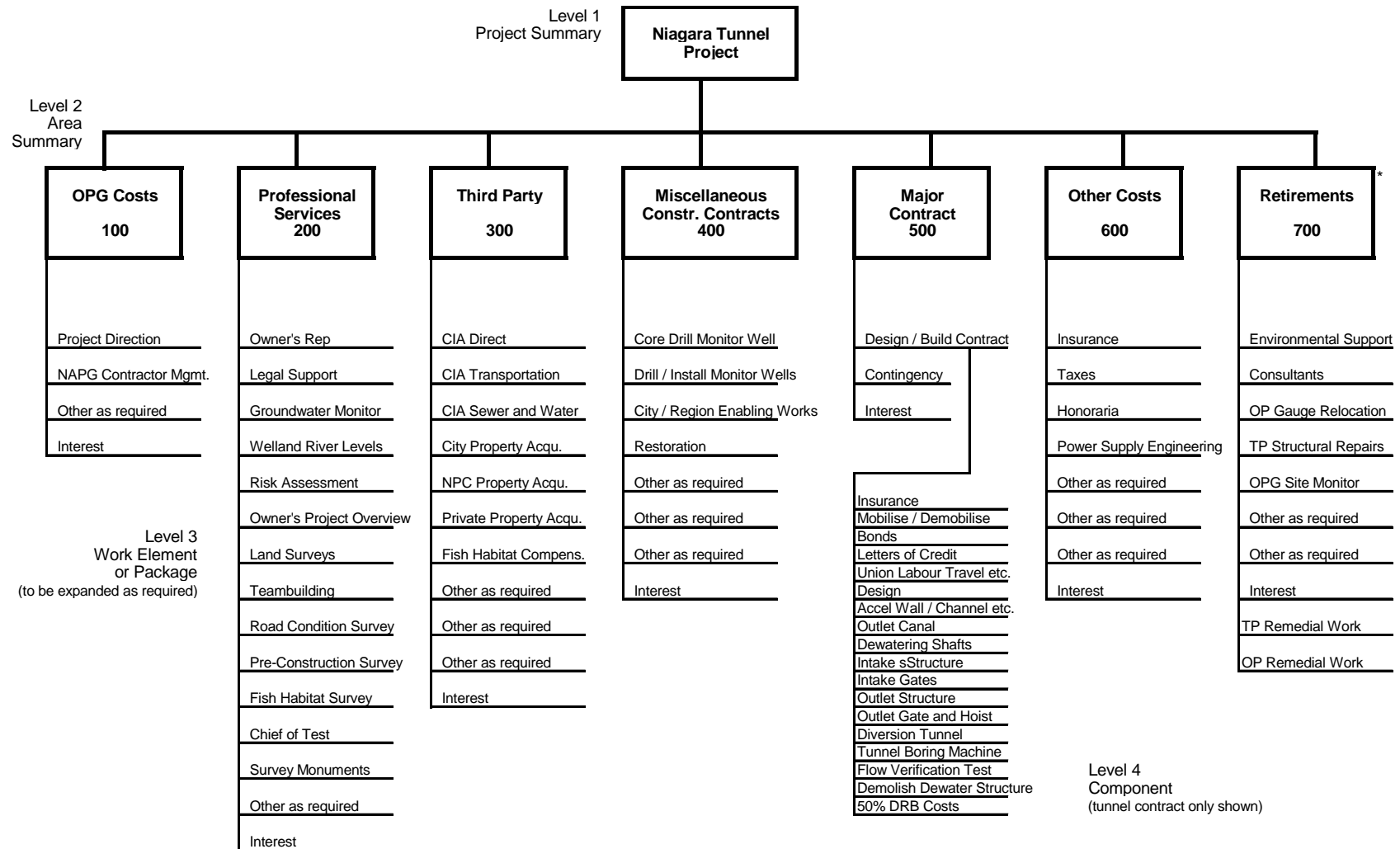
The basis of estimate should document directly, or through reference to other documents, the

- scope of work at a high level
- major deliverables
- cost breakdown structure
- execution, procurement and contracting strategies
- information sources
- estimate methodology and degree of accuracy.

The basis of estimate should also note any specific inclusions or exclusions to the estimate.

The summary of estimate should provide cash flow and total estimate information for each major work package or cost. In each case, the amount of contingency funds should be denoted.

Exhibit 12.1 – Cost Breakdown Structure



Note: Retirements are addressed in a separate PEP.

13 Project Controls and Reporting

13.1 Overview

Effective Project controls systems and processes that provide accurate and timely information regarding the Project timeline and cost performance are essential for Project success. To that end, the Project team will employ a suite of current software tools and have in place a set of procedures that clearly define the requirement of the Project controls process.

OPG employs SAP as its enterprise-wide financial accounting system and will be the source of all payment information. It is critical that the transfer of data between the Project controls system and SAP is timely and automated, if possible, to avoid duplication and error.

While appropriate computer tools are essential to efficient Project controls, they are no substitute for experienced project management staff who should have the skills to deliver effective controls even in the absence of such tools and who are ready to question the apparent output from the use of such tools.

13.2 Schedule Management

Schedules will be produced in three levels of detail as follows:

- Level 1 – Milestone Schedule by OR
- Level 2 – Coordination Schedule by OR
- Level 3 – Production Schedules by Contractors.

Schedules will contain an appropriate degree of contingency or “float” in keeping with that applied to the Project cost estimate in Section 12.2.

13.2.1 Project Schedule (Levels 1 and 2)

- The overall Project Schedule will be prepared by the Owner’s Representative in Primavera P3 format to define the overall Project prior to receipt of the contractors’ schedules.
- All milestones and the critical path(s) will be clearly identified.
- The schedule will show sequence and interdependencies of all major activities including approvals, designs, procurement, construction, etc.
- Once the tunnel Design/Build Contractor is selected, the Project Schedule will be revised as required to reflect the unique aspects of its proposed schedule, if any.
- Approval/acceptance of the Project Schedule (baseline as part of Business Case and any substantive changes) will be by the OPG Board of Directors.
- The Project Schedule will be updated and revised monthly, or at major events or occurrences, to accurately reflect and report progress.
- The Project Schedule will be tabled and discussed as an agenda item at regular team progress meetings. Comments will be tabulated for updating the schedule. The Project team will recommend and adopt recovery action plans to best achieve original goals if schedule slippage occurs.

13.2.2 Contract Schedules (Level 3)

- An initial 90-day schedule and, subsequently, a full contract schedule, will be submitted by all major contractors in Primavera P3 format.
- Contract schedules must represent a practical plan to complete the Work within the required milestones and completion dates.
- Approval/acceptance of Contract Schedules will be made after review by the Project team.
- Contract Schedules will show the sequence and interdependence of all tasks required of the contractor or consultant.
- Contract Schedules will be reviewed for compliance with the Agreement by the Contracts/Construction Manager and by the Project Controls Manager.

13.2.3 Current Schedules (Level 3)

- A copy of the Contract Schedules will be updated monthly by the contractors/consultants as Current Schedules.
- The Project Controls Manager or his delegate will compare the monthly current schedules to Contract Schedules and Project Schedule and highlight variances impacting Project goals.
- Where such Project goals are negatively impacted, the Project Manager, in keeping with the terms and conditions of the Agreement, will require contractors and consultants to submit a detailed recovery plan along with a recovery schedule by the date of the next monthly update.

13.3 Cost Management

Costs may only be expended on the Project when budgeted amounts including contingencies have been authorised by the OPG Board and a corresponding amount less contingency has been committed or released by way of a contract award or purchase order. No work will be permitted without these two controls.

13.3.1 Project Cost Estimate

- The baseline or “budget” for Project Cost Management will be based on the approved Project Cost Estimate discussed previously in Section 12 of this document.
- The goal of successful Project Cost Management is to deliver the whole scope of the Work within that budget.
- The comparison of incurred costs will be made to a “packaged” version of the Project Cost Estimate.

13.3.2 Authorised

- Budget amounts are Authorised for expenditure by package, i.e., by intended Contract or Purchase order as broken out by the Project team.
- In preparing package budgets for authorization, the appropriate amounts of contingency and escalation will be included.

13.3.3 Committed

- Funds are Committed when Contracts are awarded or Purchase Orders are issued.

13.3.4 Incurred Costs

- The basis of reporting costs will be when they are “incurred”. That is when OPG’s liability is created.
- Incurred costs will be collected and tabulated monthly by the Project Controls Manager.
- The tabulated costs will be reported against individual package budgets.
- Estimated final costs will be calculated monthly or at major occurrences and these will also be compared to package budgets.
- Areas of concern will be identified for the immediate action of the Project team.
- Overall budget trends will be identified. If the overall Project Budget is in danger of being exceeded, an action plan will be developed to adjust the scope of as yet uncommitted packages to bring it back in line. Conversely, if there is certainty that there will be a considerable underrun, previously omitted scope may be revisited and re-assessed. Such potential scope adjustments will be referred to the OPG Board for approval.

13.3.5 Invoice Processing

- All Applications for Payment will be marked to the attention of OPG Accounts Payable and delivered electronically to OPG.
- With the exception of the OR Contract and other consultants/contractors engaged directly by OPG, all Applications for Payment will be submitted in draft form to and reviewed by the OR.
- All Applications for Payment will be based upon the progress to date and, if applicable, on any schedule of values in the applicable Contract.
- All invoice processing after review and approval by the OR will be submitted to OPG and OPG will follow its current practices for payment.

13.4 Change Management

The goal of change management or configuration management is to ensure that the overall configuration of the Project does not change without a systematic review and approval of the proposed changes. Where changes are adopted, it is important to recognize their effect on all elements of the Project across its life-cycle including physical form, function, reliability and cost effectiveness, as well as the impact on the capital budget and the Project risk profile.

13.4.1 Change Control Procedures

- No change will be made to the price, scope or terms and conditions of any Contract or Purchase Order without compliance with the formal review process hereunder.
- All discrete Changes in Phase 2 exceeding a value to be set by the Project Director, or changing any other terms or conditions of the Contract (or PO) Documents, shall be referred to the Project Change Control Board for review, potential revision and recommendation of approval, before proceeding to the person or entity having appropriate authority level for such approval.
- All discrete Changes under the above value, and not changing any other terms or conditions of the Contract (or PO) Documents, shall be reported to the Project Change Control Board at the first convened meeting after they have been approved and issued.

13.4.2 Change Control Board

- The Change Control Board (CCB) will consist of
 - OPG Project Sponsor
 - OPG Project Director
 - Project Manager (Chairperson)
 - Project Controls Manager
 - other ad hoc specialist members as requested from time to time by the chairperson.
- All meetings of the CCB shall require a quorum of three members. In the absence of any regular board member, such member shall delegate their duties and responsibilities to an appropriate alternate while preserving the OPG/OR percentage representation.
- The CCB will meet at a regular frequency determined by the chairperson after consultation with the other members.
- Extraordinary meetings may be convened by the chairperson, after consultation with the other members of the CCB, on a Change Initiation which may have a potential delay to the Project.
- A Project team member proposing a change is required to present its proposed Change in person to the CCB.
- The CCB shall issue approved minutes and logs of its proceedings.

13.4.3 Initiation Of Changes

- Changes (Project Change Directive/Amendment) can be initiated by any Project team member either on behalf of their own discipline or on behalf of a contractor (Contract or Purchase Order) who has formally requested same through a Project Change Notice.
- Change Initiations (CI) shall be presented to the CCB in the appropriate written format (to be set by the Project Controls Manager). CIs will contain
 - a detailed description of the proposed Change
 - the reason for the proposed Change
 - the impact of the Change on physical form, function, reliability and cost effectiveness
 - the consequences of no Change
 - the total capital cost impact to the Project of the proposed Change (including OPG, OR, other consultant and other contracts' costs). Cost estimates should be based on contractor/consultant quotations. Any negotiations with the Contractor or Consultant to arrive at this price will be clearly stated by the Project team representative to be "**subject to OPG approval**". Any contingency amount included in any estimates shall be clearly shown.
 - any life-cycle cost impacts
 - any schedule impact from proposed Change.
- If given recommendation of approval by the CCB, and endorsed as such by the signature of the chairperson on the formal CI document, the proposed Change (Project Change Directive), accompanied by the approved CI, can proceed to the appropriate OPG person having the required authority level for such approval and execution.
- If approval is withheld for any reason, the CCB will give clear direction on what further course of action is required.

13.4.4 Project Change Directives

- Where the value of the Change does not require CCB recommendation of approval and there is no change to the terms and conditions of the Contract (or PO) Documents, a Project Change Directive (CD) can be issued at source by a person having appropriate authority without referral to CCB.
- CDs shall be formalized on a standard CD document.
- Any expected adjustment to the Contract (or PO) Price and the Contract Schedule will be clearly shown.
- Any change to the scope of the Contract or Purchase Order will be described in sufficient detail to be indisputable.
- Any changes to other terms or conditions of the Contract will be stated clearly and in detail. Any such changes will require sign-off by OPG Law Division.
- Project Change Directives will be signed by the person or entity in OPG having the appropriate level of signing authority.
- All parties involved in issuing a Project Change Directive must exercise extreme caution and proceed (after the required consultation) with the knowledge that such a document could commit and bind OPG to all consequential costs and impacts therefrom!

13.4.5 Amendments

- Amendments to the Contract shall be formalized on the appropriate form specified in the Agreement.
- The adjustment to the Contract (or PO) Price and the Contract Schedule will be clearly shown.
- Any change to the scope of the Contract or Purchase Order will be described clearly and in sufficient detail.
- Any changes to other terms or conditions of the Contract will be stated clearly and in detail, and will require prior sign-off by OPG Law Division.
- Contract Amendments will be executed by the Contractor/Consultant and by the Project Director on behalf of OPG and documented by an amendment (Instruction Notice) to the Purchase Order.
- An updated Agreement document will be maintained by the OR incorporating all Amendments to date.

12.4.6 Non-Contract Changes

- For major scope changes prior to entering into a Contract or Purchase Order, a process will be followed similar to the above.

13.5 Progress Monitoring and Status Reporting

- The main interval for all progress monitoring and status reporting will be weekly, rolled up into monthly.
- Report formats and content will be developed progressively up to the award of the Design/Build Contract.
- Estimated Final Costs and cash flows of all Contracts and Purchase Orders will be recalculated monthly.
- All Schedules will be updated monthly.

13.6 Claims Management

- Any notice of claim for additional payment or extension to the Contract Schedule received from any contractor or consultant will be formalized on the standard Project Change Notice set out in the Agreement. It will immediately be referred to the members of the Change Control Board and the CCB chairman will convene a special meeting if necessary or otherwise place it on the agenda of the next regularly scheduled meeting to discuss all options and recommend an appropriate course of action. This may result in referral to the Disputes Review Board (DRB).
- No claims will be referred to the DRB without prior CCB review and recommendation.
- Small claims not exceeding the threshold values in Section 13.4.1 may be settled at source without referral to the CCB.
- The Project Controls Manager will maintain a log of all such claims or potential claims along with the CCBs recommended course of action or rebuttal and will monitor all further progress in the matter.
- A review of all outstanding claims on the log will be a regular agenda item of the CCB.
- Tracking and discussion of all claims or potential claims will be included in the Project monthly report.
- Tracking and discussion of claims status will also be a regular item for progress meetings with the Contractors.

14 Risk Assessment and Risk Management

14.1 Overview

Subsurface undertakings such as the Niagara Tunnel Project generally face significant technical and other challenges during their planning, design, construction and operational phases. Systematic identification, analysis and effective management of the myriad of risks associated with this Project is critical to its successful outcome. A formal risk assessment process also enables informed communication with project stakeholders such as owners, funding partners, designers, contractors, insurers and the regulatory authorities, with regard to issues and expectations.

Effective risk management also facilitates more cost-effective project execution by allowing determination of the most appropriate strategies for responding to project risks and identifying opportunities. These risk response strategies generally fall into four categories as follows:

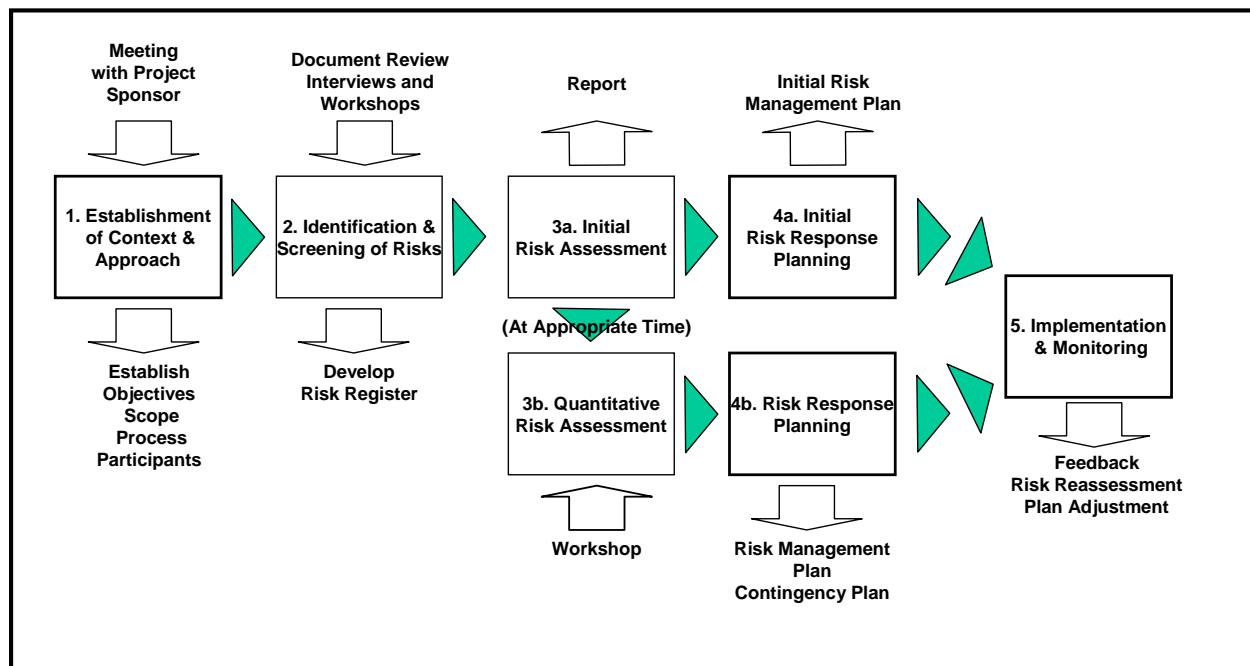
1. **Avoid Risk** – abort the undertaking or specific elements of the undertaking, design out risk or determine alternative methods to carry out the undertaking
2. **Reduce/Mitigate Risk** – re-design to reduce impact and establish control and monitoring programs to minimize risk of occurrence
3. **Transfer Risk** – Insure risk or transfer, wholly or partially, through contractual allocation
4. **Retain Risk** – to the extent that the above three alternatives are impractical or not cost-effective, identify the residual risks that are being retained and establish appropriate project contingency for cost and schedule

A qualitative risk management approach enables informed decisions with respect to Items 1 to 3 above. In order for the uncertainties associated with the project's cost and schedule estimates to be fully understood and enumerated, the risk management plan must be extended to include a quantitative risk assessment which examines, numerically, risk probabilities and potential consequences.

The key elements of a structured risk management program are listed below and shown in Exhibit 14.1.

1. Establish the basis for proceeding with risk assessment
2. Identification and Screening of Risks – Risk Register
3. Analysis of Risks
4. Formulation of a Risk Response Plan
5. Implementation and monitoring

Exhibit 14.1 – Risk Management Program



14.2 Responsibilities

OPG has determined that the Project Sponsor will retain a consulting firm independent of the project team (OPG staff and Owner's Representative staff) in order to achieve objectivity in the initial risk assessment. This is particularly critical given the short time frame before the invitation for proposals is released and because the specific technical risks are not typical in the usual course of OPG's business. The initial project readiness review and independent risk assessment will be overseen by OPG's Risk Services in collaboration with other corporate oversight functions. The independent consulting firm should have expertise in rock tunnel construction, environmental assessment and project risk management.

Key responsibilities for the five elements identified in the previous section may be summarized as follows:

Element 1 – Establish Risk Basis	OPG Enterprise Risk Management
Element 2 – Identify Risks/ Develop Risk Register	Independent Consultant
Element 3 – Risk Analysis and Simulation	Independent Consultant
Element 4 – Risk Response Plan	Project Team – Controls Manager
Element 5 – Implementation and Monitoring	Project Team – Contracts/Construction Manager

14.3 Methodology

The key elements of a risk assessment program are described below.

14.4 Establishment of Basis or Context

The scope, objectives, key evaluation criteria for the initial risk assessment are proposed by OPG Enterprise Risk Management and must be agreed to by the project sponsor.

The project areas to be examined and an initial list of risk areas are determined at this meeting. These risk areas could include the following:

1. Regulatory/Approvals/Permits
2. Stakeholder Issues
3. Planning and Design
4. Financial/Commercial/Contractual and Procurement
5. Logistics/Access
6. Construction
7. Environmental
8. Safety and Security.

14.5 Risk Identification and Screening

A workshop setting is generally utilized to identify, characterize, rank and evaluate risks and opportunities. At this stage, the analysis is qualitative in nature.

Risk workshops, utilizing a facilitator, provide a structured approach to identify risks, determine their probability of occurrence and potential impacts. The workshop will be facilitated by OPG Risk Services and the independent risk assessment and peer review consultant.

Probability and consequence criteria used in the workshop are developed prior to the workshop and confirmed by workshop attendees. A risk ranking or decision matrix is utilized to obtain an initial ranking of the identified risks and to screen out those risk that do not warrant detailed quantitative analysis. Some significant risks may not be conducive to quantitative analysis; these will be flagged for periodic qualitative assessment and reporting.

A risk register is created at these workshops, which includes a list of key project risks, preliminary assessments of probability and potential consequence, and preliminary mitigation plans.

14.6 Risk Analysis

If a quantitative risk assessment is required, additional workshops may be needed to collect data for analysis (see Item 3b in Exhibit 14.1). The data are used to help determine probability and consequence parameters to derive probability curves for project cost and schedule outcomes.

The simulation results can be used to further refine risk response planning and to assess contingency requirements for project cost and schedule.

14.7 Risk Response Planning

An initial risk response plan is developed after the initial risk assessment. The plan identifies key risks and a strategy and methodology for management of these risks. The risk management options, discussed earlier in this document include risk avoidance, reduction, transfer and risk

retention (contingency). Each decision must be reviewed to determine if it would create or result in a secondary or residual risk, which must be addressed in the risk management plan.

14.8 Implementation, Monitoring and Feedback

At a later stage, a monitoring program will be required to track how project risks are being addressed and to provide feedback to identify necessary adjustments to the risk plan. Systematic monitoring of the project and the risk management plan must be carried out to determine the effectiveness of the approach and to determine the need for modification of the plan.

OPG Risk Services will provide ongoing review of the risk management program. If required an independent third party could be retained during the course of the project for periodic project review and oversight.

15 Engineering Management Plan

15.1 Overview

OPG has elected to structure the Project as a Design/Build project, meaning that the Contractor will be responsible for the design of the Project, with OPG reviewing such design for compliance with prior Submittals and contractual obligations. OPG will require engineering support from the Owner's Representative in both phases of the project. For Phase 1, the Owner's Representative's engineering support consists of

- preparation of the Owner's Mandatory Requirements and other technical schedules to the Design/Build Agreement
- preparation of the GBR-A and negotiation of the GBR-C
- support in preparation of the Design/Build agreement and other contracts
- input and support for various studies and engineering activities, e.g.,
 - St. Davids Gorge
 - hydraulic optimization and power and energy studies
 - third party issues
 - other support as required
- technical review of bids and proposals and recommendations
- support in negotiation of Design/Build agreement.

Phase 2 engineering support will, as a minimum, consist of

- review of contractors' submittals and additional engineering to support such reviews
- support to Owner's Representative site staff on issues related to construction quality and contractual compliance
- geotechnical support to Owner's Representative site staff
- assistance on site as required.

The majority of the OPG engineering requirements for Phase 2 of the work will consist of technical review of contractors' submittals. Once the submittal schedule is known, a comprehensive and fully detailed plan, including staffing requirements to meet the submittal schedule, will be developed. The plan will include additional engineering requirements to support the review process which could, for example, include independent analysis of the tunnel lining system, hydraulic analysis of the conveyance system, structural checks of various components and geotechnical analyses.

Further detail regarding Contractor's engineering management plan in Phase 2 will be provided after Contractor selection.

15.2 Submittal Requirements

The contractor is required to submit a large number of documents to support its design. Due to the volume of submittals and the complexity of the Work, it is critical to establish a clear plan for reviewing this documentation.

In Phase 1, each proponent contractor will submit the following key submittals with their proposals. Following contractor selection, such submittals will be included as appendices to the Design/Build Agreement:

- Design Basis Document
 - codes and standards
 - layouts and general arrangements
 - conceptual design solutions, loadings and preliminary calculations
 - construction methodology, sequencing, etc
 - equipment and material specifications
- GBR-B
- Outline Specifications
- Draft Drawings
- TBM Description.

In Phase 2, the Contractor is required to submit the following key submittals:

- Final Design Basis Document
- 100% Construction Documents
 - detailed construction drawings
 - detailed construction and material specifications
 - checked engineering analysis and design calculations
 - minutes from the Contractor's of design review meetings
 - other supporting documentation
- Construction Methods
 - environmental protection procedures
 - QA/QC plans and procedures
 - specific method statements
- As-Built Design and Drawings
 - construction drawings with all 'as-built' information
 - specifications to reflect 'as-built' condition
 - checked design calculations for revisions to the 100% Construction Documents.

Additional submittals are also required for certain elements of the work.

15.3 Review of Contractor Submissions

Each contractor submittal will be reviewed against, at a minimum, the criteria set out in Table 15.1, as applicable, in descending order of precedence.

Table 15.1

Information	Author
Applicable Laws	various
The Design/Build Agreement	OPG
Owner's Mandatory Requirements	OR
Design Basis Document, Drawings and amendments	Contractor
Owner's Representative's confirmatory design review	OR
Other related and reviewed contractor submittals	Contractor
Other supporting information as provided by or requested of the contractor	Contractor

Submittals will be reviewed by the Owner's Representative in sufficient detail to verify that they are in general conformance with the criteria set out in Table 15.1. The review of the submittals will be performed by an individual who is generally knowledgeable of the project requirements, applicable codes and standards, and requirements of previous submittals. All submittals will be reviewed by an appropriate discipline professional qualified in the area requiring the review. Each submittal may be reviewed by more than one discipline professional. The Project Engineering Manager is responsible for designating who will carry out the review, and the reviewer is responsible for carrying out the review in accordance with project requirements. Review will generally not extend to means, methods, techniques, sequences or procedures of construction or to related safety precaution or programs, other than for compliance with the Design/Build Agreement.

Review of a submittal by the Owner's Representative does not relieve the Design/Build Contractor from its contractual obligations regarding design, fabrication, construction, erection, suitability for purpose, and warranties. Signing off a submittal as "Reviewed" means that the submittal becomes a "Final Submittal" which will be deemed to be incorporated into the Design/Build Agreement.

Comments resulting from the review of the Design/Build Contractor submittal will be marked on the submittal and signed by an authorized signatory in accordance with project procedures. The authorized signatory means the qualified professional designated by the Project Engineering Manager to sign the submittal review stamp. The authorized signatory and others engaged in the review of Design/Build Contractor submittals will observe the following guidelines while reviewing submittals:

- the Owner's Representative is not the Design/Build Contractor's checker. Submittals with excessive errors will be rejected and the Design/Build Contractor reminded of its contractual obligations
- the review is performed expeditiously within the contractual timeframe so as not to jeopardize the delivery schedule
- the review is not an approval of the Design/Build Contractor's design, the accuracy, completeness, details or dimensions of the submission, or the means, methods, techniques, sequences or procedures of construction and does not relieve the contractor of its contractual responsibilities

- no notes or comments are to be placed on the document which could be interpreted as an approval of anything other than general conformity with the criteria set out in Table 15.1
- if clarifications or interpretations are required from the Design/Build Contractor to properly review the submittal, only written information is acceptable; verbal information must be confirmed in writing.

After all comments have been consolidated, the authorized signatory will tick off on the submittal review stamp one of the following categories, as appropriate, and will date and sign in the space provided on the stamp:

- **Reviewed as Submitted** – to be used when there is no comment on the submittal
- **Revise as Noted – Do Not Resubmit** – to be used where comments on the submittal are minor and do not affect the Work and there is no need to delay the Design/Build Contractor in proceeding with its work
- **Revise and Resubmit** – to be used when there are inadequacies in the submittal which require correction and resubmission for further review. Whenever possible, comments will be made directly on the documents submitted.
- **Review not Required** – the submittal is not directly related to or it does not form part of the completed work
- **Not Suitable for Review – Resubmit** – submittals may be returned to the contractor if the submittal is not suitable for review and does not meet the basic requirements for such submittal.

A copy of the reviewed and signed submittal will be retained in the project file and the original returned to the Design/Build Contractor. Submittals that no longer require review will become “Final Submittals” and will form part of the Design/Build Agreement.

16 Construction, Installation and Commissioning Management Plan

16.1 Construction Strategy Overview

The project consists of three primary components namely the Intake Works, the Outlet Works and the approximately 10-km long Diversion Tunnel. The EA dictates that the tunnel will be driven by a tunnel boring machine (TBM) from the Outlet to the Intake.

Construction of the Outlet Works and Diversion Tunnel will be performed from the same location within OPG property in the vicinity of the existing OPG Pump Generating Station (PGS). Excavated spoil will be disposed on OPG property between the existing canals.

The Intake Works will be constructed from a separate work area in the Niagara River adjacent to the INCW structure with a lay down area on neighboring lands owned by Niagara Parks Commission. Excavated spoil from the Intake Works will be trucked to a suitable location for recovery of material suitable for reuse as aggregate.

In terms of Occupational Health and Safety Act (OHSA) the Contractor will be designated as Constructor for the project except for at the INCW Part Project where it is expected that the Owner will be designated as Constructor in terms of a Part Project.

An environmental restriction on intermediate drop shafts may preclude in-situ concrete lining of the tunnel. Precast concrete segmental lining will therefore likely be used and these are expected to be manufactured at an off-site segment factory. Similarly, the Contractor procured TBM will be manufactured off-site at the manufacturer's factory. Additional off-site manufactured equipment includes the sectional intake gates and outlet gates and associated control equipment.

Construction truck traffic is restricted to pre-approved designated routes. City by-laws restrict construction work to a period between 7:00 am (9:00 am on weekends and holidays) and 7:00 pm. In addition, due to the long-term nature of the project, MOE requirements are for construction noise to comply with the more stringent NPC 205. Application for local by-law exemptions for 24-h x 7-day bored tunnelling work and some localized exceptions to NPC 205 are pending.

A certain amount of pre-construction enabling work is required on site before award of the Design/Build Agreement. These include

- implementation of a Groundwater Monitoring Program
- right of way survey
- installation of First Order Survey Control Monuments
- roadworks
- provision of sewer and water connection stub-ends.

Flow testing of the facility will be carried out by an approved hydraulics testing company under the supervision of a Chief of Test.

16.2 Construction, Installation and Commissioning Management

16.2.1 Organization

Exhibit 9.5, when included in the PEP, will show the Phase 2 organization of the project team.

Daily construction monitoring will be provided by a site-based Owners Representative team led by the Contracts/Construction Manager reporting to the OR Project Manager alongside Controls Management, Engineering Management and Third Party Management.

Designated engineering teams will be responsible respectively for monitoring of the

- Intake Works
- Outlet Works and Diversion Tunnel
- Precast Tunnel Lining Factory, if applicable
- TBM manufacturing facility
- gate and hoist manufacturing facility.

Monitoring staff will be provided to ensure coverage of all construction shifts. In particular, monitoring of TBM tunnelling will be provided at the tunnel face on a full time basis during each and every tunnel production shift.

A primary site office will be established at the main work area at the Outlet Works and a satellite office will be provided at the Intake Works. Management of the site office will be the responsibility of an Office Engineer.

16.2.2 Key Tasks

The Construction Management team will be responsible for the following key tasks:

- Health and Safety of OR's Staff
- Health and Safety as Constructor for those limited times when a part project approach must be implemented at the Intake.
- Contract Administration
- Construction Monitoring and Documentation
- Coordination of Submittals Review
- Construction Quality Assurance Monitoring and Audit
- Claims Avoidance and Resolution
- Construction Progress Reporting
- Tunnel Survey and Alignment Audit
- Monitoring of factory testing and post-installation testing.
- Commissioning and Flow Testing
- Substantial Performance, Punch List and Final Completion.

In addition, the Construction Management Team will provide close support to the following Owner's Representative activities:

- Project Controls
- Risk Management Plan
- Public Communications Plan
- Agency Interfacing
- Team Building
- Change Management
- Environmental Compliance
- Community Impact Agreement Provisions
- Contract Closeout.

16.2.3 Roles and Responsibilities

To ensure clear lines of reporting and responsibility, job descriptions will be developed for each site-based position identified on the organization chart.

16.3 Construction Milestones

There are no specified construction milestones in the proposal invitation document. The contract schedule will be the schedule proposed by the successful proponent and accepted by OPG following pre-award negotiations. Construction is anticipated to commence in late summer 2005.

16.4 Testing and Commissioning

16.4.1 Testing

Quality Control Testing

Quality assurance and testing will be the responsibility of the Contractor. The Contractor will prepare a Quality Assurance/Quality Control Plan for review by OPG. OPG, through the Owners Representative will audit the quality assurance program and the work for contractual compliance. OPG reserves the right to engage independent testing agencies to assist in the quality audit.

Factory Testing

Contractor will conduct factory testing on various equipment and components of the work and will provide adequate notice and access to OPG. This includes the TBM and associated backup equipment and quality control testing in the segment-manufacturing factory, if the Contractor uses that construction method. Factory testing will be monitored for purposes of payment certification and compliance with the Quality Assurance program.

Post Installation Testing

Post installation testing will be carried out on the TBM and associated backup equipment, Intake gates, including delivery and storage at designated location, Outlet gates, tunnel watering-up and instrumentation array monitoring. Post installation testing will be monitored for purposes of payment certification and compliance with the Quality Assurance program and Contractor's contractual obligations.

16.4.2 Commissioning

Commissioning of the Niagara Tunnel Facility Project will be carried out after achievement of substantial performance after the tunnel has been watered up. Commissioning will include

- progressing through startup and closing and opening sequences of the outlet gates
- flow testing for performance rating of the facility
- provision of operating manuals and training for operation and maintenance of gates, monitoring of instrumentation arrays and on-going groundwater monitoring.

17 Environmental Management Plan

The objective of the environmental management plan is to ensure

- all environmental Approvals are in place such that the overall project schedule is not affected
- construction activities are carried out in an environmentally acceptable manner to meet all EA and Approvals requirements/conditions

17.1 Phase 1 Activities

Environmental issues to be addressed prior to Contract award involve

- advancement of outstanding environmental approvals
- assessment of the Outline Environmental Management Plan submitted by the Proponents.

As described in Section 7, a number of permits and clearances of Conditions of EA approval are required. Submissions to appropriate authorities will be followed to the extent possible without Contractor input. Specifically, the Department of Fisheries and Oceans compensation plan and monitoring plan requirements should be advanced by the OR environmental manager.

Criteria for the assessment of the Outline Environmental Management Plan will be developed in consultation between OPG and OR's Environmental Manager. The components of the outline plan should contain, at a minimum, the items outlined in Section 17.2.

17.2 Phase 2 Activities

A detailed Environmental Management Plan will be developed by the Contractor after Contract award, based on the outline plan submitted by the Contractor. The Plan will have two components—protection and compliance. The components of the Plan identified as the contractor's responsibility will become a contractual requirement. It will be the OR's responsibility to audit the plan and ensure its implementation throughout the Project.

17.2.1 Environmental Protection

A number of elements for environmental protection identified in the Contractor's Outline Environmental Management Plan will be developed in detail in Phase 2 by the Contractor. These will include details in relation to

- Erosion and Sediment Control
- Stormwater Management
- Dewatering Plans
- Air emissions/Dust Control/Mud control
- Excavated Material Plan
- BTEX Management and Disposal Plan
- Transport Impact Management Plan
- Emergency Services Plan
- Spill Contingency Plan
- Solid/Domestic/Hazardous Waste Management
- Site Clearing Plan
- Blasting Plan

- Hazardous Material Handling
- Restoration Plan
- Groundwater Monitoring.

These elements will be the responsibility of the contractor to develop and implement. The timing and responsibilities for development of these elements are identified in Table 17.1. A number of elements must be submitted and approved by the regulatory agencies prior to the commencement of construction. There will be overlap in the development of some elements and it will be the contractor's decision as to whether to submit these as separate documents or to combine a number of them. The Owner's Representative will be responsible for auditing the Work for compliance with accepted plans.

17.2.2 Environmental Compliance Program

A detailed environmental compliance program will be developed by the Contractor, based on the outline plan submitted with the proposal.

The program will identify all areas where compliance is required to meet

- commitments made in the EA document
- Conditions of EA Approval
- Conditions of Authorization under the Fisheries Act
- Community Impact Agreement commitments
- Certificates of Approval
- Permits and Authorizations
- environmental protection requirements identified above.

Components of the program which are the responsibility of the Contractor will be clearly identified. All reporting requirements to OPG/OR and the Authorities having Jurisdiction will be outlined.

It will be the OR Third Party Manager's responsibility to oversee the program and ensure that the reporting schedule is met, including submission of the annual compliance monitoring report to MOE, pursuant to the EA Approval (Condition 1.6) and any reporting to the Community Liaison Committee, pursuant to the Community Impact Agreement.

The program will be updated to incorporate any new conditions required as further permits/approvals are obtained.

Table 17.1 Environmental Protection

Environmental Protection	Responsibility for Documentation	Submission Date	Agency
1. Erosion and Sediment Control Plan (including in-stream work)	Contractor	Prior to start of Construction	NPCA DFO MNR
2. Dewatering Plan	Contractor	Prior to start of Construction	MOE (NPCA, DFO, MNR)
3. Stormwater Management	Contractor	Prior to start of Construction	NPCA
4. Blasting Plan	Contractor	Approval required prior to any in-water blasting Prior to on land blasting	DFO OR (City/Liaison committee)
5. Dust Control, including CofA (Air) Ventilation	Contractor	Prior to tunneling	MOE
6. Spill Contingency Plan	Contractor	Prior to start of Construction	OR/OPG
7. Transportation Impact Management	OR/Contractor	Prior to start of Construction	Regional Municipality of Niagara/City of Niagara Falls
8. Excavated Material Plan, including re-use	OR/Contractor (Reuse Committee)	Prior to start of Construction	MOE, RMON
9. Emergency Services Plan	Contractor	Prior to start of Construction	City of Niagara Falls/ Liaison Committee
10. BTX Management and Disposal	Contractor/OR	prior to start of tunneling	MOE
11. Solid/Domestic Waste Management	Contractor	Prior to start of Construction	OR
12. Hazardous Waste Management	Contractor	Prior to start of Construction	OR
13. Restoration Plan	Contractor	3 months prior to clean-up (?)	OR

18 Communications Plans

18.1 Communications Management

18.1.1 Communications Strategy

The strategy for addressing the need for effective communications concerning the Project is to develop two plans—one to handle public and OPG employee communications and the other to handle internal project team communications. The former is being developed by OPG Public Affairs for approval by the OPG Project Director; the latter is being developed by the OR Project Manager for approval by the OPG Project Director.

18.1.2 Public and OPG Employee Communications

The overall purpose of public communications is to proactively manage public communications aspects throughout all phases of the Project. The goal of public communication is to build public support for the project and proactively deal with any public issues that arise.

OPG Public Affairs will develop a public communications plan which describes the communication activities to be undertaken to support the successful completion of the Project. This plan must be approved by the OPG Project Director. The plan entails use of a wide range of existing well-proven tactics focused on building community support through communication of significant Project milestones and ensuring effective response to any community impact issues as they arise.

An important focus will be to demonstrate that the Project is being well managed, e.g., meeting stated commitments on time. The plan will also include strategies to address unanticipated events, delays or other major changes to the project.

The OPG Project Director will oversee public communication activities.

The respective roles and responsibilities of the OPG Project Director, OPG Public Affairs, other OPG organizational units, the Owner's Representative and the Design/Build Contractor will be identified with respect to public communications.

The public communications plan will be made up of three components - public communications, OPG employee communications, and communications to support the Community Impact Agreement.

The goal of the public communications plan is to ensure timely and accurate notification of Project approvals, construction start, key construction milestones, and Project completion. Tactics consist of notification to affected communities and local media of project information and significant Project milestones, contact with local key stakeholders, interest groups and media to ensure that they are fully informed about the Project and have any questions answered quickly, quick response to media and public inquiries, and holding of public forums such as Open Houses if required. Typical examples of community notification will include

- media releases and/or suggested information articles for community newspapers
- newsletters to key stakeholders and communities adjacent to construction activities
- a frequently updated public website with project information.

18.1.3 Employee Communications

OPG employee communications will consist of articles in internal OPG publications and posting of frequently updated project information on OPG's internal website to ensure general OPG employee (and especially OPG Niagara Plant Group employee), knowledge, understanding, and support of the Project. Project information will be integrated with OPG employee wide news to optimize use of these existing resources. As well, there must be a mechanism (e-mail address) to ensure that employee questions and concerns about the Project can be easily communicated and responded to by project staff.

Communications support for the Community Impact Agreement consists of any public communications in support of the municipal Liaison Committee, the implementation and monitoring of the citizen complaint procedure during construction, as well as any other communication activities required, e.g., to support municipal transportation management and tourism impact management plans as specified in the Community Impact Agreement. The citizen complaints procedure will be simple and responsive. For example, a telephone and e-mail "hot line" that is monitored at least twice daily with immediate acknowledgement response and strict limits on timeframes for full response to issues raised by the public. A protocol will be included to direct inquiries to appropriate project or Niagara Plant Group staff and ensure coordination of responses. In addition, there will be public notices to inform the local construction industry of potential project-related employment and supplier opportunities in line with the provisions of the Community Impact Agreement.

18.1.4 Project Team Communications

The OPG Project Director will coordinate communications between the project team and other entities, except the Design/Build Contractor. The OR Project Manager will coordinate communications between the project team and the Design/Build Contractor and will establish a communications program and protocols for the internal project team and with the Design/Build Contractor and, subcontractors.

Open communication is essential for timely decision-making and efficient execution of this work. To facilitate accurate and timely information transfer, efforts of the Project Team will be coordinated and integrated to facilitate effective communication, thereby adopting a 'no surprises' approach to Project execution. Key elements include

- planning meetings, convened by the OR Project Manager (PM) as required, involving key Project team members to define the scope of work and establish baseline budgets and schedules for future work
- monthly progress meetings, convened by the OR Project Manager, involving key Project team members to review cost and schedule performance versus the baseline plan
- recap meetings, convened by the OR Project Manager at appropriate points to review lessons learned, and implement identified improvements
- Site coordination meetings (during Phase 2) at a frequency of not less than one per week, to review progress and plan upcoming activities.

Project team members from different disciplines and different organizational units will adopt the most effective interface method (email, telephone conferences, memoranda, small group discussions, etc) to ensure that the latest information (e.g., design constraints, environmental constraints, scheduling constraints, etc) is available to other Project team members whose work will be affected.

The following Rules of Conduct will apply to promote more productive meetings:

- meeting agendas must be prepared for all meetings and distributed in advance of the meeting to all invitees
- the focus of discussion will be weekly Project updates* and updates to the Action Tracking System database
- project meetings will begin at the scheduled time - latecomers will miss the start
- only one person will speak at any time - others will listen and not conduct side discussions
- it is acceptable to criticize ideas - but not to criticize people
- participants are encouraged to be frank and honest
- participants should stick to the topic at hand
- participants should keep an open mind
- the meeting chair is responsible for keeping the meeting on agenda.

Note: Weekly and monthly Project updates may be modified for use in keeping internal stakeholders up to date on Project progress.

Meeting Notes are required for all meetings to document the purpose, date, location, attendance, file number, summary of the discussion, summary of results, and summary of follow-up actions required. Action items identified at meetings will be issued to all Project team members to enhance the level of communications and understanding of the Project development. Meeting Notes should be prepared and issued by the meeting organizer within one week after the meeting (within two days, if possible). A copy of the Meeting Notes is to be filed in the Project Records Centre by the meeting organizer.

A password protected “FTP” website will be developed for project team use only, e.g., posting of update information.

Table 18.1 summarizes the overall Project communications requirements for Phase 1.

Table 18.2 identifies the protocol for communications between OPG staff and OR staff for Phase 1.

18.2 Team Building

OPG has proposed a voluntary team building program for the Project. The draft Design/Build Contract identifies the Team Building Program as “a structured approach to improve communication between OPG and its representatives and the Contractor and its Subcontractors, and to facilitate problem solving, conflict avoidance, and issue resolution.”

18.2.1 Objective

To maximize the effectiveness of each Project participant's resources to efficiently and safely achieve a quality end product, on time and within budget without unresolved disputes.

18.2.2 Principles for Project Team

Team building principles will be employed to develop productive working relationships and to encourage all project team members to be innovative and strive to reach their full potential. Team building principles to be employed include

- providing constructive feedback to team members
- following a cooperative work ethic at all times
- compromise and being creative in resolving differences
- providing clear team goals that are understood by all team members
- creating a team atmosphere of mutual respect, inclusion and trust.

OPG and OR Project team members attended an initial team building workshop on February 28 and March 1, 2005. The session was facilitated by an outside consultant.

18.2.3 Participation in Team Building by Project Contractor

The contractor's participation in the team building program is totally voluntary. However, if the contractor agrees to partake in the program, it is anticipated that within 60 days after signing the Design/Build Contract the Contractor's on-site Project Manager and OPG's on-site representative will develop a plan to hold a team building workshop to be attended by key staff of both parties. Follow-up workshops will be held periodically as agreed to by the contractor and OPG.

18.3 Confidentiality Agreements

Confidentiality Agreements will be signed with the Owner's Representative and subcontractors working on behalf of OPG.

Table 18.1 – Project Communications Plan – Phase 1

Stakeholder	Information	Frequency	Methodology	Responsible
Board	<ul style="list-style-type: none"> High level performance metrics Key external issues 	Quarterly	Meeting and Presentation Meeting Handout Board Memo	Major Projects Committee/Project Sponsor
Major Projects Committee	<ul style="list-style-type: none"> High level performance metrics Key external issues 	Monthly	Verbal/Presentation/Board Memo	Project Sponsor/Director
Sponsor	<ul style="list-style-type: none"> Cost, schedule , safety and quality reports Issues/concerns and Actions 	Weekly	Verbal Status Report	Project Director
Project Director	<ul style="list-style-type: none"> Communications Report Issues and Actions 	Bi-weekly	One-on-one meeting	Project Manager
Project Team	<ul style="list-style-type: none"> Cost and schedule metrics Issues and Actions Report Work ahead 	Weekly	Team Meeting Minutes of Meeting	Project Manager
Approving Agencies	<ul style="list-style-type: none"> Approvals status list Approvals schedule 	Bi-Weekly and Monthly	Minutes of Meeting	EA/Third Party Coordinator
Niagara Plant Group	<ul style="list-style-type: none"> Technical documentation Stakeholder issues 	Quarterly	Workshop setting	Project Manager

Table 18.2 – OPG and Owners Representative Internal Communications Protocol

Communication	Contact Person	Methodology
Formal Communications OPG to/from OR	OPG Project Director to/from OR Project Manager	Letter Email Fax
Request for work to OR staff	OPG Project Director to OR Project Manager	Verbal Letter Email Fax
Meeting Invitations	OPG staff to/from OR staff Cc to OPG Project Director and OR Project Manager	Verbal Email Letter Fax
Requests for information OPG to/from OR	OPG staff to/from OR staff Cc to OPG Project Director and OR Project Manager	Verbal Email Letter Fax
Project Coordination	OPG staff to/from OR staff Cc to OPG Project Director and OR Project Manager	Verbal Email Letter Fax
Cost and Schedule Information	OPG Project Director to/from OR Project Manager	Letter Email Fax

19 Records Management

During execution of the Niagara Tunnel Project, most project records will be kept at the Project Records Centre at the Acres offices in Niagara Falls. Exceptions to this will be confidential and legal documents that will be kept at OPG headquarters in Toronto. Upon completion of the Project, all Project records will be transmitted to the Niagara Plant Group Records Centre.

Documents and records will be organized in accordance with the SCI system. A records management plan is under development to capture changes and improvements in records management.

19.1 Data Room

A Data Room has been assembled and will be open to proponents of the Niagara Tunnel Project. In compiling the material for the Data Room, OPG and its Representatives have elected to make all available information, of which they are aware, that is potentially relevant to the Niagara Tunnel Project, available to proponents. The material in the Data Room represents work done since the 1980s by various parties. There is a risk that material in the Data Room may be outdated, irrelevant, inaccurate or incomplete.

The Data Room is located at the Project Records Centre in Niagara Falls. The OR Data Room Coordinator is responsible for developing data room operation procedures and for facilitating access to the Data Room for Proponents.

Any new material to be added to the Data Room must first be approved by OPG or the Owner's Representative.

19.2 Core Samples

The core samples are located at the OPG Niagara Transformer Station, 1900 Murray Street (at Main Street) in Niagara Falls, are available for viewing by Proponents. Visits can be arranged by contacting Peter Pahl, Telephone 905-357-6721, email: peter.pahl@opg.com.

19.3 Project Documents and Correspondence

All Project documents, including correspondence, Purchase Requisitions, Purchase Orders (including amendments), reports, drawings, bills of material and the like must include proper document numbers and must be provided for filing with Project Records Centre.

Project drawings will be produced following OPG drawing standards and will include an approved title block. Project drawings are to be produced in electronic format preferably using the latest approved version of Autocad.

Proper document numbers, include the Property Designation (NAW130), Document Type, SCI, Serial Number and Revision Number. The Hydroelectric Records Centre manages the assignment of document and drawing numbers.

Proper file numbers, including the following, must appear on all Project correspondence:

Property Designation **NAW130**
 SCI (5-number code)..... **XXXXX**
 Retention Period (T# = Temporary for # of years; P = Permanent)..... **T# or P**

The SCI number codes are hierarchical. The five digits represent the following hierarchy:

XFunction
XFeature
XSystem
XSubsystem
XComponent or Element

For Project correspondence, SCI numbers used should be limited to function, feature and system (first three digits), as appropriate, with zeros assigned for the subsystem and component digits. SCI numbers recommended for use on the Niagara Tunnel Project are noted below:

SCI Listing for Project Document Management

SCI #	Description	Correspondence	Reports	Drawings
00000	ADMIN and ENGINEERING SCIENCES			
00060	HMM / Acres Administration	✓		
00120	Project Management	✓		
00121	Project Coordination	✓		
00124	Community Liaison	✓		
00132	Drawing Production	✓		
00200	Progress / Activity Reports	✓	✓	
00240	Field Progress Reports	✓	✓	
00280	Progress Photographs	✓	✓	
00300	Schedules	✓		
00400	Estimates and Costs	✓		
00539	Department of Fisheries and Oceans (DFO)	✓		
00541	Ministry of the Environment (MOE)	✓		
00549	Ministry of Natural Resources (MNR), including Niagara Peninsula Conservation Authority (NPCA)	✓		
00559	Other Provincial - Niagara Parks Commission (NPC)	✓		
00576	Municipal – Counties and Regions – Regional Municipality of Niagara (RMON)	✓		

SCI Listing for Project Document Management

SCI #	Description	Correspondence	Reports	Drawings
00577	Municipal – Cities – Niagara Falls, Niagara-on-the-Lake, Welland	✓		
00600	Procurement	✓		
01900	Quality Engineering	✓		
02700	Hydraulic Engineering	✓		
02720	Hydraulics (Welland River WL)	✓		
07000	Environmental Studies	✓	✓	
07080	Hazardous Materials	✓	✓	
07300	Waste Management	✓	✓	
07500	Noise Theory, Control and Effects	✓	✓	
10000	SITE and IMPROVEMENTS			
10120	Geotechnical Investigations	✓	✓	✓
10190	River and Groundwater Investigations	✓	✓	
11000	Property Acquisition	✓		✓
13000	Site Access Systems (Permanent)	✓	✓	✓
20000	BUILDINGS and STRUCTURES			
20100	General Arrangement	✓	✓	✓
26500	Cofferdams	✓	✓	✓
29230	Tunnels (Including Liner)	✓	✓	✓
29270	Dewatering Structure	✓	✓	✓
29300	Intake Structures (Including Service Gates)	✓	✓	✓
29700	Outlet Structures (Including Gates and Hoists)	✓	✓	✓
60000	INSTRUMENTATION and CONTROL			
62900	Instrumentation – Water Conveying Structures	✓	✓	✓
80000	CONSTRUCTION INDIRECTS (Temporary Facilities and Services)			
83000	Materials Management	✓	✓	✓
84500	Construction Roads and Bridges (On Site)	✓	✓	✓
85100	Health and Safety	✓	✓	✓
85200	Security	✓	✓	✓
86000	Camp Facilities and Services	✓	✓	✓
88200	Tunnel Excavation Equipment	✓	✓	✓
88400	Material Disposal	✓	✓	✓

All documents will be managed through the Project Records Centre in Niagara Falls, and the Project Records Centre becomes the owner of the document for all edits, submissions, etc.

19.3.1 Correspondence

Correspondence originated by all Project staff must be assigned a proper file number during its preparation. No more than one cross-reference file number is to be applied. The Official Record copy of all correspondence must be routed through the OR Project Manager to the Project Records Centre, in a timely manner.

The recipient of correspondence originated by external parties should identify the date received, apply a proper file number on the original, make any necessary working copies, and route the original through the OR Project Manager to the Project Records Centre, in a timely manner.

19.3.2 Drawings

The drawing originator will provide the appropriate SCI number to identify the drawing(s) and arrange assignment of a new drawing number(s) from the Project Records Centre in Niagara Falls; e.g., NAW130-D4E-29230-0001-00,

Property Number.....	NAW130
Document Type.....	D (Drawing)
Drawing Size.....	4 (or appropriate size)
Document Source.....	E (e.g., Consultant)
SCI Number	XXXXX
Serial Number	XXXX
Revision Number	XX

All drawings to be produced by the Design/Build Contractor and others contractors must be assigned appropriate OPG drawing numbers. For this purpose, the Design/Build Contractor will indicate the number of required drawings in each SCI category and arrange for a block of new drawing numbers from the Project Records Centre in Niagara Falls.

All drawings shall be received in electronic format as well as hard copy, which will be stamped and signed.

Other drawings received from third parties and manufacturers will be assigned drawing numbers on receipt.

19.3.3 Other Documents

The document originator will provide the appropriate SCI number to identify the document(s) and arrange assignment of a new document number from the Project Records Centre; e.g., R-NAW130-29230--0001,

Document Type.....	R (Report), T (Tender), P(Proposal)
Property Number.....	NAW130
SCI Number	XXXXX
Serial Number	XXXX

All documents to be produced by the Design/Build Contractor must be assigned appropriate OPG document numbers. For this purpose, the Design/Build Contractor will indicate the number of required documents in each SCI category and arrange for a block of new document numbers to be assigned from the Project Records Centre.

Other documents received from third parties and manufacturers will be assigned document numbers on receipt.

19.4 Electronic Document Management System (iXOS)

OPG Hydroelectric has an electronic document management system called iXOS. Niagara Tunnel Project documents (e.g., drawing, manuals, reports, correspondence, etc) should be formulated in electronic format compatible with the iXOS. Hydroelectric software standards (AutoCad and Microsoft Office – Word, Excel, Powerpoint and MS Project) have been adopted for use by all members of the Project team to facilitate convenient information exchange. Primavera P3 will be utilized for development of the Project schedule.

20 Project Closeout

20.1 Purpose

The purpose of the Project Closeout Phase is to ensure that all Project related activities and deliverables are complete prior to completion of the Project and to determine whether the asset is attaining or exceeding the performance objectives (Guaranteed Flow Amount, etc).

20.2 Description

The Closeout phase involves doing all the activities identified in the Project Closeout Plan to complete an orderly windup of the Project. This includes handoff of all remaining deliverables to the end users, closing out all contracts, finalizing Project costs and closing the OPG work order, ensuring the necessary records are filed, and reviewing lessons learned from the Project.

The OPG Project Director is responsible for preparing a Project Closeout Report and the Project Sponsor is responsible for reviewing and accepting it, after verifying that the scope of work and the Project objectives have been completed satisfactorily.

After the Project is in-service, a Post Implementation Review (PIR) will be conducted to verify that the Project business objectives have been achieved and to capture lessons learned for future projects.

When it is determined that the scope of work and the Project objectives have been completed satisfactorily, the OPG Project Director will prepare a Certificate of Acceptance which the Project Sponsor will accept after an appropriate review.

20.3 Prerequisites

Prerequisites for the Project Closeout Phase are

- Certificate of Substantial Performance of the Design/Build Contract
- new tunnel in operation
- Project Closeout Plan
- operating license (if applicable).

20.4 Key Activities

Key activities in the Project Closeout Phase are

- prepare schedule for rectifying deficiencies
- scope verification
- flow verification test
- finalise as-built documentation
- turnover documentation to Niagara Plant Group
- prepare Deficiencies report
- prepare Project Completion Report
- prepare Project Management Controls Report
- prepare Certificate of Acceptance
- file Asset in Service Report.

20.5 Project Closeout Plan

The Project Controls Manager will prepare a Project Closeout Plan and schedule for the assistance and direction of the Project team during the Project Closeout Phase and, on acceptance of the plan by the OPG Project Director, will monitor adherence to same.

The OR Project Manager will ensure compliance with the requirements of the Project Closeout Plan.

20.6 Schedule for Rectifying Deficiencies

The schedule for rectifying deficiencies will be prepared from the Project deficiency List. This list will be prepared by

- the Contracts/Construction Manager for the Design/Build Contract and Miscellaneous Construction Contracts
- by the EA/Third Party Manager for EA and third party issues
- by the OR Project Manager for all other outstanding items.

The schedule format will be a check list or punch list with required milestone dates. The persons identified above as being responsible for preparing the deficiency lists will also be responsible for preparing the schedules for correcting the deficiencies.

These same managers will be responsible for recording and monitoring actual progress for review and action by the OR Project Manager.

20.7 Scope Verification

The purpose of scope verification is to ensure that all work is completed correctly and satisfactorily.

The OR Project Manager will prepare a report for the OPG Project Director's acceptance, cataloguing all aspects of compliance with the Project scope, including a signed off and completed deficiency list.

20.8 Finalised As-Built Documentation

Finalised as-built documentation will be collected and/or prepared by the Project team.

As-built documentation will include

- as-built drawings from the Contractors
- design calculations for any changes to the initial contract design
- a listing and scope description for all approved Contract changes
- a listing, description and impact report of any outstanding deficiencies which will not be rectified
- warranties for the construction contracts
- approvals and sign-offs from all third part agencies.

20.9 Turnover Documentation to Niagara Plant Group

The main purpose of the turnover of documentation is to formally transfer ownership of the completed tunnel facility and all associated documentation to the Niagara Plant Group.

The turnover of all documentation will take place when Final Completion of the Tunnel Contract has been certified.

The documents to be turned over will include

- a full set of original contract documents for all Contracts and Purchase Orders executed as part of the Project
- all amendments to same
- all original agreements with and certificates of approval from all third party agencies
- all amendments to same
- as-built drawings from the Contractors
- design calculations for any changes to the initial contract design
- signed-off deficiency lists
- a listing, description and impact report of any outstanding deficiencies which will not be rectified
- warranties for the Construction Contracts
- operating and maintenance manuals for the tunnel facility
- spare parts list
- training documentation for the facility
- all permits, certificates and licenses
- quality assurance records
- all Project correspondence files save those deemed “privileged” by OPG Law Division.

20.10 Deficiencies Report

The OR Project Manager will prepare a deficiency report for any deficiencies remaining uncorrected after Final Contract Completion.

The report will indicate the nature of such deficiencies, their deviation from the approved design and/or scope, their impact (if any) on the operation, maintenance and life-cycle cost to operate the facility, and the changes made to the Contract Price to permit acceptance of such remaining deficiencies.

The OPG Project Director is required to approve and accept the deficiency report.

In the event that there are outstanding deficiencies remaining after the Tunnel has been declared in-service, a clean-up work order should be opened to hold funding necessary to complete the remaining items.

20.11 Project Completion Report

The Project Completion Report will be prepared by the Project team under the direction of the OR Project Manager and will

- analyse Project performance relative to the Project Execution Plan
- identify problems in Project execution and their solutions
- record the Project history focusing on those things the Project team would do again or do differently on another similar project. This information would be of particular importance to OPG should the fourth tunnel ever be built.

The “Lessons Learned” part of the report will address, among other things, the following:

- What contributed most to the success/failure of the Project?
- What worked well? What did not work well?
- What constraints limited our performance? How could those constraints be removed in future?
- Where did we have problems? Should these have been foreseen? If so, what indicators were missed?
- What innovations did we introduce on this Project? What were their impacts?
- What other things could we have done to improve Project performance and success?
- Is the client (Niagara Plant Group) satisfied with the facility as delivered?

20.12 Project Management Controls Report

The Project Controls Manager will document all Project controls issues arising from the management of the Project including cost, scope and schedule variances.

20.13 Certificate of Acceptance

The purpose of the Certificate of Acceptance is to ensure that all Project stakeholders and the Project Sponsor are satisfied that the Project is complete and meets their requirements.

A formal document will be prepared by the OPG Project Director for the approval and signature of the Project stakeholders. This document will be accepted by the signature of the Niagara Plant Group Manager and the Project Sponsor.

20.14 Asset in Service Report

Upon successful completion of commissioning, the tunnel will be ready for full commercial operation by the Niagara Plant Group. At this stage the OPG Project Director and the Niagara Plant Group Manager will complete and file the Report of Equipment In-Service form. The interest charged to the Project will then stop as the facility begins supporting the generation of revenue.

Appendix A – Project Charter

PROJECT CHARTER

Project ID – EXEC0007

Revision 00

January 13, 2005

Project Name & Location

Niagara Tunnel Project (the **Project**)
Niagara Falls, Ontario

Need & Justification

The Ontario Government, OPG's sole shareholder, has endorsed this Project as being consistent with its objective of promoting the development of cost competitive, environmentally friendly sources of electricity generation. The proposed tunnel would facilitate efficient utilization of available water in the existing Sir Adam Beck generating facilities, increasing the average annual energy production by about 1.6 TWh. At an estimated Levelized Unit Energy Cost (LUEC) of approximately 3.5 cents/KWh, the Project would present a competitive alternative for meeting the needs of the Province.

Objectives

To divert an additional 500 (nominal) cubic metres per second of water from the Upper Niagara River to the Beck Hydroelectric complex at Queenston, in a safe, economic and timely manner. This will be done, to the extent practical and possible, in a manner that reflects and meets the requirements of the primary stakeholders. Specifically, the project objectives are to:

- Maintain a safe working environment.
- Maintain the Project on schedule and within budget.
- Meet all environmental and mitigation requirements.
- Achieve a high overall quality of design and construction, meeting performance requirements.
- Maintain a good working relationship with stakeholders, contractors and the affected public.

The Province of Ontario and OPG consider delivery of this project to be a top priority.

Scope and Deliverables

The proposed Project includes the planning, design, construction, commissioning and placing into service of a 10km long diversion tunnel with a nominal 12.7m internal diameter, including all associated facilities and enabling work. The Project scope also includes the execution of OPG's obligations regarding the Niagara Exchange Agreement (NEA). The NEA secures water rights for the Niagara tunnel, and involves the decommissioning of Toronto Power GS (TPGS) and Ontario Power GS (OPGS) and transferring these two stations to the Niagara Parks Commission (NPC). The Project will be executed in two phases as follows:

Phase 1

For the tunnel, this phase includes project activation, project planning, conceptual design, permitting/approvals submissions, and procurement of a design-build tunnel contract. The planning and design of enabling work such as road improvements and power hookups is also part of this phase. For the NEA, this phase includes the completion of Environmental Site Assessments

PROJECT CHARTER

Project ID – EXEC0007

Revision 00

January 13, 2005

(ESA's) for the two stations and procurement of a decommissioning contract.

Key Deliverables for the tunnel include contractor pre-qualification, contractor selection, executed design-build contract, applicable permits/approvals and third party agreements, and designs for enabling work. The key deliverables for the NEA include ESA's, Records of Site Conditions, contractor selection, and an executed decommissioning contract. Key deliverables for the total Project also include a Release Quality Estimate (RQE) and Business Case for Phase 2 as well as Project approval by OPG's Board of Directors.

Phase 2

For the tunnel, this phase includes obtaining applicable permits/approvals, detail design, construction, testing and commissioning of the diversion tunnel and construction and installation of enabling works. For the NEA, it includes execution of the decommissioning work.

Key Deliverables for the tunnel include permits/approvals, detailed design of tunnel, construction of diversion tunnel and associated facilities, diversion tunnel commissioning and placing into service, and performance testing. The key deliverables for the NEA include decommissioning of the two stations and transfer to NPC. A key deliverable for the total Project is a close out report.

The scope of the Project is more fully described in the Project Execution Plan.

Customer(s)

OPG's Niagara Plant Group

Key Stakeholders

Province of Ontario (OPG's sole shareholder)
 Regional Municipality of Niagara
 City of Niagara Falls
 Town of Niagara-on-the-Lake
 Ontario Ministry of the Environment
 Ontario Ministry of Natural Resources
 Niagara Parks Commission
 Niagara Peninsula Conservation Authority
 Canada's Department of Fisheries and Oceans
 International Niagara Board of Control

Major Milestones

The Ontario Government, through the Ministry of Energy, has indicated its strong desire for this Project to be implemented in the shortest possible time. The design-build contracting approach, selected for the tunnel project, provides the best means to achieve this timing objective. The current project schedule is as follows:

Board approval	June 2005
Phase 1 completion	July 2005
Decommissioning of 2 Stations	January 2006
Transfer to NPC	March 2006
In-Service Date (tunnel)	September 2009
Phase 2 completion	September 2010

PROJECT CHARTER

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Budget

The budget for this Project has not been approved at the time of preparation of this Project Charter. A partial release of \$10,000,000 for Phase 1 work was approved by the OPG Board of Directors on June 24, 2004. The preliminary cost estimate for the project is \$735 million comprised as follows:

Phase 1	10,000,000
Phase 2	<u>725,000,000</u>
Total	\$735,000,000

Constraints & Limitations

Under the proposed rate regulation regime in the Province of Ontario, all prudently incurred costs for this Project should be fully recoverable. This needs to be confirmed once the Project cost estimates are finalized at the end of Phase 1.

Project Execution and Management

Phase 1 of the project will be undertaken by a team consisting of OPG staff and consultant staff acting as Owner's Representative.

Phase 2 of the project will be substantially undertaken by contractors, with oversight provided by OPG staff and Owner's Representative staff.

The Project Director will develop a detailed Project Execution Plan (PEP) for acceptance by key members of the project team and approval by the Project Sponsor. The PEP will include a description of the Project organization and associated roles and responsibilities. It will also include a reporting plan, describing the proposed flow of information and documentation to the Project Sponsor and ultimately to OPG's Board of Directors.

All significant proposed changes to project configuration (including scope, budget, timeline and quality) must be submitted to the project Change Control Board for evaluation before submission to the OPG Major Projects Committee.

Authority of Project Director

This document authorizes the Project Director to undertake Phase 1 of the Project, reasonably utilizing OPG resources and third party resources as appropriate. More specifically, the Project Director is authorized to:

- Approve project in-scope expenditures up to approved Project funds (\$10M).
- Directly request assistance from OPG functional departments as necessary.
- Retain contractors and consultants as required.
- Commit OPG, in discussions/negotiations with regulatory agencies and other stakeholders with respect to satisfying the EA Conditions of Approval.

PROJECT CHARTER

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At the appropriate time, and subject to approval of Phase 2 of the Project by OPG's Board of Directors, this Charter will be amended to include the construction and commissioning phase of the Project.

Signatures

Project Director (E. Elsayed)



Date

Jan. 14, 2005

Niagara Plant Group Manager (D. Heath)



Date:

January 14, 2005

Project Sponsor (J. Burpee)




Date:

Jan 17/05

Appendix B – PEP Ownership

PEP Section	Owner
1 Introduction and Background	M. Hughes
2 Purpose of Project and Objectives	M. Hughes
3 Project Scope	M. Hughes
4 Project Authorization	E. Elsayed
5 Health and Safety Management	R. Everdell
6 External Stakeholders	C. Walker
7 Approvals and Third Party Requirements	C. Mee
8 Execution and Delivery Strategy	H. Charalambu
9 Organization, Roles and Responsibilities	H. Charalambu
10 Authority Levels	E. Elsayed
11 Schedule and Milestones	J. Tait
12 Project Cost Estimate	J. Tait
13 Project Controls and Reporting	J. Tait
14 Risk Assessment and Risk Management	D. Eden
15 Engineering Management Plan	M. Hughes
16 Construction, Installation and Commissioning Management Plan	R. Delmar
17 Environmental Plan	C. Mee
18 Communications Plans	C. Walker
19 Records Management	M. Walsh
20 Project Closeout	J. Tait

Appendix C – Organizational Authority Register (OAR)


	Governing Document Type: STANDARD		Security Classification: INTERNAL USE ONLY	
	Sponsoring Unit: FINANCE		Document Number: FIN-STD-AU-001	Page: 1 of 5
	Applicability: OPG Wide		Effective Date: June 30, 2004	Revision: R01
TITLE: ORGANIZATIONAL AUTHORITY REGISTER: AUTHORITIES FOR ALL MANAGERS				

<p align="center">PURPOSE</p> <p>The OPG Organizational Authority Register (OAR) provides a common framework of delegated authorities and position holders who can exercise those authorities. Authority is the right to order and/or make final decisions, including the right to approve a transaction and execute any documents related to the approval.</p> <p>SUBSIDIARY OPERATIONS: The OPG OAR will be used to define approval limits for financial decisions made on behalf of a subsidiary, joint venture or related business alliance (SUB) where an OPG employee is acting as a director/officer of said SUB regardless of the OPG employee's title or approval levels within that SUB.</p>

<p align="center">EXCEPTIONS</p> <p>NONE</p>

<p align="center">AUTHORIZATION</p>	
Subject Matter Expert: <u>Robin Heard, Director Accounting</u>	Date: _____
Approval Authority: <u>Donn Hanbidge, VP Controller</u>	Date: _____

<p align="center">DOCUMENT RELATIONSHIP</p>	
Receives Authority From:	Financial Management & Internal Control Policy
To be reviewed:	2 years

	Governing Document Type: STANDARD		Security Classification: INTERNAL USE ONLY	
	Sponsoring Unit: FINANCE		Document Number: FIN-STD-AU-001	Page: 2 of 5
	Applicability: OPG Wide		Effective Date: June 30, 2004	Revision: R01
TITLE: ORGANIZATIONAL AUTHORITY REGISTER: AUTHORITIES FOR ALL MANAGERS				


1.0 REQUIREMENTS

FINANCIAL DECISIONS: Position holders are delegated the following authorities

ELEMENT	AUTHORITY LEVEL – by Standard Position and Stratum Level							
	CEO	EVPs, COO	Senior VP	VP	Director	Manager	Section Manager	Super-visor
FINANCIAL TRANSACTIONS –								
Stratum Level	8	7	6	5	4	3	2	1
1.1 Project * The authority to approve, amend scope, defer or cancel projects and investments. A project is limited in time, has a specific objective and involves a series of coordinated activities	\$25M	\$15M	\$8M	\$4M	\$1M	NA	NA	NA
1.2 Project Not In Budget** refers to projects not listed in the original approved plan. It should be used on an exception basis only and not on a regular basis	\$15M	\$7.5M	\$4M	\$2M	\$0.5M	NA	NA	NA
1.3 Strategic Project refers to investments with strategic implications or sensitivities as identified by the CEO.	\$10M	NA	NA	NA	NA	NA	NA	NA
1.4 Forecast Project Over – Variance refers to the authority to approve forecast overspending on an approved project.	Greater of 10% or \$10M; max \$25 M	Greater of 10% or \$6M; max \$15M	Greater of 10% or \$3M; max \$8M	Greater of 10% or \$1.5 M; max 4M	Greater of 10% or \$.4M; max \$1M	NA	NA	NA
1.5 Requisitions within approved plan/budget or amendment for material and contracted services and excludes IT, insurance legal, advertising and real estate.	>\$25M	\$25M	\$15M	\$8M	\$4M	\$1M	\$50K	\$10K
1.6 Business Travel and Expense	>\$100K	\$100K	\$40K	\$25K	\$15K	\$10K	\$5K	NA
1.7 Asset Write-off refers only to authority to declare an asset surplus and write it off.	\$10M	\$7.5M	\$5M	\$2M	\$500K	\$250K	NA	NA
1.8 Research Funding refers to financial grants for activities with benefit to OPG.	>\$10M	\$10M	\$5M	\$2 M	\$1M	NA	NA	NA
1.9 Local Sale Excess Material refers to the authority to sell surplus material.	>\$25K	\$25K	\$10K	\$5K	\$1K	NA	NA	NA
1.10 General Sales (not energy)	>\$40M	\$40M	\$10M	\$5M	\$2.5M	\$50K	NA	NA

* **1.1 Project Authority:** Project Approval, both OM&A and capital, must capture all expenditures to be incurred by the company. Except for contracts related to Pickering A Return to Service which require prior approval by the shareholder for new transactions >\$15M.

****1.2 Project Not In Budget Authority** refers to projects not listed in the original approved plan. It should be used on an **exception basis only** and not on a regular basis. Notify Controllers of such approvals over \$1M so that approved projects not in budget will be presented to the President. Except for contracts related to Pickering A Return to Service which require prior approval by the shareholder for new transactions >\$15M.

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	Sponsoring Unit: FINANCE		Document Number: FIN-STD-AU-001	Page: 3 of 5
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TITLE: ORGANIZATIONAL AUTHORITY REGISTER: AUTHORITIES FOR ALL MANAGERS				

- 1.1 LOCAL PURCHASES:** The VISA Purchase Card/Cheque Program shall be used for local purchases. For transaction limits, procedures, restrictions and general guidance, refer to the Purchasing Card Program material on the OPG Intranet. Purchases made on the Purchasing Card are to be pre-approved and must be minimum R1 and have OAR element 1.5 requisitioning authority in the position holder's grid.

- 1.2 OTHER DECISIONS:** A Rule of Two (R2) applies to the items noted below. In other cases, Rule of One (R1) applies or higher, at management's discretion.

Organizational Structure	Position Accountabilities	Hires & Employment Contracts
Voluntary and Involuntary Terminations	Pay Scale Adjustments and Salary Plans	Surplus staff Declaration
T&E Credit Cards outside the guidelines		

1.3 SECONDARY APPROVALS

1. Contract Review By Legal Department and Finance Legal and Finance (local controller) must approve contracts and amendments to contracts, prior to their execution, including:

- those outside the normal course of day to day business but within defined accountabilities; or
- those within the normal course of day-to-day business where the transaction amount or potential liability for OPG are over \$5 million. This includes any agreements, memorandums of understanding, letters of intent or other legal documents associated with or leading up to the transaction.
- Legal Department must review employment contracts for senior Management Group positions (Band H and above) prior to execution.
- Treasury Department must approve all contracts with non-standard payment terms ie line of credit, financial guarantee, performance bond, etc., prior to execution.


Please contact Law Department or Finance Department if there is any question as to whether the contract is routine or non-routine. Since the review and approval process normally requires some time, please ensure Legal and Finance are involved early in the process.

2. Hires of former employees - EVP HR must approve all hires of former employees.

3. External Hires– Hiring Unit EVP must approve all external hires following approval from VP Human Resources, Comp & Benefits if the employment contract terms differ materially from normal compensation terms for a similar position in OPG and from Director Taxation if the employment contract is with a non-resident individual and the employment contract terms include a tax equalization clause to address the tax differential to the individual between Canada and individual's foreign country of residence.

4. Business Case Review: Finance (local controller) must approve the business case for all projects and related variances, all business cases >\$8M must be approved by the VP Controller; all nuclear business cases >\$4M must be approved by the Director, Investment Planning. CIO must approve all business cases and related variances with IT expenditures (equipment, services or consultants) greater than \$250K, either standalone project or part of a larger project.

Special Situations – Corporate Donations, Sponsorships, Advertising, Information Services and Equipment, Real Estate, Insurance, Legal, Leases

	Governing Document Type: STANDARD		Security Classification: INTERNAL USE ONLY	
	Sponsoring Unit: FINANCE		Document Number: FIN-STD-AU-001	Page: 4 of 5
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1.4 SECONDARY APPROVALS – SPECIAL SITUATIONS – CONTACT UNIT WITH SPECIFIC AUTHORITY:

- Corporate and Environment Affairs must approve all **corporate donations, sponsorships for brand building and requisitions for advertising** – See OAR elements 2.0 series (note: Energy Markets, Treasury and HR have special sponsorship authority and Energy Markets has special advertising authority)
- CIO must approve **all business cases with an IT expenditure** (equipment or services) greater than \$250K, either a standalone IT project or part of a larger project.
- CIO organization must approve **requisitions for IT equipment and services** See OAR elements 3.0 series
- Law must approve all requisitions for **legal services** See OAR elements 4.0 series
- Human Resources must approve all **payroll related transactions**. See OAR elements 5.0 series
- Supply Chain must approve all **purchases – material, consultants, contractors** – see OAR element 7 series
- Supply Chain must approve all **disposal of equipment** – see OAR element 8.0 Series
- Real Estate must approve all **real estate requisitions** – see oar elements 9.0 series
- Fleet Management must approve for all **transport and work equipment requisitions**
- Employee Relocation Services of Compensation & Benefits must approve all **relocation expenses**
- Treasury must approve all financing including **all leases and insurance** and contracts with non-standard financing terms and conditions i.e. line of credit, guarantee, etc., see elements 10 series.

NOTE: For transactions where other units have specific authority for secondary approvals, early involvement with those business units is recommended.

1.5 CONSTRAINTS ON AUTHORITY:

The delegation and exercise of all authorities are governed by:

- **Policies and procedures** governing the transaction. The OAR does not replace these governing documents, but works with them as part of the OPG internal control framework;
- **Prior approvals**, e.g. the Corporate strategy, business plan and budget,
- **Standard Segregation of Duties** - The original initiator of a transaction cannot be the approver – except for energy transactions - even if the transaction is within their assigned authority limits.


1.6 EXERCISE OF AUTHORITY

Position holders should exercise adequate due diligence prior to all decisions, including proper documentation and proper review and sign-off at the appropriate level.

2.0 ROLES AND ACCOUNTABILITIES

Position Holders must comply with authority limits within the context of their job function, defined responsibilities and related governing documents and must exercise appropriate due diligence in the exercise of authorities.

Management must ensure direct reports comply with OAR authority limits.

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3.0 DEFINITIONS

R1	Rule of One means manager approves items relating to a direct report
R2	Rule of Two means manager approves items relating to a direct report of a direct report
\$XX	Canadian dollar denominated authority limits, inclusive of PST within an approved or amended planning document (business plan, budget, performance contract)
Multi-year contract	The present value of the total contract value (typically leases and settlements, NOT projects) should be used to determine the authority level.

4.0 RECORDS AND REFERENCES

4.1 Records

None

4.2 References

4.2.1 Performance References

FIN-STD-AU-003 Organizational Authority Register: Element Definitions

4.2.2 Developmental References

None

5.0 REVISION SUMMARY

Revision	Summary of Changes
R01 Jun 17, 2004	Intent Revision <ul style="list-style-type: none"> Re-formatted and re-numbered to comply with the new governing documents standard. No change to authority element numbers. Purpose – included direction to OPG employees acting as officers/directors of a subsidiary, joint venture or related business alliance. 1.0 – Requirements – Element 1.1 and 1.2 – added exception for Pickering A Return to Service. 1.3 – Secondary approvals – 1. and 4. included definition for “finance”. Added requirement for secondary approval by treasury for contracts with non-standard payment terms. Amended text to include legal review of employment contracts for management group Band H and higher prior to execution. For item 3. expanded approvals to include all external hires with non-standard employment terms.
R00 Dec 6, 2001 Initial Issue	