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EQ754-171503/A

Client Ref. No. - N° de réf. du client

Terms of Reference

Amd. No. - N° de la modif.

File No. - N° du dossier

Buyer ID - Id de l'acheteur

PWL003

Project No.- No. du projet

R.077680.001

PROJECT BRIEF

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PROJECT BRIEF

This Project Brief is divided into two sections:

- **Description of Project**
- **Description of Services**

Project Administration

Required Services

For standards relating to the service provisions herein please refer to the document "Doing Business with A&E Ontario Region". The standards in "Doing Business with A&E Ontario Region" must be adhered to in conjunction with this scope of services.

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PWL003Project No.- No. du projet
R.077680.001**DESCRIPTION OF PROJECT****PD 1 PROJECT INFORMATION**

Public Works and Government Services Canada (PWGSC), on behalf of Environment Canada (EC), intends to retain the services of a Construction Manager (CM) for the *CCIW Lab Modernization Plan Implementation and Optional Master Planning Services* Project at the Canada Centre for Inland Waters (CCIW).

- 1.1 PWGSC Project Title:** CCIW Lab Modernization Plan Implementation and Optional Master Planning Services
- 1.2 Location of the Project:** Canada Centre for Inland Waters (CCIW)
867 Lakeshore Road Burlington, Ontario
- 1.3 PWGSC Project Number:** R.077680.001
- 1.4 Client / User:** Adam Kurz, P.Eng.
Project Leader (Client Department)
Environment Canada
867 Lakeshore Road Burlington, Ontario L7R 4A6
- 1.5 PWGSC Project Manager:** Kathryn Gould, M.Arch., OAA
Project Manager (Departmental Representative)
Project Management
Professional and Technical Services
Real Property Branch
Public Works and Government Services Canada
(PWGSC)
4900 Yonge St., Toronto Ontario M2N 6A6
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PD 2 PROJECT IDENTIFICATION**2.1 Purpose of Document**

On Behalf of Environment Canada (EC), Public Works and Government Services Canada (PWGSC) has prepared this Request for Proposal to engage the services of a Construction Manager (CM) to provide CM Advisory (CMa) and CM General Contractor (CMc) for the *CCIW Lab Modernization Plan Implementation and Optional Master Planning Services* project and to ensure that the CM has a clear understanding of the project scope, procedures, and performance requirements.

2.2 Project Description

The *CCIW Lab Modernization Plan Implementation and Optional Master Planning Services* project will comprise of the implementation of a portion of the *Lab Modernization Plan* (LMP, Dialog, 2015), renovating lab [W246 through](#) W249 to become swing space for project, and sprinklering the CCIW complex, including NWRI, WTC, and Annex buildings, as outlined in the *Fire Safety Upgrades – Sprinkler System* study (WSP, July 2016). The Construction Managers work may be amended to include investigations and/or testing during the optional Master Planning Services phase for the Consultant.

The Construction Manager services will be divided into two phases: Advisory Services and Tender and Construction Services. For the first deliverable of the Advisory Services, the Project Team and Construction Manager will review all of the existing documentation for the LMP and other required scope, determining what extent of the identified scope of work can be delivered for the identified project budget. Once the scope is approved, this work can then proceed into Design Services Phase.

The work will incorporate a portion of the scope as identified in the Lab Modernization Plan (LMP; PWGSC, 2015/16). The LMP is a series of reports and a design concept for modernizing and recapitalizing the A&L buildings laboratory's on floors 4 through 7, and related areas. Other priority projects identified by EC that are included in the base contract include:

- Renovating Lab [W246 through](#) W249, which is to be utilized as project laboratory swing space for the duration of implementation of the LMP, and
- Providing a National Building Code of Canada (NBC) 2015 and NFPA 13 "Standard for the Installation of Sprinkler Systems" compliant, fully sprinklered CCIW, including NWRI, WTC and Annex buildings, as outlined in the *Fire Safety Upgrades – Sprinkler System* study (WSP, July 2016)

The deliverables for the sprinklering of the building produced based on this Terms of Reference shall:

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- Incorporate the WSP Consulting Engineering report, "Life Safety Upgrades Sprinkler System" dated July 26, 2016, to provide a fully sprinklered CCIW-NWRI complex based on WSP Report **Option 1: Building Occupied – After Hours**,
- All Sprinkler work is to occur after normal operating hours.
 - Normal operating hours are as follows:
 - Monday to Friday 07:00 hours to 17:00 hours
 - Saturday Closed
 - Sunday Closed
- All design and construction shall be compliant with the National Building Code of Canada (NBC) 2015 and National Fire Code of Canada (NFC) 2015 and referenced standards.
- referenced standards include but are not limited to:
 - NFPA 13-2016, Standard for the Installation of Sprinkler Systems
 - NFPA 20-2016, Standard for the Installation of Stationary Pumps for Fire Protection
 - CAN/CSA C282-15, Emergency Electrical Power Supply for Building
 - CAN/ULC-S524-14, Standard for the Installation of Fire Alarm Systems
 - CAN/ULC-S537-13, Standard for the Verification of Fire Alarms
- removal of all fire alarm initiating devices made redundant as a result of installed sprinkler system

As the entire complex is presently occupied, the project will take into account strategic phasing and be implemented over a 5-year period, to minimize disruption to EC staff and the public. With the input of the Construction Manager the scope of work will be organized into a series of work packages, which will then be delivered over the course of the project to meet the Clients forecasted cash flow over the 5 years.

2.2.2 Project Team

The project requires a multi-disciplinary Project Team with experience in design and construction of laboratory facilities and good understanding and knowledge of laboratory operations. PWGSC intends to engage a Consultant to prepare the design and construction documents and provide construction administration for this project through a separate Request For Proposal.

The Construction Manager (CM) is engaged for advisory and General Contractor services. They will provide advisory input to the project team during design, as well as the procurement of sub-contractors and the management of the overall construction of the project. The CM is then

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responsible for implementing the construction of the project. The Consultant team shall coordinate and incorporate the input from the CM into the construction documents.

The Consultant will also engage a Commissioning Manager (CxM) to establish and document EC's criteria for system function, performance and maintainability, and to verify and document compliance with these criterion throughout design, construction, start-up, initial period of operation, and seasonal testing.

The Consultant will hire a Sustainable Design Specialist whom will assist with ensuring the project meets Sustainable Development Strategy (SDS) commitments and departmental policy requirements with respect to Greening Government Operations.

The Consultant shall provide the services of a Lab Move Coordination advisor to plan and coordinate all the complexities of decommissioning, relocating and reinstalling equipment, while maintaining operations of the laboratories during the project implementation.

PWGSC also intends to engage an Environmental Consultant to create a project specific Hazardous Materials and Designated Substance Survey (DSS) report, conduct further investigations and prepare environmental and abatement specifications, where applicable. The Consultant team shall coordinate and incorporate these specifications describing the scope of work into the construction documents.

The Construction Manager shall note, Shared Services Canada (SSC) is responsible for the installation of IT Cabling. The consultant and Construction Manager shall incorporate general cabling supporting infrastructure and telecom room requirements in the design only. Physical cables and associated equipment are to be supplied by others. General Cabling Supporting Infrastructure and telecom room requirements will be made available to the successful proponent.

The Construction Manager (CM) shall work in collaboration with the project team and stakeholders, by providing: advisory input during design, procurement of Subcontractors and management of the overall construction of the project until completion.

2.3 Cost

2.3.1 Estimated Construction Costs

The total Estimated Construction Cost for the project is \$16,800,000, including escalation, excluding HST. The construction cost estimates do not include Administration costs; Project Management fees; Design Consultant or CM fees. Estimated Construction Cost is in 'Budget-

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Year (Current)' dollars and it includes General Contractor Services and an allowance for escalation.

The approved funding for the *Lab Modernization Plan Implementation and Optional Master Planning Services* project does not cover the entire scope of work identified in the original report, so the Project Team must first work to identify the scope that is feasible for the identified budget.

The Crown will not accept scope creep or cost escalation of selected Proponent's proposal, except in the limited situations as stipulated in the terms of the contract.

2.3.2 Tentative Cash Flow

The Construction Manager will advise the consultant on the division of the scope of work into work packages, which are to be delivered based on the clients required cash flow. This cash flow will be reviewed by the project team and Client at regular intervals and revised as necessary to reflect the most effective delivery of the project.

Construction Costs

| B16/17 | B17/18 | B18/19 | B19/20 | B20/21 | B21/22 | Total |
|---------------|---------------|---------------|---------------|---------------|---------------|----------------------|
| \$0 | \$1,000,000 | \$5,000,000 | \$3,900,000 | \$3,900,000 | \$3,000,000 | \$16,800,000* |

*These identified construction costs are to include escalation

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2.4 Tentative Schedule

| Activities: | Duration |
|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------|
| CM Contract Award | Baseline |
| Phase 1 Advisory Services RS 1 Advisory Support Services RS 2 Schedule Management Services RS 3 Cost Management Services RS 4 Risk Management Services RS 5 Scope Control Services RS 6 Quality Control Services | 50 weeks |
| Phase 2 Tender and Construction Services RS 1 Advisory Support Services RS 2 Schedule Management Services RS 3 Cost Management Services RS 4 Risk Management Services RS 5 Scope Control Services RS 6 Quality Control Services RS 7 Health and Safety Planning and Implementation RS 8 Reporting and Project Site Documents RS 9 Tendering the Work | 220 weeks* |
| TOTAL | 270 weeks |

* This is the maximum project duration, project end date is not to go past Mar. 31, 2022

This is a multi-year project that is expected to be awarded in 2016/17, to both Consultant and CM, and is projected to continue until year 2022. The project end date is not to go past March 31, 2022. The tendering process will be done by the CM and will be organized as separate tendering packages to accommodate the phasing of the project. Overlap of Phase 1 and Phase 2 tasks, activities, and deliverables is expected and shall be demonstrated on the project schedule.

The scope of work for the Lab Modernization Plan (PWGSC, 2015) for the upgrades to floors 4 to 7 of the Administration and Laboratory Building has been developed at the Design Concept stage and is expected to be implemented as EC's priority, with five (5) construction phases identified. A portion of this work is to be implemented as part of this project, the scope of which will be determined as part of the first phase. The scope of work for each work packages to be tendered by the CM, are to be developed jointly by the CM and Consultant.

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The above time allocations shall take into effect immediately after the award of a contract to the successful proponent. Activity durations are preliminary, and the CM is responsible for verifying and confirming the above schedule dates as part of its scheduling mandate.

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PD 3 PROJECT BACKGROUND**3.1 Project History**

Environment Canada's National Water Research Institute (NWRI) is the largest freshwater research facility in Canada. It includes the Canada Centre for Inland Waters (CCIW) located at 867 Lakeshore Road in Burlington, Ontario. The CCIW complex consists of six inter-connected buildings built in 4 phases in the early 1970s, with a total of almost 50,000 square metres of space: the Administration and Laboratory building, the Research and Development building, the Hydraulics Lab, the Boiler Plant, the Warehouse, and the Wastewater Technology Centre. CCIW is owned and operated by Environment Canada (EC).

The CCIW houses the central facilities of the NWRI and other EC programs, including: the Ecosystem Monitoring and Assessment Network (EMAN) coordinating office; Ontario regional offices of EC, including those related to Great Lakes and meteorological programs; and the Wastewater Technology Centre (WTC), specializing in the advancement of environmentally friendly chemistry technologies as well as technologies for the treatment of municipal and industrial wastewater.

CCIW hosts staff from Environment Canada's Water Science and Technology Directorate as well as members of the Department of Fisheries and Oceans. Staff working at the centre includes aquatic ecologists, hydrologists, toxicologists, physical geographers, modelers, limnologists, environmental chemists and research technicians. The National Laboratory for Environmental Testing at the CCIW has fully accredited environmental analysis capability for a wide range of organic and inorganic chemicals, including a specialization in low level metals and the analysis of organic contaminants. In addition to laboratory research, work carried out at the National Laboratory for Environmental Testing involves engineering and technical operations, such as the planning and management of field sampling programs.

3.2 Summary of Pertinent Research, Planning and Recommendations

The CCIW has continued to operate since the 1970's as originally designed and various renovations have taken place over the years. As a result, there are a number of areas within the facility that do not meet current laboratory standards and life and safety requirements.

A Design Concept Report for the Lab Modernization Plan of CCIW was completed in August 2015. This report includes the recommended upgrades to the laboratories and office support space for the 4th floor to the 7th floor of the Administration and Laboratory (A&L) building. The proposed design strategy includes providing for maximum flexibility and adaptability to facilitate

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current and future operational needs. The design approach includes the use of a standard laboratory plan module, modular and mobile caseworks, as well as overhead service carriers.

There was also a secondary report done as part of the Lab Modernization Plan into the development of a New Building to house the new laboratory spaces, reusing the A&L building for other purposes. This report is provided for information only and does not need to be considered for the purposes identifying the scope of this project.

PWGSC contracted a study of the sprinkler system completed by WSP in July 2016. This report investigates design and implementation methods for a fully integrated sprinkler system in the NWRI complex of the CCIW Facility in accordance with the latest codes and standards specific to life safety and property protection. The feasibility analysis report considers the work necessary to install a new sprinkler system that is compliant to the latest National Building Code (NBC), National Fire Code (NFC) and all other applicable codes and standards in the NWRI complex. Sections of the NWRI complex are sprinklered and components of existing system includes: pre-action systems, dry systems, wet sprinkler systems and clean agent extinguishing systems.

The *Lab Standards, Space Standards and Design Guidelines* by Health Canada and Public Health Agency of Canada (Draft, March 2014) need to be considered for this project. The *Government of Canada Workplace 2.0 Fit-up Standards* should also be followed as design guidelines for the office space and support open and flexible workspaces with collaborative areas.

3.3 Stakeholders

Project Stakeholders include representatives from the following organizations:

- Environment Canada - Client Department / User – Project Leader
- PWGSC - Real Property Branch, Professional and Technical Services - Project Manager

3.4 Site characteristics, Challenges

The CM shall:

- Undertake a review of the existing conditions where the work has been identified to ensure safety of the facility;
 - Consider phased construction for the dismantling of the laboratories, relocating staff and equipment, decommissioning and re-commissioning equipment;
 - All laboratories are currently occupied, and a workable plan for minimal disruption to EC scientists is imperative;
 - All noise and dust generating work shall occur after operational hours;
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- The duration of all building systems shutdowns shall be minimized and done after operational hours, whenever possible.

3.5 Federal Objectives

The Government of Canada has committed to reducing its environmental footprint, and PWGSC is an active participant in achieving this goal. In passing the Federal Sustainable Development Act in 2008, the government established a new and innovative sustainable development approach. The Act called for a Federal Sustainable Development Strategy (FSDS), to be updated every three years, as well as regular progress reports. The second cycle of the FSDS, covering the period 2013–2016, expands the strategy's whole-of-government picture, more closely aligning sustainable development commitments with departmental performance reporting, and providing a broader range of environmental sustainability indicators to measure progress.

PWGSC's diverse green building commitments are formalized in the department's response to the FSDS, specific targets in past PWGSC SDSs, input to PWGSC Report on Plans and Priorities (2012-2013), the department's Sustainable Buildings Policy (Departmental Policy 100), and various Ministerial announcements. These documents contain integrated environmental considerations into the building planning, design and construction stages.

This project must be designed and detailed with due diligence to demonstrate that long term considerations have been examined. These considerations pertain to all building systems. Life cycle analysis must be considered in design, detailing and material selection. Durability and ease of maintenance and equipment replacement must be demonstrated throughout the project.

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PD 4 EXISTING DOCUMENTATION

4.1 Existing Documentation - Available to all Proponents

- CCIW Laboratory Modernization Plan :
 - RS 2.1.1 Analysis of Project Scope of Work (Dialog, October 2014);
 - RS 2.1.2 Design Concept Report (Dialog, August 2015);
 - RS 2.2.1 Investigation and Report (Dialog, January 2015);
 - RS 2.2.2 Functional Programming (Dialog, February 2015);
 - [RS 2.1.2 New Laboratory Building Analysis at CCIW \(Dialog, March 2016\);](#)
 - RS 2.2.3 Feasibility Study (Dialog, March 2015).
- Life Safety Upgrades – Sprinkler System (WSP, July 2016).
- Building Condition Report (PWGSC, September 2009).
- Fire Protection Study (3 parts: NWRI, WTC & Annex; LMDG, March 31, 2016).

4.1.1 Access to Existing Documentation

The existing documentation available to all proponents can be obtained electronically on a CD from the PWGSC Real Property Contracting Office upon request.

4.2 Existing Documentation - To be made available to the Successful Proponent

Upon award, copies of all pertinent documentation will be made available to the CM.

- Asbestos Assessment Report prepared (Pinchin Environmental, July 2013);
 - CCIW Lab Report (EC, October 2011);
 - Fire Protection Compliance Monitoring Inspection Report (March 2011);
 - Measurement of Existing Airflows for AHU-1, 3, 5, 43 & 44 (March 2015);
 - CCIW Air Handling Unit Assessment Report (Filer Engineering, December 2014);
 - MD 15128-2013: Laboratory Fume Hoods Guidelines for Building Owners, Design Professionals, and Maintenance Personnel (PWGSC, April 2013)
 - MD 15129-2006: Perchloric Acid Fume Hoods and their Exhaust Systems (PWGSC, March 2006)
 - National Performance Standards for Office Buildings (NPS, 2016-05-10)
 - PWGSC Commissioning Manual (CP.1), latest edition;
 - Existing 'As-Built' drawings (EC, original 1970 construction).
 - Government of Canada Workplace 2.0 Fit-Up Standards
 - Shared Services Canada (SSC) General Cabling Supporting Infrastructure Requirements
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- Shared Services Canada (SSC) Statement of Requirements for Telecom Rooms

4.3 Disclaimer

Reference Information will be available in the language in which it is written. The documentation may be unreliable and is offered, "As is" for the information of the Consultant.

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R.077680.001**PD 5 PROJECT OBJECTIVES****5.1 Quality****5.1.1 Design Principles – General**

- The level of quality is to be consistent with other Government of Canada laboratory buildings.
- The project is to be implemented in an environmentally responsible manner, providing a healthy and safe work environment that meets all applicable codes and supports optimum operations.
- Quality of materials, details and construction methods shall be commensurate with the type of building and allocated budget, and take into account the total life-cycling of the building. Experimental materials should be avoided.
- The character, massing, scale, materials of this project will be compatible with its surrounding context.
- Operating costs must be kept to a minimum and reflect the projected operating costs in the cost plan. This is to be achieved by compliance with the energy budget, selection of equipment, requiring the minimum of operating personnel and building finishes for easy maintenance.

5.1.2 Design Principles – Specific**Building Standards:**

- The Laboratories for EC are to comply to the following:
 - *Lab Standards, Space Standards and Design Guidelines* by Health Canada and Public Health Agency of Canada (Draft, March 2014)
 - Canadian Biosafety Standards and Guidelines:
Web resource: <http://canadianbiosafetystandards.collaboration.gc.ca/>
 - The administration office area and its support office space are to comply with the Government of Canada Workplace 2.0 Fit-Up Standards. A copy of the fit-up standards will be made available to the successful proponent.
 - For commissioning activities and documentation refer to PWGSC Commissioning Manual (CP.1), latest edition.
 - The Telecom Room, Cabling Infrastructure and Conduit Requirements are to comply with the following Shared Services requirements:
 - General Cabling Supporting Infrastructure Requirements
 - Statement of Requirements for Telecom Rooms
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5.2 Sustainable Development

The modernization of the CCIW complex shall be aligned with the Federal Sustainable Development Strategy (FSDS) and federal government's framework for sustainability. Priorities should be given in the planning of the project for life cycle assessments, improve indoor environment quality and performance of the buildings, promote water conservation, reduce energy usage and greenhouse gas emissions, and use durable and low environmental impact materials, finishes and furniture. The consultant team will include a Sustainable Design Specialist to guide this process.

The requirements for LEED Commercial Interiors (CI) Silver or equivalent Green Globe targets should be considered as a minimum performance measurement for the project. The selection of the appropriate green building evaluation tool and certification could be sought upon direction from EC.

5.3 Designated Substances and Hazardous Materials and Environmental Restrictions

Designated Substances and Hazardous Materials have been identified at this site through various audits of the building, refer to existing documentation for information. PWGSC will engage an Environmental Consultant after the project scope is defined to review the Designated Substance and Hazardous Materials Survey (DSHMS), conduct further investigations, issue a new report for the identified scope, and prepare environmental and abatement specifications. The Consultant team shall coordinate and incorporate these specifications describing the scope of work into the construction documents.

An asbestos-containing building materials assessment of the facility was conducted in July 2013. This assessment was performed for long term management of the asbestos not for construction nor renovation purposes at the time of assessment. The asbestos assessment report dated July 12, 2013 indicates the following:

Asbestos was confirmed or visually presumed to be present in the following building materials:

- Texture finish
 - Pipe insulation
 - Mechanical insulation
 - Duct insulation
 - Plaster
 - Drywall joint compound
 - Asbestos cement (Transite)
 - Vinyl sheet flooring
 - Vinyl floor tiles
 - Bakelite
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5.4 Waste Management

The project will be implemented in an environmentally responsible manner.

The Construction Renovation and Demolition (CRD) waste management practices are to be carried out in line with industry standards to support Federal Sustainable Development Strategy, and at minimum should seek to reuse and/or recycle all possible materials where local services and markets exist, and should ensure that CRD waste management practices meet any provincial regulations, city and/or municipal bylaws concerning CRD waste.

The CM shall work with the Consultant Team to implement a waste management program that complies with applicable provincial regulations and federal policies. For all Real Property Branch projects greater than \$1 million, a solid waste management program must be implemented to maximize reuse and recycling opportunities where the infrastructure exists. This requirement exists by regulation in the province of Ontario for projects greater than 2,000 m² (O. Reg. 102/94 and 103/94) and by policy for the rest of Canada. It is a PWGSC best practice to achieve a minimum landfill diversion rate of 75%.

5.5 Code Compliance

Codes, regulations, by laws and decisions of “authorities having jurisdiction” must be observed. National model codes, acts and standards must be observed. PWGSC and EC Departmental Policies, Directive and Standards must be adhered to. The latest editions of the applicable codes, standards, guidelines, regulations, and by-laws, should be followed, including but not limited to the following:

1. National Building Code of Canada;
 2. National Fire Code of Canada;
 3. National Plumbing Code of Canada;
 4. Canadian Electrical Code;
 5. Canada Labour Code;
 6. Treasury Board of Canada Secretariat, Directives and Standards;
 7. Canada Occupational Health and Safety Regulations;
 8. Environment Canada Codes of Practice;
 9. National Energy Code of Canada for Buildings;
 10. Lab Standards, Space Standards and Design Guidelines, by Health Canada and Public Health Agency of Canada;
 11. PWGSC Federal Office Building Standards;
 12. Government of Canada Workplace 2.0 Fit-up Standards;
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13. Canadian Standards Association, Standards and Guidelines;
14. ANSI, ASHRAE, ASTM, AWMAC, FM, MPI, TSSA, ULC Standards;
15. Provincial Codes and Municipal Codes and By-Laws, as applicable.

Authorities having jurisdiction shall review the design in order to obtain and apply approvals and permits required for the project. In cases of overlap, the most stringent requirements will apply. Refer to PWGSC document "Doing Business with A&E Ontario Region" attached in Appendix D for a minimal list of applicable codes, regulations, standards and guidelines.

The following Codes, Regulations and Standards listed may apply to this project. The Commissioning Manager, in collaboration with the Consultant must be aware of these documents and their effect on the commissioning process, documentations and deliverables (the most stringent Codes, Regulations and Standards shall apply):

1. PWGSC Commissioning Manual (CP.1) and Guidelines (CP.3 to CP.13), latest edition
 2. CSA Z320-11 – Building Commissioning Standard and Check Sheets
 3. PWGSC MD 15000 – Mechanical Environmental Standards for Federal Office Buildings
 4. PWGSC MD 15116 – Computer Room Air-conditioning
 5. PWGSC MD 15128 – Laboratory Fume Hoods
 6. PWGSC MD 15161 – Design Guideline for Control of Legionella
 7. PWGSC MD 15200 – Re-Commissioning Manual for Buildings 2011
 8. PWGSC Fit-up Standard – Workplace 2.0 – April 2012
 9. Canadian Biosafety Standards and Guidelines, first edition
 10. CAN CSA-B651-12 – Accessible Design for the Built Environment
 11. CAN/ULC-S536-04 – Inspection and Testing of Fire Alarm Systems
 12. CAN/ULC-S537-04 – Verification of Fire Alarm Systems
 13. CSA C22.2 No.151-M1986 (R2004) Laboratory Equipment
 14. CSA Z316.5-04 (R2009) – Fume Hoods and Associated Exhaust Systems
 15. ASHRAE Guideline 0-2005 – The Commissioning Process
 16. ASHRAE Guideline 1.1-2007 – The HVAC Commissioning Process
 17. ASHRAE/IES Standard 202-2013 – Commissioning Process for Buildings and Systems
 18. NEBB Procedural Standards for Whole Building Systems Commissioning
 19. NEBB Procedural Standards for Fume Hood Performance Testing
 20. AABC National Standards for Total System Balance 2002
 21. AABC Test and Balance Procedures
 22. NFPA 13-2016, Standard for the Installation of Sprinkler Systems
 23. NFPA 20-2016, Standard for the Installation of Stationary Pumps for Fire Protection
 24. CAN/CSA C282-15, Emergency Electrical Power Supply for Building
 25. CAN/ULC-S524-14, Standard for the Installation of Fire Alarm Systems
 26. CAN/ULC-S537-13, Standard for the Verification of Fire Alarms
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R.077680.001**5.6 Risk Management**

A risk management strategy is crucial for PWGSC Project Management and integrates project planning into procurement planning. All the stakeholders of a project will be an integral part of the risk management strategy, culminating in an integrated product team. Specific services required for project delivery are outlined in Required Services.

5.7 Health and Safety

PWGSC recognizes the responsibility to ensure the health and safety of all persons on Crown construction projects and the entitlement of both federal employees and private sector workers to the full protection afforded them by occupational health and safety regulations.

In keeping with the responsibility and in order to enhance health and safety protection for all individuals on federal construction sites, PWGSC will voluntarily comply with the applicable provincial/territorial construction health and safety acts and regulations, in addition to the related Canada Occupational Health and Safety Regulations.

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PD 6 ISSUES

6.1 Major Cost Issues

Effective cost estimating and cost control is of prime importance and shall be provided by professional quantity surveyors. The CM shall advise the Consultant on the cost estimates, as described in RS 3 – Cost Services. The Class 'C' and Class 'B' cost estimates shall be submitted in elemental cost analysis format. The standard of acceptance for this format is the current issue of the elemental cost analysis format issued by the Canadian Institute of Quantity Surveyors.

The Class 'A' cost estimate shall be submitted in trade cost breakdown format. Cost estimates shall have a summary, plus full back-up showing items of work, quantities, unit prices, and amounts.

6.2 Major Phasing Issues

EC is concerned with phasing the work to minimize disruptions to employees and building services. Their urgent operational requirements may affect the work plan. The Consultant and CM will work together to devise a phasing plan which will cover the decommissioning the equipment, moving the equipment to a temporary storage area, relocating and reinstalling laboratory equipment in the renovated laboratories and maintaining functional operations of the organization throughout the duration of the construction. Coordination and scheduled phasing plans will be required.

The assistance of a Lab Move Coordinator will facilitate discussions during design development, and organize planning activities for EC to manage their operations and relocate staff during the implementation of the project. The challenge for relocating the staff is that swing space is limited. Options for swing space will need to be investigated.

6.3 Documentation of Existing Facility

The as-built documents, drawings and building conditions reports for the facility may be found to be inaccurate. As such, unforeseen site conditions could potentially increase the project cost and delay the project completion. The Consultant shall do an extensive study of the existing conditions to produce a set of measured drawings in order to help mitigate this issue.

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PD 7 PROJECT DELIVERY APPROACH**7.1 GENERAL**

1. The CM, in consultation with the Departmental Representative shall:
 - a. Perform the role of CM for the Project respecting the approved scope, quality, budget and schedule; and
 - b. Develop partnership and communication between all members of the project delivery team and stakeholders throughout all phases of the project life.
2. All Services and duties listed and allocated to the CM throughout the Required Services section are:
 - a. The full responsibility of the CM; and
 - b. Are not exhaustive and do not preclude alternative or supplementary approaches as may be suggested by the CM for consideration by the Departmental Representative and vice versa.

7.2 SUMMARY OF PERSONNEL AND QUALIFICATIONS

1. The CM shall provide a Construction Management team with the following specialists / subject matter experts:
 - a. Risk Management Specialist;
 - b. Schedule Management Specialist;
 - c. Budgeting Specialist;
 - d. Waste Management Specialist;
 - e. Quantity Surveying Specialist;
 - f. Commissioning Process Manager;
 - g. Construction Project Manager;
 - h. Construction Site Superintendent;
 - i. Construction Quality Management Specialist.

The CM shall report directly to the PWGSC Departmental Representative.

7.3 PROJECT DELIVERY OBJECTIVES AND REQUISITE

1. Under this project delivery approach, responsibility of the CM shall include Advisory and Support services (CMa) and General Contractor (GC/CMc) required services.
 - a. The primary reason for this approach is that a Construction Manager (CM) will provide PWGSC with valuable construction advice and the flexibility to implement and coordinate multiple projects and sub-projects and phases and expedite the schedule of completion of the work.

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- b. Having one construction manager to oversee all sub-projects on this project provides advantages of coordination, quality assurance, efficiency and scale.
- 2. The Construction Manager shall:
 - a. Provide Construction Management services, Advisory (CMa) and General Contractor (CMc) Required Services, throughout the project life cycle.
 - i. All Services and duties listed and allocated to the CM throughout the Required Services sections are not exhaustive and do not preclude alternative or supplementary approaches as may be suggested by the CM for consideration by the Departmental Representative and vice versa.
 - ii. Deliver project according to the Project Milestones, within approved scope, quality, budget and construction cost estimate and schedule. The project milestones are as follows:
 - 1. Phase 1: Advisory Services
 - a. Analysis of Project Scope of Work
 - b. Design Concept
 - c. Design Development
 - d. Construction Documents
 - i. Work Package Submissions at 50%, 75%, 99% and 100%
 - 2. Phase 2: Tender and Construction Services
 - a. Tender Call, Bid Evaluation & Construction Contract Award
 - i. Tender of each Work Package
 - b. Construction and Contract Administration
 - i. Construction of each Work Package
 - c. Closeout
 - b. A continuous risk management program to address the risks associated with designing and renovating facilities in an occupied facility,
 - c. A quality management plan that includes quality reviews on a construction management project delivery approach, and
 - d. Contingency plans to mitigate potential delays arising from logistic and weather related challenges.

7.4 PHASE 1: ADVISORY SERVICES

- 1. For the design phase of this Project, an Architectural and Engineering firm (referred to herein as the Consultant) is being engaged to complete the design and will direct and co-ordinate all phases of the design work for this Project.
 - 2. During design phase,
 - a. Architectural and Engineering services including all cross discipline coordination work has been provided by the Consultant Team.
-

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- b. The CM shall provide advisory and support services to the design team and provide quality reviews on the constructability of proposed designs and tender ready packages. Written comments shall be submitted before any construction work begins.
3. The Consultant Team will work closely with the CM to develop the design and ensure that all information is made available to the CM. The CM shall provide advice on CM activities:
 - a. Construction costs;
 - b. Material delivery & construction schedules;
 - c. Constructability;
 - d. Suitability and availability of materials and components;
 - e. Sustainable design, construction, and operation principles and practices;
 - f. Risk Management Report.

7.5 PHASE 2: TENDER AND CONSTRUCTION SERVICES

1. The CM shall provide services as the General Contractor during the construction phase of the project.
 - a. The CM shall provide the Crown with flexibility to implement and coordinate multiple tender packages, and phases and shall expedite the schedule of completion of the Work.
 - b. The CM shall oversee all construction tender packages on the building site and provide coordination, quality assurance and efficiency.
 - c. The CM, in consultation with the Consultant Team and Departmental Representative, will help determine the number of tender packages required for the project. This is to enable the Consultant Team to prepare the tender packages in a timely manner and ensure full co-ordination of the work of all disciplines.

7.6 Tentative Work / Tender Packages

1. The project will be delivered using multiple work and tender packages. The work packages will be determined in consultation with the Consultant during the design phase, and reviewed with the Departmental Representative prior to tender.
-

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2.

DESCRIPTION OF SERVICES

PA1 PROJECT ADMINISTRATION

INTENT

The following administrative requirements apply during all phases of project delivery.

1.1 Departmental Representative

The PWGSC Project Manager assigned to the project is the Departmental Representative (DR).

The Departmental Representative is responsible for managing the CM's Contract. The CM reports to the Departmental Representative.

The Departmental Representative is directly concerned with the project and responsible for its progress. The Departmental Representative is the liaison between the CM, the Consultant, and the Client Department.

1.2 Client Department

Environment Canada (EC) is the Client Department for this project, and will provide design approvals and quality reviews and acceptance. EC will work closely with the Departmental Representative to define the project requirements, facilitate access to the site and support the Project Team.

1.3 Shared Services Canada (SSC)

Shared Services Canada (SSC) is the government department responsible for all IT cabling. SSC designs, supplies, and installs all IT cabling on this project. The consultant shall incorporate general cabling supporting infrastructure and telecom room requirements in the design only. Physical cables and associated equipment are to be supplied by others (SSC). General Cabling Supporting Infrastructure and telecom room requirements will be made available to the successful proponent. SSC will supply an IT cabling location plan, based on the floor and furniture plans developed by the Consultant, for design of the cabling infrastructure.

1.4 Correspondence

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All correspondence related to this project and communication protocol shall be distributed as directed and approved by the Departmental Representative. All communications must carry the Contract name/number, PWGSC project title and project number. The date format will be yy-mm-dd. All email correspondence must have subject lines with the PWGSC project number and wording of subject line must be clear.

1.5 Lines of Communication

Unless otherwise arranged with Departmental Representative, the CM shall communicate directly with the Departmental Representative. The CM will also work in collaboration with the Consultant Team and participate in design meetings to provide constructability advice and recommendations for the construction phasing and tender package sequencing. There shall be no direct official contact between the Client Department and the CM.

1.6 Media

The CM shall not respond to requests for project related information or questions from the media. Such inquiries are to be directed to the Departmental Representative.

1.7 Codes and Standards

The Consultant shall comply with the latest addition of all statutes, codes, regulations, and by-laws applicable to the design and where necessary, shall review the design with that Public Authorities Having Jurisdiction in order that the consents, approvals, licenses and permits required for the project may be applied for and obtained. Unless otherwise advised federal codes and standards will govern.

The Consultant shall identify all jurisdictions appropriate to the project.

1.8 Health and Safety

The Consultant shall abide by the current Occupational Health and Safety Act and Regulations and Environmental Acts and Regulations.

1.9 Sustainable Development

The Consultant shall be conscious of PWGSC's diverse green building commitments (as outlined in PD 3, Section 3.5 – Federal Objectives), and incorporate them into the project.

1.10 Security Screening Requirements

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Contractor and all sub-contractors staff shall have a personal security screening in progress prior to commencement of any work. Prior to the commencement of work the successful bidder must complete a "Request for Private Sector Organizational Screening" which when completed will be sent to CISD by ECCC Security.

1.11 Project Meetings

The CM shall arrange bi-weekly meetings for the Project Team during project implementation at the project site or in the offices of PWGSC or the Consultant, including representatives from EC, PWGSC, the Consultants, CxM, and Environmental Consultant when required.

Design Meetings

The Departmental Representative or the Consultant shall chair these meetings and distribute the meeting minutes within 48 hours of the meeting. The CM's Project Manager shall attend these meetings.

Construction Meetings

The CM shall hold construction meetings with Subcontractors, PWGSC, and the Consultant to discuss and coordinate the work and its progress. Prepare and distribute meeting minutes within 48 hours of the meeting, with copies to the Project Team.

Commissioning Meetings

Once commissioning commences, the CM shall attend separate commissioning meetings with Subcontractors, PWGSC, the Consultant and the Commissioning Manager to discuss and coordinate the commissioning of work and its progress. Prepare and distribute meeting minutes within 48 hours of the meeting, with copies to the Project Team.

1.12 Project Response Time

It is a requirement of this project that the CM and the CM's key personnel and Subcontractors be personally available to attend meetings or respond to inquiries within two (2) days.

1.13 General Project Deliverables

- Where deliverables and submissions are required for this project, they shall be submitted in accordance with this Project Brief.
 - For the submission standards and requirements, refer to PWGSC document "Doing Business with A&E Ontario Region" attached as Appendix D.
 - Provide a website for the project team to openly share project information.
-

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- Unless otherwise indicated in the Project Brief, provide the number of copies and format as described in the table below:

| Submission | No of Hard Copies | No of Digital Copies* | Format |
|-----------------------------|--------------------------|------------------------------|-------------------------|
| Written Reports | 4 | 2 | Microsoft Word (*.doc) |
| Spreadsheets and Cash Flows | 4 | 2 | Microsoft Excel (*.xls) |
| Schedules | 4 | 2 | Microsoft Project |
| Shop Drawings | 4 | 2 | Auto Cad (*.dwg) or PDF |

*Note: Submit file in PDF format on copy via e-mail and another copy on a CD with the other required files.

1.14 Acceptance of CM Deliverables

- While PWGSC acknowledges the CM's obligations to meet project requirements, the project delivery process entitles PWGSC to review the work. PWGSC reserves the right to reject undesirable or unsatisfactory work.
 - Acceptances indicate that based on a general review of material for specific issues, the material is considered to comply with governmental and departmental objectives and practices, and that overall project objectives are being satisfied.
 - The acceptance does not relieve the CM of responsibility for the work and compliance with the contract.
 - PWGSC acceptances do not prohibit rejection of work, which is determined to be unsatisfactory at later stages of review.
 - Acceptances by the Client / Users Department and other agencies and levels of government must be obtained to supplement PWGSC acceptances.
-

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REQUIRED SERVICES

GR 1 GENERAL REQUIREMENTS

1.1 General

All Required Services will be included and covered by the fees identified in the Price Proposal Form.

The Construction Manager shall:

1. Provide CMa Services throughout the project life cycle and respective milestones.
 - a. See Section PD 7.3.2 (b) for project milestones.
2. Counsel PWGSC and the Consultant Team by providing Advisory and Support services throughout the Design and Construction/Implementation Phases of the project to achieve a Quality process and outcome to meet or exceeds the Project requirements and expectations.
3. Assist in the development of the overall project concept.
4. In consultation the Departmental Representative develop and maintain a partnership, lines of communication and reporting between all members of the project delivery team and stakeholders throughout the project life cycle.

1.2 Summary of Services

The following is a summary of the project delivery for the Construction Manager contract, including:

1. Subsequent simplified diagrams depict a conventional combined CMa and CMc Services condition with respective Level of Effort and Roles.
2. Level of effort associated with the CMa and CMc Required Services vary with the project delivery life cycle; simplified in diagram below.



Figure1 Level of Effort

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3. Roles of CMa and CMc switch and remain interrelated dependant on the overall project delivery life cycle and construction tender packages; simplified in diagram below.
4. Role switch-over typically occur when the CM implements Work by Own Force and upon initiating or participating in a tender with subsequent contract award by either CM or PWGSC.

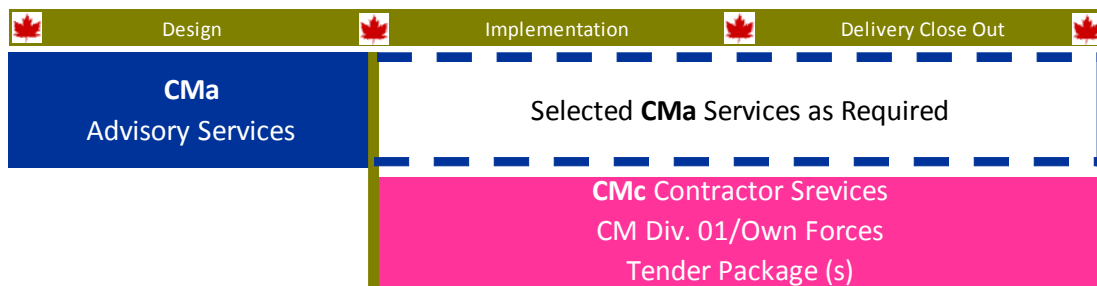


Figure 2 CMa and CMc Roles

5. CMa and CMc roles remain interrelated during construction- Implantation and Delivery Close-Out phases, to address select CMa services such as;
 - a. Preparation of tender package documentation;
 - b. Recommended listing of Sub-Contractors;
 - c. On-going Management and Reporting related to;
 - i. Cost estimating and budgeting;
 - ii. Master and detail schedules updates.
 - iii. Quality management;
 - d. Risk and mitigation input; and
 - e. Commissioning Process – planning, coordination with Commissioning Manager, and implementation.
5. Services required for this project, provided as required in CMa (Advisory Support Services) or CMc (General Contractor Services), are as follows:

| | |
|-------|-----------------------------------------------|
| RS 1 | Advisory Support Services |
| RS 2 | Schedule Management Services |
| RS 3 | Cost Management Services |
| RS 4 | Risk Management Services |
| RS 5 | Scope Control Services |
| RS 6 | Quality Control Services |
| RS 7 | Health and Safety Planning and Implementation |
| RS 8 | Reporting and Project Site Documents |
| RS 9 | Tendering the Work |
| RS 10 | Commissioning |
| RS 11 | Construction Monitoring |
| RS 12 | Changes (Notices and Orders) |

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RS 13 Construction General Instructions

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RS 1 ADVISORY SUPPORT SERVICES

The CM, as expert in matters of construction, counsels PWGSC and the Consultant Team by providing advisory and support services throughout the design and construction phases of the project.

1.1 SCOPE AND ACTIVITIES

The CM shall:

1. Analyze and become familiar with all the Project background documents and reports;
 2. Review site conditions, with respect to technical and implementation issues affecting this project;
 3. Review the program for all potential tender packages included in the project;
 4. Prepare a construction schedule;
 5. Develop a list of recommended construction trades and tender packages;
 6. Prepare estimates for each tender package;
 7. Prepare a detailed construction budget;
 8. Participate in all integrated design sessions and provide advice on;
 - a. Constructability of the design and details contained in the contract documents,
 - b. Scheduling of the Work, and
 - c. Costing, pricing and bid suitability.
 9. Assist in providing liaison and coordination with Government Authorities for various reviews and approvals;
 10. Develop and maintain the Project Procedures Manual (PPM) and all documents triggered by the PPM;
 11. Advise on construction related matters for the Departmental Representative, the User Department, the Consultant Team and members of the CM's Project Delivery Team;
 12. Effective control measures and management of;
 - a. Project costs and expenditures,
 - b. Project schedule and progress,
 - c. Scope & quality of the Work,
 - d. Change management and change order control, and
 - e. Risk management and claims avoidance.
 13. Mitigate potential conflict and overlap, with respect to;
 - a. The design services performed by the Consultant Team, and
 - b. The work to be performed by the various Sub-Trades.
 14. Provide quality control methodologies with respect to;
 - a. Availability and cost comparisons of construction materials,
 - b. Methods of construction and constructability,
-

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- c. Scope and quality of construction materials and systems,
 - d. Alternative approaches to completing the Work,
 - e. Risk Management,
 - f. Life Cycle Cost analysis,
 - g. Sustainability, and
 - h. Value Engineering.
- 15. Develop procurement strategies and construction implementation phasing;
 - 16. Determine appropriate construction tender packages;
 - 17. Determine the potential impact to the Project of applicable labour conditions and availability of materials;
 - 18. Prepare a Commission Plan and Schedules for commissioning of all operating building components, systems and integrated systems at the appropriate phases of construction, so as to ensure coordinated, effective and efficient building operation (in conformance with the Commissioning Process);
 - 19. Obtain and administer project guarantees Warrantees and manufacturer's guarantees; and
 - 20. Provide advice on methods of construction as may be required from time to time by the Consultant Team.

The above listing of Services is neither complete nor exhaustive and the full scope of Advisory Services required shall include the entire content of the TOR, in concert with the terms and General Conditions of the Contract.

1.2 DOCUMENT DELIVERABLES**1. Project Procedures Manual**

- a. The CM shall develop a Project Procedures Manual in consultation with the Departmental Representative for the execution of Project activities.
 - b. The Manual will provide a description of procedures, roles, responsibilities, levels of authority and the documentation for the execution of the Project, including details of the processes and sample outlines.
 - c. The Manual will include the process and methods to:
 - i. Maintain Project records;
 - ii. Implement a quality assurance program;
 - iii. Prepare, update, monitor and maintain the Master Schedule;
 - iv. Update, monitor and maintain the Cost Plan, Progress Payments, Change Orders and Cash Flow;
 - v. Manage communications as directed by the Departmental Representative between Project Delivery Team participants based upon the documented roles, responsibilities and authority of Team members, and maintain a listing of meetings, frequency, type, etc.;
-

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- vi. Manage correspondence, reports and performance records;
 - vii. Distribute correspondence electronically;
 - viii. Process Shop Drawings;
 - ix. Document the process for reviews and approvals of Tender Package Contracts and change orders; and
 - x. Maintain a decision log during the construction of the project, recording participants, date and place of all decisions affecting schedule, budget, scope, or quality.
2. Project Monitoring and Reporting
- a. Provide a system for documentation and project monitoring and reporting through each stage of project delivery, for review and acceptance by the Departmental Representative.
 - b. Prepare and submit, at the start of the project, a sample of the report outline for all reports for review by the Departmental Representative. Sample report outline is contained in Part 6 of the GP&S document.
 - i. Resubmit as may be required.
 - ii. The date of issue of the CM Monthly Report shall be established.
 - iii. The structure of the CM Monthly Report shall be used for all subsequent project stages.
 - c. Prepare and submit quarterly reports to address:
 - i. Milestone reporting on Estimating and Cost Planning;
 - ii. Updated Project Procedures Manual; and
 - d. Prepare and submit monthly progress reports during the Design Development and Construction Document Stages, in an outline approved by the Departmental Representative.
 - e. The purpose of the report shall be to review and monitor the progress of the Services by the CM. The report shall:
 - i. Identify the progress of Advisory Support and Construction Support Services;
 - ii. Identify Progress Claims and Payments to date (including change orders) in a form that compares the original budgets for each Tender Package with the expected costs;
 - iii. Identify all instances where the schedule is not being met and identify impact on scheduled completion date;
 - 1. Outline remedial measures being taken or planned to be undertaken to ensure the scheduled completion date; and
 - iv. Identify any anticipated or potential problems to be addressed.
 - f. Prepare and submit monthly reports during construction to address status and variances with respect to schedule, budget, quality, and scope:
 - i. The actual report outline shall be acceptable to the Departmental Representative, and shall provide the following;
-

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1. An executive summary of key points,
 2. General progress of the Work and modifications to reflect changes in project parameters as may be identified throughout the project life,
 3. Construction Cost Plan Report including an overview of cost issues as outlined in this TOR,
 4. Master Schedule Update and narrative report including an overview of schedule issues as outlined in this TOR,
 - a. Monitor changes to the Master Schedule at least once a month and submit written reports to the Departmental Representative on any deviations or delays from the master schedule, and identify possible remediation measures required to maintain the Master Schedule Completion date.
 - b. Monthly reports must identify not only reasons for delay but also offer suggestions, where possible, on how to bring the project back on track.
 5. Identification of risks and proposed strategies for mitigation, including scope creep as well as quality control outlined in this TOR,
 6. Waste Management Report as including an overview of Waste Management Strategies for construction,
 7. Health and Safety status Report, including narrative on the application or adjustment to the CM's Health and Safety Plans as well as any incidents and resulting actions, and
 8. Commissioning Plan progress report.
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RS 2 SCHEDULE MANAGEMENT SERVICES

Planning and scheduling is a continuous interactive process involving planning, action, measurement, evaluations and revision.

Employ an experienced scheduler who is fully conversant with all aspects of project planning, scheduling and construction sequencing. The scheduler will play a major role in the development and monitoring of the project schedule, providing scheduling services from commencement of the award of the Contract, through construction, commissioning, including the warranty period.

Prepare, monitor, update and maintain the overall schedule for the duration of the Project. Following consultation with the Project team, incorporate the sequence and timing of the required basic program decisions, including design time, documentation, bid calls, bid evaluations, subcontract awards and on-site construction activities and commissioning into the schedule.

2.1 SCOPE AND ACTIVITIES

The CM shall also:

1. Revise, monitor and update the preliminary schedule as the project proceeds;
 2. Finalize the overall schedule for the approval of the Departmental Representative and estimate the manpower requirements for the Work. Break down the schedule into individual networks and tasks for each package of Work. Indicate the sequence and timing for the construction operations and the milestone completion dates for the Work packages;
 3. During the design stage of the services, identify items or processes where long lead times are required and that could jeopardize the schedule. Pre-purchase items and implement procurement methodologies to ensure timely delivery to meet the schedule and cash flow requirements. Assess the risk to the project schedule for late deliveries;
 4. Identify and implement methodologies aimed at mitigating and minimizing the impact of construction activities on EC's operations.
 5. Provide advice and recommendations on;
 - a. A procurement strategy for any equipment or materials, which should be pre-ordered to meet the Master Schedule, and
 - b. Means to minimize disruption to PCA during construction.
 6. If changes to the Schedule become necessary, indicate the impact and the reasons for such changes and submit proposed amendments to the Departmental Representative for review and acceptance.
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1. Prepare and submit to the Departmental Representative for review and acceptance, a draft Master Schedule (within 14 calendar days of contract award) and maintain the Plan throughout the life of the Project.
 - a. Prepare the Schedule using Microsoft Project to develop detailed network diagrams, with work breakdown structures and Key milestones listings.
 - b. Develop Critical Paths for all key activities, with key milestone dates and lead times for each activity.
 - c. Identify anticipated start and completion dates for all design and construction activities, linked by interdependence on activities that must be completed prior to the start of a subsequent activity.
 - d. Prepare separate schedules for each tender package and incorporated into the Master Schedule.
 2. Ensure that the schedule has the capability of tracking changes
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RS 3 COST MANAGEMENT SERVICES

PWGSC manages all funding for the Project, including budgeting, expenditures and Progress Payment approvals.

Provide costing and cost control services for all aspects of the Work, from commencement of contract award through to the completion of the project, including:

- a) At completion of design development and tender documents (50%, 75%, 99%, 100%);
- b) Prior to and after award of each tender package;
- c) Monthly during the delivery of the project;
- d) During the warranty period;
- e) When there is project scope change affecting the construction estimates by more than 5%.

Work with the Consultant and the Departmental Representative to come up with the best overall solution to meet the program requirements, estimated construction cost and the schedule. The CM is to establish a cost control program and prepare a projected cash flow for the project, based upon reconciled estimates.

Within the limits of the estimated construction cost, establish estimates for Work packages, as well as make and document assumptions for Work not yet defined. Submit to the Departmental Representative for review. Update and refine the estimates for the approval of the Departmental Representative as the development of the drawings and specifications proceeds.

The intent is to ensure that, at all times during the project, a comprehensive construction estimate is in place, which includes all aspects of the project, even those which are not fully developed and/or which have not yet been assigned to any specific Work package.

The CM's estimator is expected to review all information provided and to visit the site as required throughout the course of project to become familiar with the site conditions, site access and on-site progress.

Incorporate into cost estimating process and cost estimates a broad range of cost techniques, especially the following:

Risk Analysis:

All construction estimates (except the final pretender estimate) shall include and identify design, estimating, inflation escalation and currency exchange allowances as are deemed necessary in light of the current information available.

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Life Cycle Costing:

In advising the Consultant of the cost information for alternative materials, methods and systems, use all available information to ensure that the project estimated construction cost (upon which design and construction decisions will be made) is respected.

Cash Flow:

Provide and maintain a cash flow for the Work, based upon the project schedule and the current estimate at each stage. The cash flow is be updated at each stage of the project. At all times, provide the Departmental Representative and the Consultant all costing estimates, information and assumptions related to the Work.

Prepare Class 'A' cost estimates for each Work package in advance of the tender of that package. Submit a monthly report outlining activities during the previous month, highlighting any areas of concern and new information received, along with forecast and proposed construction estimate revisions. Include, as separate cost categories, the CM's Fixed Fee, Time Based Fee and Percentage Fee.

A typical Master Cost Plan report from the CM will contain:

1. Elemental or other format estimate summary;
2. Estimate back-up detail:
 - Basis for escalation, inflation and contingency calculations;
 - Detailed measurement and pricing.
3. Narrative:
 - Outline description of estimate basis;
 - Description of information obtained and used in the estimate;
 - Listing of notable inclusions;
 - Listing of notable exclusions;
 - Listing of items carrying significant risk.
4. Reconciliation against last submission;
5. Any other relevant information.

Provide a sample of the report to the Departmental Representative for acceptance. Revise as required incorporating comments of the Departmental Representative.

Each monthly report shall be based on the previous report and will provide the Departmental Representative with up to date information on all aspects of the construction estimate and the CM's fees. Indicate all costs committed and expended to date. Identify for each Work package, the original estimate amount, the contract amount, the breakdown and total of approved change

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orders, estimated amounts on contemplated change orders, the revised contract amount, the total cost anticipated and the cost to complete the project.

Inform the Departmental Representative and Consultant in writing immediately of any issue. Recommend actions to ensure the project remains within the estimated construction cost.

Provide timely identification and early warning of all changes that affect or potentially affect the construction budget, by identifying issues immediately to Departmental Representative and through the submission of Exception Report as part of the Master Cost Plan. Suggest appropriate mitigating measures including proposed alternative design solutions to bring the project back on budget.

No acceptance or approval by the Departmental Representative, whether expressed or implied shall be deemed to relieve the CM of its professional or technical responsibility for the CM's estimates and monthly reports. Neither does acceptance of an estimate by the Departmental Representative in any way abrogate the CM's responsibility to maintain the estimated construction cost throughout the life of the project and to undertake corrective action should the lowest acceptable bid, for any Work package, differ significantly from the approved estimate.

3.1 SCOPE AND ACTIVITIES

The CM shall:

1. Provide advice and recommendations on;
 - a. Costs related to construction feasibility, availability of materials and labour, time requirements for installation and construction,
 - b. Budget costs of systems, assemblies, equipment, materials and specialty labour,
 - c. Current pricing levels and trends in associated activities relating to the project,
 - d. The selection, availability and pricing of goods and services,
 - e. Insurance and bonding requirements.
 2. Provide suggestions and/or alternatives for cost reductions or acceleration of the Construction Schedule if requested by the PWGSC Departmental Representative.
 - a. Evaluate costs for alternative materials, construction techniques and installation methods.
 3. Revise and refine the initially approved Master Cost Plan as the project progresses, incorporate approved changes as they occur and develop cash flow reports and forecasts as required by the Departmental Representative.
 4. Advise of deviations from the Master Cost Plan and obtain written authorization from the Departmental Representative. Seek and report on authorization as per the Departmental Representatives change process.
 5. Monitor Project costs and expenditures against the approved Construction Cost Limit and identify variances between actual and budgeted or estimated costs.
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- a. Notify the Departmental Representative in the event that the CM considers that the Construction Cost Estimate will exceed the Construction Cost Limit.
 - b. Provide recommendations for remedial action to maintain and keep the estimates within the Construction Cost Limit.
6. Track costs so that PWGSC can manage the budget.

3.2 DELIVERABLES

1. Prepare and submit to the Departmental Representative for review and acceptance, a Master Cost Plan within 14 calendar days of award of contract and maintain the Plan throughout the life of the Project.
 - a. Include all CM projected costs, Construction Cost Estimates and Construction Cost Limits.
 - b. Develop budgets for the work of each work package.
 - i. Prepare tender package budgets as soon as major project requirements have been identified.
 - ii. Update at the milestone review stages for PWGSC acceptance.
 - c. Address all costs in Federal Fiscal Year (FY) format (April 01 to March 31 of the following year).
 - d. Prepare estimated costs, (including summary plus full back-up showing items of work, quantities, unit prices and amounts) at:
 - i. The Schematic Design Stage (Class C);
 - ii. The Design Development Stage (Class B); and
 - iii. The time of tendering each tender package (Class A).
 2. Prepare and submit, as part of the Master Cost Plan, an Exception Report which will include sufficient description and cost detail to clearly identify:
 - a. Scope Change: Identifying the nature, reason and total cost impact of all identified and potential Project scope changes affecting the estimated construction cost.
 - b. Cost overruns and under runs: Identifying the nature, reason and total cost impact of all identified and potential cost variations.
 - c. Options enabling a return to the estimated construction cost: Identifying the nature and potential cost effects of all identified options proposed to return the project within estimated construction cost.
 3. Update at monthly intervals as agreed with the Departmental Representative.
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RS 4 RISK MANAGEMENT SERVICES

PWGSC's Departmental Representative prepares the Risk Management Plan for the Project. Provide support to the Departmental Representative in identifying risks throughout the project life cycle, and providing input and assessment on the project risk plan. Provide the Departmental Representative written comments on the project risk plan at each stage of the project.

4.1 SCOPE AND SERVICES

The CM shall:

1. Review, comment and advise the Departmental Representative on the risk management plan;
2. Advise on project risks specific to the project and recommend mitigation options to the Departmental Representative.
3. Advise on issues of risk that integrate project planning with procurement planning and construction;
4. Identify and implement methodologies aimed at mitigating and minimizing the impact of construction activities on occupants and user department operations during construction; and
5. Implement a claims avoidance program.
6. Monitor risk as outlined in the risk management plan.

4.2 DELIVERABLES

1. Submit a monthly report on Project Risks to the Departmental Representative.

RS 5 SCOPE CONTROL SERVICES

Immediately advise the Departmental Representative of any potential increase or decrease in scope **before** it affects project cost, schedule, or quality.

RS 6 QUALITY CONTROL SERVICES

The responsibility for construction quality control remains with the CM. As part of the CM Advisory and the CM Project Procedures Manual the development and implementation Quality Control Plan (QCP) and application of associated Interrelated Processes such as; Quality Planning (QP), Quality Assurance (QA), and Quality Control (QC), remains with the CM.

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The CM's Team shall work to:

1. Adopt project delivery processes such as Risk Management and advising on methods to obtain best value;
2. Ensure that Health, Safety, Security and Sustainable Development requirements are adhered to;
3. Report all site health and safety incidents to Departmental Representative.

Develop a quality management system to ensure that the specified quality standards for the project are achieved.

The Work must meet the design and operational intent and criteria. The CM's continuous adherence, daily, to quality management of the entire construction process throughout all aspects of construction is essential. The significance of this issue cannot be understated. Actively document non-compliance, monitor and follow-up on the Work of all Subcontractors to ensure the construction is realized, as designed. The CM is not to solely rely upon the Consultant to document non-compliance with the design, but rather take a leading role in managing the Subcontractors and their Work, establishing a quality management database to ensure all construction issues, observations and reports are recorded and closed out, completely and correctly, to the approval of the Departmental Representative.

Establish, monitor, update and report on a quality management database specific to this project. Inputs to the database will come from the Departmental Representative, the Consultant team, and CM's team daily site observations. Output from the database will go to Subcontractors, suppliers, as required, the Consultant and the Departmental Representative. All quality issues are to be addressed promptly, to ensure the pace of construction is maintained without the need for rework of the Work.

Provide field engineering quality control services responsible for:

- a) Day-to-day execution of the quality control plan - architectural, mechanical, electrical and structural components and systems;
 - b) Working with Subcontractors to explain the nature of the quality control plan and their role in it and ensuring quality workmanship on site;
 - c) Maintaining quality records on site including:
 - i. Inspections and tests reports;
 - ii. Non-conformance reports;
 - iii. Corrective actions reports and sign-offs.
 - iv. Facilitating quality inspections by the Departmental Representative and Consultant.
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d) Reporting to the CM's project manager on the quality process for the project.

6.1 SCOPE AND SERVICES

1. The CM shall apply quality assurance reviews during the design and construction phases, including participation in reviews of the systems, components, construction tools and techniques of the proposed design.
2. The CM shall be responsible for ensuring that the CM's Subcontractors adhere to:
 - a. Industry standard practices following the requirements of the Construction Documents; and
 - b. Professional conduct in all phases of the project, employing best practices for budget, schedule, quality, and scope management.
3. The CM shall participate in Integrated Design Process (IDP) Workshops.
 - a. The Consultant Team shall facilitate IDP Workshops through the design stage. The CM's Construction Project Manager shall attend IDP workshops for the purpose of providing advice to the Consultant Team on Constructability of various options that the Consultant Team is considering including:
 - i. Selection of materials, building systems and equipment;
 - ii. Constructability; and
 - iii. Coordination between all design disciplines.
4. Review construction drawings and specifications for each tender package at various stages acceptable to the Departmental representative.
 - a. At Schematic Design, Design Development milestones; and
 - b. At 50%, 75% and 99% stages of construction Documentation associated with each Tender Package
 - i. Some tender packages may require fewer reviews, due to the nature of the work involved.
 - c. Of each Tender Package specific Division 00 and 01.
5. Track quality management actions and results and compile a monthly report

6.2 DELIVERABLES

1. Submit to the Departmental representative within fourteen (14) calendar days of award of contract a Quality Control Plan (QCP) including, but not limited to:
 - a. Identification and definition of key activities and deliverables;
 - b. Description of internal controls;
 - c. Quality Control methodologies and procedures to be utilized to deliver a quality project that meets the established Standards; and
 - d. Deliverable verification plan.
 2. Quarterly Quality Control Plan (QCP) update and Report,
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- a. Including QM planned/actual actions and results.
3. QA reviews
4. Submit a written summary of the design and construction document reviews to the Departmental Representative.

RS 7 HEALTH AND SAFETY PLANNING AND IMPLEMENTATION**7.1 SCOPE AND SERVICES**

The CM shall be responsible and assume the role of "Constructor" as described in the Occupational Health & Safety Act (Revised Statutes of Ontario, 1990 Chapter O.1, as amended) and the Regulations for Construction projects (213/91 as amended; current edition) for all aspects of the project.

1. Further, the CM shall comply with and enforce the requirements of:
 - a. The National Building Code of Canada (NBC Most Current Edition), Part 8 Safety Measures at Construction and Demolition Sites and Provincial Regulations for Construction Projects;
 - b. The Workplace Hazardous Materials Information System (WHMIS) regarding use, handling, storage and disposal of hazardous materials; and labelling and the provision of Material Safety Data Sheets (MSDS).

The Departmental Representative will review CM's Site-specific Health and Safety Plan and provide comments to the CM within five (5) days after receipt of the plan. The CM shall revise the plan as appropriate and resubmit to the Departmental Representative within three (3) days after receipt of comments from the Departmental Representative.

The Departmental Representative's review of the CM's final Health and Safety plan should not be construed as approval and does not reduce the CM's overall responsibility for construction Health and Safety.

When construction operations are underway, provide the following on site personnel:

1. One (1) qualified Site Superintendent; and
 2. One (1) Health and Safety Officer, who will be at the site daily to document site conditions, job hazards and provide direction to construction workers or operational personnel on health and safety matters.
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7.2 DELIVERABLES

The CM shall:

1. Provide site-specific safety orientation sessions to all workers and visitors, over the duration of the project.
 2. Ensure the Health and Safety protection afforded under the Canada Labour Code to all visitors to the site, including workers, staff, Subcontractors and the general public.
 3. Provide appropriate safeguards to ensure safe protection and security of materials and holdings on the site.
 4. Give precedence to safety and health of public and site personnel and protection of environment over cost and schedule considerations for Work.
 5. Develop and implement a site-specific safety plan for all aspects of this project. The site-specific safety plan shall be based on a preliminary and ongoing hazard assessment of the project to be performed. Update the site-specific safety plan as site conditions or hazards change. Inform all persons on the site daily, in the change of conditions or hazards. Resubmit the updated plan to the Departmental Representative immediately.
 6. Develop an on-site Contingency and Emergency Response Plan, which must address standard operating procedures to be implemented during emergency situations.
 7. Be responsible for health and safety of persons on site, safety of property on site and for protection of persons adjacent to site and environment to extent that they may be affected by conduct of Work.
 8. Comply with and enforce compliance by employees with safety requirements of Contract Documents, applicable federal, provincial, local statutes, regulations, and ordinances, and with Site-specific Health and Safety Plan.
 9. Should any unforeseen or peculiar safety-related factor, hazard, or condition become evident during performance of the project, follow procedures in place for Employee's Right to Refuse Work in accordance with Acts and Regulations of Province having jurisdiction. Advise Departmental Representative verbally and in writing.
 10. Ensure applicable items, articles, notices and orders are posted in conspicuous location on Site in accordance with Acts and Regulations of Province having jurisdiction, and in consultation with Departmental Representative.
 11. Immediately address health and safety non-compliance issues identified by authority having jurisdiction or by Departmental Representative. Provide Departmental Representative with written report of action taken to correct non-compliance of health and safety issues identified. Departmental Representative may stop Work if non-compliance of health and safety regulations is not corrected.
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12. Use powder actuated devices only after receipt of written permission from Departmental representative. Blasting or other use of explosives is not permitted without prior receipt of written instruction by Departmental Representative.

RS 8 REPORTING AND PROJECT SITE DOCUMENTS**8.1 SCOPE AND ACTIVITIES**

The CM shall prepare and submit, at the start of the project, a sample of the Construction Management Monthly Report structure for review by the Departmental Representative. Resubmit, as required for approval and acceptance.

8.2 DELIVERABLES

1. Submit Construction Management Monthly Reports are to be completed and submitted on last working day of each month, along with the Request for Progress Payment, and shall include:
 2. Project Schedule update;
 3. Construction Budget report, including detailed change order log, invoicing and payments;
 4. Risk Management update;
 5. Quality management report, including listing of new and outstanding issues;
 6. Health and safety status report, including narrative on the application or adjustment to the site-specific Health and Safety Plan and risk and hazard assessments;
 7. A copy of the Site Superintendent's daily logbook and daily photographs, certified as true copies, as a separate report or volume, recording the following:
 - a. Weather conditions, particularly unusual weather relative to Work in progress,
 - b. Materials and equipment deliveries;
 - c. Daily activities and major Work done through all shifts of Work;
 - d. Start, stop or completion of activities through all shifts of Work;
 - e. Presence of inspection and testing firms, tests taken and results;
 - f. Unusual Site conditions experienced;
 - g. Significant developments, remarks, emails or other correspondence;
 - h. Reports, instructions from appropriate authorities' response actions,
 - i. Strength on-site by each Subcontractor and the CM;
 - j. Safety inspections and reports;
 - k. If work is based on unit prices, measure and record the quantities for verification of monthly progress claims and the Final Certificate of Measurement.

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8. The CM shall maintain a decision log during the implementation of the project, recording all decisions affecting the scope, schedule, cost and quality. These records are to be made available to the Departmental Representative at all times.
9. The CM shall maintain project site documents at the project site, on a daily basis, records of all necessary contracts, samples, purchases, materials, equipment, maintenance and operating manuals and instructions, and other Work related documents, including revisions.

RS 9 TENDERING THE WORK

It is understood that the CM will deliver the construction services called for in this Project Brief through Subcontractors. As an independent entity, the CM will select its own Subcontractors. It is most important that these selection processes are fair, open and transparent and that all qualified Subcontractors have the opportunity to be considered for the construction Work. PWGSC believes that competitive bidding and open tendering processes will yield the best value at lowest cost for subcontracted Work.

The CM will:

1. In subcontracting for the construction the CM shall:
 - a. In consultation with the Consultant, coordinate the tender and contract documents packages prepared by the Consultant and that clearly set out the requirements for materiel and services;
 - b. Using standard construction industry documents, such as CCDC 11 - 1996 (R2006) CM's Qualification Statement, ensure that Subcontractors in trades that are essential to the successful delivery of the Work are pre-qualified prior to being invited to submit tenders;
 - c. Enter into contracts with qualified Subcontractors who submit the lowest-priced compliant tenders;
 - d. Manage Subcontractors and ensure they provide the required services in a manner consistent with the terms and conditions of this Contract and achieve timely delivery of quality services at the lowest cost;
 - e. Establish quality and performance requirements and monitor Subcontractor performance, including quality of deliverables, adherence to schedules and costs;
 - f. Provide for dispute resolution, initiation of subcontract amendments and payments.
 2. The CM shall obtain open, fair and competitive bids for the subcontracts required for each portion of the Work in accordance with the following requirements:
 - a. Subcontracts estimated at less than \$25,000 including all applicable taxes, may be single-sourced to qualified suppliers only upon the written approval of the Departmental Representative.
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- b. For subcontracts estimated at less than \$100,000, including all applicable taxes, and upon the written approval of the Departmental Representative, the CM may invite a minimum of three (3) qualified suppliers to submit bids.
 - c. For subcontracts estimated at less than \$100,000, including all applicable taxes, the CM, upon the written agreement of the Departmental Representative, may set aside the requirement to solicit a minimum of three (3) bids if it has demonstrated to the satisfaction of the Departmental Representative, that less than three (3) firms are capable of performing the Work.
 - d. For subcontracts estimated at \$100,000 or more, including all applicable taxes, advertise publicly, in accordance with the following open bidding procedures:
 - i. The public advertisement shall include, at a minimum, a description of the nature of the Work to be performed, information regarding any technical requirements, financial guarantees or other documentation to be provided with the bid, the completion date for the Work, the address of the bid closing location and the final date and time for receiving bids, the identification of a contact point for obtaining bid documents and from which further information may be obtained, the date, time and place of the public opening of the bids.
 - ii. Tender documentation shall include all of the public advertisement information, as well as identification of the bid validity period, the criteria for awarding the contract including any factors other than price to be considered in the evaluation of bids, the terms of payment and any other terms or conditions.
 - iii. During the solicitation, the CM shall reply promptly to any request for bid documents or any reasonable request for relevant information made by a supplier participating in the tender. Information provided in response to questions during the tender period must be provided to all bidders.
 3. The receipt and opening of bids and the awarding of contracts must be consistent with the following:
 - a. Bids must be opened in the presence of a least two representatives of the CM, as well as a representative of Canada, all of whom will act as witnesses to the opening by verifying and signing the Record of Bids received.
 - b. Contracts shall be awarded in accordance with the requirements specified in the notices and bid documentation, and must be submitted by a supplier that complies with the terms and conditions of the bid documents.
 - c. The CM shall, upon request, promptly inform suppliers participating in the bid of decisions on contract awards.
 4. The CM shall:
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- a. Seek pre-approval from the Departmental Representative for any deviation from the competitive subcontracting process and make the documentation available to PWGSC.
 - b. Demonstrate to the Departmental Representative that it has a competitive subcontracting process and a prequalification process, reflecting best industry practices.
 5. The CM shall analyze the bids received and recommend awards to the Departmental Representative through a trade contract award recommendation. The format of the trade contract award recommendation is the responsibility of the CM, however, at a minimum; the recommendation must include copies of the following documents:
 - a. Prequalification Phase (if applicable) – copies of prequalification documents such as CCDC 11 - 1996 (R2006) CM's Qualification Statement or equivalent, the list of CMs submitting applications for prequalification and the results of the evaluation of prequalification submissions.
 - b. Tender Phase: copies of all bids received, verification (e.g. a time stamp) that bids were received on time prior to the time scheduled for bid closing, a copy of the Record of the bid opening, properly witnessed, a copy of the public notice, or invitation to tender if the Work is valued at under \$100,000, a copy of all solicitation documents, a summary of all tenders received with bid amount breakdowns and totals, verification that bid security (if applicable) was provided with the bid, information on any tender qualifications or disqualifications; and identification of the supplier recommended for contract award.
 6. When the Departmental Representative approves the expenditure and the procurement process, the CM shall prepare the subcontracts for execution. No award of subcontracts to a Subcontractor can proceed without an approved trade contract award recommendation.
 7. The CM, and anyone not at arm's length to the CM, shall be ineligible to submit bids for any construction tenders issued for work tendered as part of the CM contract. For further clarity, the CM will be deemed to have a conflict of interest that would prevent it from being eligible to submit bids for any tenders issued in connection with the project. This does not limit the CM ability to use its own forces when permitted by the Departmental Representative.
 8. Canada reserves the right to require the CM to enter into subcontracts for the supply of services or materials with Subcontractors that have been prequalified by Canada for any component of the Work. Any such subcontract shall form part of the Cost of the Work.
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To achieve, verify and document that the performance of the facility and its various systems meet design intent as well as the Client Department's functional and operational needs. These activities and processes extend through all stages of the project from design development to occupancy, operation and post-occupancy. The commissioning process requires coordinated efforts from all members of the commissioning team.

Commissioning is a team effort among all parties involved in the project. It demands full cooperation in all stages of planning, design, construction, installation, activation and performance verification and operation. It also requires clear communications among all parties to achieve understanding of all requirements. This includes full documentation of major decisions and activities.

The Departmental Representative, the CM and CM's Commissioning Specialist, the Subcontractors, the Consultants, the Consultant's Commissioning Manager will form the commissioning team. The commissioning team must work together in a collaborative and open manner to successfully complete the commissioning process. The CM and the CM's Commissioning Specialist shall take on a key and leading role in driving the commissioning process to successful completion.

The roles and responsibilities of the commissioning team are listed as follows:

- **Consultant's Commissioning Manager (CxM)**
A qualified professional who represents the Client Department interests to schedule and coordinate all commissioning activities during project delivery stage, as well as post-occupancy commissioning. The CxM is also responsible for the preparation of the Commissioning Plan, the Commissioning Schedule, and the preparation and completion of all applicable commissioning forms which include the Product Information (PI) Forms and Performance Verification (PV) Report Forms for the systems/equipment to be commissioned; review of applicable shop drawings; witnessing of all commissioning testing including startups and functional performance verification testing and post-occupancy testing for the systems/equipment to be commissioned; the timely submission of completed commissioning forms to Departmental Representative for review and approval; preparation and submission of the Final Commissioning Reports.
 - **Consultant**
Provides all design information required for commissioning to meet Client Department's functional requirements and maintain design intent of the base building systems, prepares the Design Intent Brief and Commissioning Brief and submits to the Consultant CxM for coordination of the Commissioning Plan. The Consultant will verify that the base building and Client Department's functional and operational requirements are correctly interpreted
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during the design stage and contract documents, and that the building systems operate consistently at peak efficiencies, under all normal load conditions. The Consultant will manage and liaise with the CxM and incorporate the commissioning requirements and standards into the design and construction contract documents.

- **Departmental Representative**
Overall responsibility of the project delivery including approval of commissioning budget and schedule, resolution of contract disputes, approval of commissioning report and certification of final completion.
- **Construction Manager (CM)**
Ensure the CM's Commissioning Specialist is conducting their roles, responsibilities, and activities effectively to meet scope, time and budget. CM is to report on progress of activities to the Departmental Representative.
- **CM's Commissioning Specialist**
The CM's Commissioning Specialist shall co-ordinate with the Consultant's CxM to arrange personnel, sub-contractor(s) and qualified testing agencies for conducting pre-startup tests, equipment startup and testing, system startup and testing, TAB, functional performance verification, post-occupancy testing, O&M training sessions; submission of shop drawings, test results, as-built drawings and the operating and maintenance (O&M) manuals.

10.2 Scope and Activities - Specific

The CM is to retain an experienced Commissioning Specialist who is conversant in laboratory operations. The CM's Commissioning Specialist will be directing a commissioning process, or program of activities, for all of the Work that is reasonable and practical. This specialist will document and witness all test results. The CM is to report on the activities of the Commissioning Specialist to the Departmental Representative.

Commissioning is an integral part of all phases of the Work. Commissioning and performance verification is a key element of the project quality management plan and shall be conducted at all stages of the project. Assist the Consultant's CxM to update the Commissioning Plan throughout the project, with input and direction from the Consultant. Commission each phase of the Work and the overall Work and make every effort to reduce the project schedule and estimated construction cost.

The CM and the CM's Commissioning Specialist are responsible for:

1. Ensuring that all required commissioning activities are identified in the project schedule and in construction documents;
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2. Ensuring that information on labeling protocols, maintenance data requirements and protocols are relayed to the Subcontractors and related information sessions with stakeholders are scheduled as required;
 3. Confirming that Subcontractors' Work is sufficiently complete to warrant inspection and testing, by the Consultant and for scheduling of the required inspections and tests;
 4. Developing and implementing a site quality assurance program to minimize delays as a result of poor workmanship or Subcontractor error; to reduce deficiencies and call-backs during warranty periods; to reduce long-term risk arising to stakeholders from poor workmanship;
 5. Administrating and managing independent quality control testing as may be required by the Departmental Representative, the Consultant or the CM to confirm the adequacy of a Subcontractor's Work or commissioning reports;
 6. Ensuring that all test results, documents, manuals are provided by Subcontractors; monitoring the Consultant review process and reporting to the Departmental Representative on the progress of the commissioning effort;
 7. Directing Subcontractors to complete, repair, adjust or rebuild portions of the Work that do not meet the verification standards including monitoring deficiencies and ensuring that they are corrected;
 8. Ensuring that seasonal commissioning activities are detailed within the project schedule, are completed on time, and with the proper documentation and or follow-up action;
 9. Monitoring and inspecting with the Consultant the Work during its warranty period and during seasonal commissioning activities to ensure defects are corrected. The frequency of monitoring and inspection expected to occur twice during the warranty period - three and eleven months;
 10. Ensuring that testing and commissioning of equipment is witnessed and inspected by the Consultant and the required authority;
 11. Coordinating the federal, provincial and municipal inspections required for occupancy;
 12. Scheduling and following-up on the three and eleven month inspections after the issuance of the Substantial Performance;
 13. Undertaking all actions required to close-out subcontracts including final warranty reviews, contract close-outs;
 14. Coordinating the training of EC operational staff and the equipment handovers;
 15. Monitoring and reporting to the Departmental Representative on the progress of the commissioning process against the plan;
 16. Witness all testing including testing of all components, systems and integrated systems. This includes, but is not limited to, a complete verification of the controls sequence of all systems;
 17. Complete and sign-off all verification reports and compile into a comprehensive Commissioning Manual as the project progresses, including Commissioning Manual updates to include seasonal commissioning activities;
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18. Organize commissioning meetings at a minimum weekly, preparing agenda, chairing meetings, preparing minutes and distributing them;
 19. Provide schedules related to all commissioning activities as well as reporting and monitoring. Present an updated commissioning schedule at all commissioning meetings. Identify any variances and issues to be addressed at those commissioning meetings;
 20. Assist in the labeling protocols by gathering all forms dealing with product information from various Subcontractors and reviewing and verifying that the information is correct. The physical labeling requirements are the responsibility of the Subcontractors;
 21. Confirm that the Subcontractors' Work is sufficiently complete prior to start up so that inspections are carried out, deficiencies identified by the Consultants and corrected by the Subcontractors;
 22. Gather all the start-up reports, reviewing format and content against manufacturer's instructions prior to start-up, ensuring that they reflect the procedures listed in the manufacturer's instructions;
 23. Manage the process of developing the testing and performance verification. The Commissioning Specialist will prepare verification forms and make them project specific. All forms will be submitted to the Consultant and Consultant's Commissioning Manager for review and comment. Update the forms as required. During testing, the Commissioning Specialist will record all results and report any variances to the Consultant's Commissioning Manager and Consultant.
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Monitor the progress of the Work of the Subcontractors on site, coordinate the Work with trades and suppliers, the Departmental Representative and the Consultant, and drive the Work to completion.

1. Maintain competent personnel on site as follows:
 - a. One (1) full-time superintendent, one (1) full-time safety officer, one (1) field engineer (as required), and one (1) commissioning specialist (as required) on site during implementation of the Work to monitor and provide general direction to all those associated with the Work.
 2. Identify unacceptable Work early to avoid delays that might arise as a result of required corrections of deficient Work. Ensure that comprehensive quality management processes are followed daily. Ensure that adequate back-up personnel are available;
 3. Establish on-site organization and lines of authority in order to carry out the overall plans of the CM and the Departmental Representative;
 4. Schedule and conduct progress meetings at which Subcontractors, Departmental Representative, Consultant and CM can discuss jointly such matters as procedures, progress, problems, risks, costs and scheduling;
 5. Provide daily monitoring of the schedule as the Work proceeds;
 6. Complete the Work according to the accepted construction documents, project schedule and project estimated construction cost;
 7. As part of a comprehensive quality management process, provide daily inspection of all aspects of the Work, documenting matters for action or follow-up by Subcontractors, or referral to the Consultant. Ensure the Work is constructed as specified. Use photographs to document issues and their correction;
 8. Review the adequacy of the Subcontractors personnel and equipment and availability of material and supplies to meet the schedule. Implement remedial action when requirements of a subcontract or the project schedule are not being met;
 9. Prepare and maintain a decision log recording all decisions affecting schedule, construction estimates, scope, or quality, including dates, place, and participants. These records are to be made available to the Departmental Representative at all times;
 10. Monitor and document all health and safety matters daily.
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R.077680.001**RS 12 CHANGES (NOTICES AND ORDERS)**

When a change to a subcontract is identified on site, the Consultant will prepare and issue a contemplated change notice (CCN). The Consultant will review the cost estimate provided by the CM and provide recommendations to the Departmental Representative with respect to the fairness and reasonableness of the quotation. The Departmental Representative will be responsible for authorizing the change based on the indicative cost estimate and request that the CM obtain firm pricing on it.

1. The CM shall prepare and submit an indicative cost estimate breakdown for each contemplated change to the Departmental Representative and the Consultant for review and approval before proceeding with the change. The breakdown shall itemize all labour, material, plant and equipment costs estimated by the CM.
 2. It is the responsibility of the CM to ensure that all prices included in the CM's breakdown, including the costs and mark-ups of Subcontractors, are fair and reasonable.
 3. Labour rates, for all trades, shall be paid in accordance with trade union agreements and with the approval of the Departmental Representative.
 4. The costs of all material, plant and equipment must be based on the actual amount paid to suppliers by the CM or Subcontractors and said costs are to include all applicable discounts.
 5. The CM's percentage fee of the project estimated construction cost will include for all services and Work associated with changes and shall not be subject to any mark-ups or additional fees.
 6. Upon acceptance of the quotation, the CM shall prepare a notice of change and sent it to the Subcontractor and provide a copy to the Consultant and the Departmental Representative.
 7. A detailed log of the cost of forecasted final subcontract amounts, change notices and change orders is to be maintained by the CM for all subcontracts, at all times throughout the project.
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RS 13 CONSTRUCTION GENERAL INSTRUCTIONS**13.1 CONSTRUCTION WORK**

The CM shall:

1. Be responsible for the development, coordination and management of all Work and services included in Division 01;
2. Ensure the provision of all necessary equipment to the project and all other resources required to perform all services;
3. Procure, coordinate, administer and manage all construction Work and contracts;
4. Prepare and execute contracts with the successful Sub-trades so as to:
 - a. Coordinate and manage the respective contracts in an integrated manner to avoid any conflicts between the Work of any of the CM's sub-trades and/or the CM's own forces;
 - b. Coordinate, manage and ensure completion all the Work of each Sub-trade tender package in strict adherence to the accepted drawings and specifications of each tender package, including all addenda and authorized change orders;
 - c. Deliver the Work packages by the agreed upon completion dates;
 - d. Develop and implement a procedure for review, certification, processing and payment of Sub-trades in accordance with the terms and conditions of the CM Contract.
 - e. Schedule and conduct progress meetings at which Sub-trades, PWGSC and the CM can jointly discuss such matters as procedures, progress, problems, risks and scheduling;
 - f. Provide timely response to correct issues as they occur.

13.2 SHOP DRAWINGS AND PRODUCT DATA

Submit for the Departmental Representative's review, six (6) copies of each shop drawing and product data.

The review is for the sole purpose of ascertaining conformance with the general design concept, and does not mean approval of the design details inherent in the shop drawings, responsibility for which shall remain with the CM. Such review shall not relieve the CM of responsibility for errors or omissions in the shop drawings or of his responsibility for meeting all requirements of the Contract Documents.

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Product data consist of manufacturer's catalogue sheets, brochures, literature, performance charts and diagrams, used to illustrate standard manufactured products. Cross-reference product data information to applicable portions of Contract Documents.

Do not commence manufacture or order materials before shop drawings and product data are reviewed.

13.3 FEES, PERMITS AND CERTIFICATES

Pay all fees, levies and obtain all permits as required by authorities having jurisdiction. Provide authorities with plans, applications and information as required to obtain permits and acceptance certificates. Provide inspection and completion certificates as evidence that the work conforms to the requirements of Authority having jurisdiction. Only the actual cost of fees or levies will be reimbursed in accordance with the Price Proposal. All works related in obtaining permit or certificates is to be included in the Price Proposal Form.

13.4 FIRE SAFETY REQUIREMENTS

Comply with the National Building Code of Canada (NBC most current) for fire safety in construction and the National Fire Code of Canada (NFC most current) for fire prevention, fire fighting and life safety in building in use.

Welding and cutting: Before cutting and welding operations commence, issue hot work permits then continuously monitor all welding, soldering, grinding and/or cutting work. Store flammable liquids in approved CSA containers. No open flame shall be used unless permitted and authorized by the CM.

At least 48 hours prior to commencing cutting, welding or soldering procedure, advise the Departmental Representative:

1. Notice of intent, indicating devices affected, time and duration of isolation or bypass;
2. Completed welding permit as defined in NFC;
3. Return welding permit to Site Superintendent immediately upon completion of procedures for which permit was issued.

A fire watcher as described in NFC shall be assigned when welding or cutting operations are carried out in areas where combustible materials within 10m may be ignited by conduction or radiation.

Where work requires interruption of fire alarms or fire suppression, extinguishing or protection systems:

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1. Provide watchman service as described in NFC; In general, watchman service is defined as an individual conversant with Fire Emergency Procedures, performing fire picket duty within an unprotected and unoccupied (no workers) area once per hour.
2. Retain services of manufacturer for fire protection systems on daily basis or as approved by NFC, to isolate and protect all devices relating to:
 - a. Modification of fire alarms, fire suppression, extinguishing or protection systems; and/or
 - b. Cutting, welding, soldering or other construction activities which might activate fire protection systems.

Immediately upon completion of work, restore fire protection systems to normal operation and verify that all devices are fully operational. Inform fire alarm system monitoring agency and local Fire Department immediately prior to isolation and immediately upon restoration of normal operation.

13.5 FIELD QUALITY CONTROL

Carry out Work using qualified licensed workers or apprentices in accordance with Provincial Act respecting manpower vocational training and qualification.

Permit employees registered in Provincial apprenticeship program to perform specific tasks only if under direct supervision of qualified licensed workers. Determine permitted activities and tasks by apprentices, based on level of training attended and demonstration of ability to perform specific duties.

13.6 HAZARDOUS MATERIALS

Comply with the requirements of the Workplace Hazardous Materials Information System (WHMIS) regarding use, handling, storage, and disposal of hazardous materials, and regarding labeling and the provision of Material Safety Data Sheets (MSDS).

For work in occupied buildings, give the Departmental Representative 48 hours to 1 weeks notice for work involving designated substances (O. Reg. 490/09 Designated Substances), hazardous substances, and before painting, caulking, installing carpet or using adhesives.

13.7 TEMPORARY UTILITIES

Provide temporary heating and ventilation as required to facilitate progress of work. Arrange for connection with appropriate utility company for water supply and temporary power and lighting.

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Provide temporary telephone, fax and data for own use. Pay costs of installation, maintenance and removal.

Give the Departmental Representative one (1) week notice related to each necessary interruption of any mechanical or electrical service throughout the course of the work. Keep duration of these interruptions to a minimum. Carry out all interruptions after normal working hours of the occupants, preferably on weekends.

13.8 PROTECTION

Protect finished work against damage until take-over. Protect adjacent work against the spread of dust and dirt beyond the work areas. Protect operatives and other users of site from all hazards. Protect mobilization area so run-off into existing storm water systems is contained.

Provide dust tight screens or partitions to localize dust-generating activities, and for protection of workers, finished areas of work and public. Maintain and relocate protection until such work is complete.

13.9 USE OF SITE AND FACILITIES

Execute Work with least possible interference or disturbance to the normal use of premises. Make arrangements with Departmental Representative to facilitate work as stated. The CM shall install proper site separation and identification.

Where elevators exist, the CM may use these at Departmental Representative's discretion. Protect from damage, safety hazards and overloading of existing equipment.

Provide sanitary facilities as required by Provincial regulation for the expected workforce.

Smoking is not permitted on the site. Obey smoking restrictions on building property.

Maintain an office at the site until project completion. Provide and setup site offices for CM's dedicated site staff, meeting area and lunchroom. Office areas are to be secure, clean and quiet (by construction site standards). Each office shall be maintained in clean condition during the progress of the Work and adequately lighted, heated, ventilated and air conditioned space for meetings, filing and plan tables for Contract Documents.

13.10 SITE STORAGE

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Provide all required storage space, which shall be equipped and maintained by the CM. Do not unreasonably encumber site with materials or equipment. Move stored products or equipment which interferes with the operations of EC. Obtain and pay for use of additional storage or work areas needed for operations.

13.11 SIGNS

Provide signs related to traffic control, information, instruction, use of equipment, public safety devices, to the Departmental Representative's approval. No advertising will be permitted on this project.

13.12 ACCESS AND EGRESS

Design, construct and maintain temporary access to and egress from work areas, including stairs, runways, ramps or ladders and scaffolding, independent of finished surfaces and in accordance with relevant municipal, provincial and other regulations.

13.13 SCAFFOLDS AND WORK PLATFORMS

Design, install, and inspect scaffolds and work platforms required for work in accordance with relevant municipal, provincial and other regulations. Provide design drawings, signed and sealed by qualified Professional Engineer licensed in the province of Ontario, where prescribed. Additions or modifications to scaffolding must be approved by Professional Engineer in writing.

13.14 WASTE MANAGEMENT

Comply with the Environmental Protection Act, Ontario Regulations O. Reg. 102/94 and O. Reg. 103/94 for waste management program on construction and demolition projects.

The CM shall:

1. Review the draft waste reduction plan from the Environmental Consultant and submit to the Departmental Representative and Environmental Consultant a final waste reduction work plan for the project.
 2. Ensure that the plan is in compliance with PWGSC guidelines and meets the requirements of local authorities having jurisdiction;
 3. Clearly outline the strategy and methodology for optimizing solid waste diversion from landfill and disposal of toxic or hazardous materials in the most appropriate manner;
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4. Include all related schedules outlining expected inventory targets and results required when waste audits are conducted;
5. Include a non-hazardous solid waste reduction program for eliminating waste through reduction, reuse and recycling including:
 - a. Requirements for sorting construction waste on site by types;
 - b. A description of the most practical manner for recycling each individual material.
6. Develop specific procedures for conducting waste management audits on site, including audit objectives, frequency and format;
7. Prepare written monthly reports containing records of waste disposal efforts, including:
 - a. A review of the implementation strategy;
 - b. A review of Subcontractors disposal practices for paints, solvents and pressure treated wood scraps and other similar products or materials.
8. Perform a waste management audit indicating the degree to which recycling objectives are being achieved and recommendations for improvements if objectives are not being met.

13.15 OPERATIONS AND MAINTENANCE MANUALS

Two (2) weeks prior to any scheduled training, submit to Departmental Representative four (4) copies of approved Operations Data and Maintenance Manual compiled as follows:

1. Bind data in vinyl hard cover 3 "D" ring type loose leaf binders for 212 x 275 mm size paper. Binders must not exceed 75 mm thick or be more than 2/3 full.
2. Enclose title sheet labelled "Operation Data and Maintenance Manual", project name, date and list of contents. Project name must appear on binder face and spine.
3. Organize contents into applicable sections of work to parallel project specifications breakdown.
4. Mark each section by labelled tabs protected with celluloid covers fastened to hard paper dividing sheets.

Include following information plus data specified:

1. Maintenance instructions for finished surface and materials;
 2. Copies of hardware and paint schedules.
 3. Description: Operation of the equipment and systems defining start-up, shut-down an emergency procedures, and any fixed or adjustable set points that affect the efficiency of the operation. Include nameplate information such as make, size, capacity and serial number.
 4. Maintenance: Use clear drawings, diagrams or manufacturers' literature which specifically apply and detail the following:
 - a. Lubrication products and schedules;
 - b. Trouble shooting procedures;
 - c. Adjustment techniques;
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- d. Operational checks;
 - e. Suppliers names, addresses and telephone numbers and components supplied by them must be included in this section. Components must be identified by a description and manufacturers part number.
5. Guarantees showing:
- a. Name and address of projects.
 - b. Guarantee commencement date (date of Interim Certificate of Completion).
 - c. Duration of guarantee.
 - d. Clear indication of what is being guaranteed and what remedial action will be taken under guarantee.
 - e. Signature and seal of Guarantor.
 - f. Additional material used in project listed under various Sections showing name of manufacturer and source of supply.
6. Spare parts: List all recommended spares to be maintained on site to ensure optimum efficiency. List all special tools appropriate to unique application. All parts/tools detailed must be identified as to manufacturer, manufacturer part number and supplier (including address).

Include one complete set of final shop drawings (bound separately) indicating corrections and changes made during fabrication and installation.

As Built drawings and O&M manual shall be converted, where necessary, into Portable Document File (PDF) format permit for viewing using Acrobat reader.

13.16 RECORDS

As work progresses, maintain accurate records to show deviations from Contract drawings. Just prior to Departmental Representative's inspection for issuance of the Certificate of Completion, supply to the Departmental Representative one (1) electronic copy and two (2) sets of hard copies of the prints with all deviations neatly inked in.

13.17 GUARANTEES AND WARRANTIES

Before completion of Work, collect all manufacturer's guarantees and warranties and deposit with Departmental Representative.

13.18 CONSTRUCTION CLEAN UP

The CM will be responsible for construction cleaning throughout the life of the project, as Work progresses. At the end of each work period, and more often if requested by the Departmental

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Representative, remove debris from site, neatly stack material for use, and clean up to ensure a safe work environment.

Upon completion remove scaffolding, temporary protection and surplus materials. Make good defects noted at this stage.

Clean areas under contract to a condition at least equal to that previously existing, including building exterior and surrounding site, to the approval of the Departmental Representative.

13.19 SECURITY CLEARANCES

All personnel employed on this project will be subject to a security check. Obtain requisite clearance, as instructed, for each individual required to enter the premises.

13.20 SITE SECURITY

CM shall be responsible for security of the entire site until the facility is ready for intended use. Develop a security plan in consultation with the Departmental Representative. Revise plan as required to approval of Departmental Representative. Update plan to meet requirements of Departmental Representative as Project progresses. Be responsible for:

1. Coordination of construction activities and EC operations;
2. Access to the site including sign-in procedures and security clearances;
3. Off-hours security including procedures to escort, to lockup, evening and weekend surveillance, fire watches, emergency procedures and responses;
4. All safety issues related to the Work or its site to be performed as required by federal, provincial or municipal regulations;
5. Safeguarding of components to be reused or recycled;
6. Protection of materials, equipment, workmanship and, throughout the implementation of the project, any EC items installed prior to the building being ready for use;
7. A site protocol to be developed and enforced, including:
 - a. No CDs, radios or tape machines;
 - b. Noise control;
 - c. No parking on site;
 - d. Due regard for the general public's expectations with respect to behaviour, language and dress in public places (all portions of the site are deemed to be public).

Provide emergency response coordination and for responses to site problems during non-working hours. In consultation with the Departmental Representative, establish a list of contacts for responses and communication. In the event of any problems, contact the Departmental

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Representative immediately. In case of an emergency where the safety of persons or property is concerned, or Work is endangered by the actions of the Subcontractors or other persons, take immediate action. If required, stop Work. In all situations, notify the Departmental Representative. Give immediate written notice to the Subcontractor or other person of the hazard.

13.21 TESTING / LABORATORY SERVICES

Departmental Representative will appoint and will reimburse CM for costs of inspection and testing services, unless indicated otherwise.

Provide safe working areas and assist with testing procedures, including provisions for materials or services and coordination, as required by testing agency and as authorized by Departmental Representative.

Where tests indicate non-compliance with specifications, CM is to pay for initial test and all subsequent testing of work to verify acceptability of corrected work.