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Architectural & Engineering Services **TERMS OF REFERENCE**

Small Craft Harbour Feasibility Studies

**Fisheries and Oceans
Canada (DFO):
Chesterfield Inlet, NU
Coral Harbour, NU
Naujaat, NU
Sanikiluaq, NU**



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1 PROJECT DESCRIPTION

1.1 GENERAL

1.1.1 PURPOSE OF THE TERMS OF REFERENCE (TOR)

- .1 Public Works & Government Services Canada (PWGSC) requires the services of an Civil/Marine engineering firm (Consultant), acting as the Prime Consultant with a multi-disciplinary team of sub-consultants for the delivery of services required for this project.

1.1.2 THE TOR AND THE DOING BUSINESS WITH PWGSC DOCUMENTATION AND DELIVERABLES MANUAL

- .1 The TOR describes the project specific requirements, services and deliverables while the *Doing Business with PWGSC Documentation and Deliverables Manual* outlines the standards and procedures for construction documents, cost estimating and project scheduling.
- .2 Document precedence:
 - .1 In the event of a document conflict the TOR takes precedence.

1.1.3 PROJECT INFORMATION

Project Information	
Project Title:	Small Craft Harbour Feasibility Studies
Project Location:	Chesterfield Inlet, NU Coral Harbour, NU Naujaat, NU Sanikiluaq, NU
PWGSC Project Number:	R.118621.001
PWGSC Contracting Officer:	TBD
PWGSC Departmental Representative:	Michael Lyzaniwski

1.2 BACKGROUND INFORMATION

1.2.1 USER DEPARTMENT

- .1 The User Department referred to throughout the TOR is Fisheries and Oceans Canada, Small Craft Harbours.
- .2 Fisheries and Oceans Canada is the federal lead for safeguarding our waters and managing Canada's fisheries, oceans and freshwater resources. DFO supports economic growth in the marine and fisheries sectors.

1.2.2 USER DEPARTMENT'S NEED

- .1 The User Department requires a feasibility assessment of four (4) sites for potential development of Small Craft Harbours (SCH).
 - .1 The harbours are to provide safe harbours and landing facilities in support of local fishing operations and the developing inshore and offshore commercial fisheries.
 - .2 The marine infrastructure shall be designed to support safe access to the land and sea in the context of rapid environmental changes in



the Arctic and in support of community fish harvesting and marine mammal harvest.

1.2.3 EXISTING CONDITIONS

- .1 All of the site locations are located above the tree line and within the permafrost zone of Canada. The region generally consists of glacially scoured igneous/metamorphic terrain.
- .2 Chesterfield Inlet, NU
 - .1 The site is located on the west coast of Hudson Bay. Chesterfield Inlet is accessible by scheduled airline services from Rankin Inlet, Nunavut. The community is supplied via sealift at various times during the shipping season.
 - .2 There is no existing harbour infrastructure.
 - .3 One location is being considered for the construction of a small craft harbour and is shown on the site plan in Appendix A.
- .3 Coral Harbour, NU
 - .1 The site is located on the southern shore of Southampton Island in South Bay. Coral Harbour, or Salliq, is accessible by scheduled airline services from Rankin Inlet, Nunavut. The community is supplied via sealift at various times during the shipping season.
 - .2 The harbour site consists of a basin with gravel shoreline, timber fixed wharf, rubble mound breakwater, and a large floating dock with a timber access ramp.
 - .3 One location is being considered for the construction of a small craft harbour and is shown on the site plan in Appendix A.
- .4 Naujaat, NU
 - .1 The site is located on the southern end of the Melville Peninsula on the western shore of Hudson Bay. Naujaat is accessible by scheduled airline services from Rankin Inlet, Nunavut. The community is supplied via sealift at various times during the shipping season.
 - .2 There is no existing harbour infrastructure.
 - .3 One location is being considered for the construction of a small craft harbour and is shown on the site plan in Appendix A.
- .5 Sanikiluaq, NU
 - .1 The site is located on the northern shore of Flaherty Island in Hudson Bay. Sanikiluaq is accessible by scheduled airline services from Winnipeg, MB. The community is supplied via sealift at various times during the shipping season.
 - .2 The harbour site consists of two small rubble mound breakwater and gravel shoreline.
 - .3 One location is being considered for the construction of a small craft harbour and is shown on the site plan in Appendix A.

1.2.4 CHALLENGES AND CONSTRAINTS



- .1 The site locations are all located in remote communities in Nunavut. The Consultant is required to be familiar with the logistical constraints imposed by these remote locations.
- .2 The Consultant will be required to become familiar with the project site and obtain local information as required.
- .3 The remote locations for some of these harbours mean that equipment and materials are not readily available. Consider life cycle costs when selecting materials and equipment, including not only the cost of construction but also the costs associated with doing maintenance on infrastructure in remote locations.
- .4 Maximize reliability of design by specifying simple, durable, and robust materials and equipment that DFO can easily maintain using by persons with moderate technical skills working in remote locations.
- .5 Visits to the Work site may be affected by Provincial and Territorial Public Health measures implemented as a result of the COVID-19 pandemic. Access may be restricted or completely prohibited at any time and alternate means of gathering the information relevant to the design may be required.

1.3 OUTLINE OF WORK

1.3.1 SUMMARY

- .1 The scope of work for this project is to provide site specific feasibility studies and conceptual designs for each of the four communities identified.
 - .1 Consult with stake holders and community members;
 - .2 Provide site investigation and assessment services, and;
 - .3 Develop Feasibility Study Reports for each location.

1.3.2 COMMUNITY CONSULTATION

- .1 Coordinate and facilitate consultations with community members and stake holders for each site location.

1.3.3 SITE INVESTIGATION AND STUDIES

- .1 Provide site investigations, studies, assessment and analysis including:
 - .1 Bathymetric and topographic survey;
 - .2 Orthoimagery;
 - .3 Biological environment and socio-economic environment assessment;
 - .4 Wave climate and agitation study;
 - .5 Desktop geotechnical site investigation and On-Site sub-bottom profiling;
 - .6 Coastal processes and sedimentation study;
 - .7 Ice assessment studies;
 - .8 Quarry investigation, and;
 - .9 Landform and soil studies.

1.3.4 FEASIBILITY STUDY SERVICE



- .1 Develop one conceptual Small Craft Harbour design for each location that is consistent with the DFO Harbour Accommodations Guidelines. The conceptual design is to include:
 - .1 Breakwater(s);
 - .2 Harbour Basin;
 - .3 Fixed Wharf;
 - .1 Design vessel must accommodate a length of 28.53m, breadth of 7.77m, depth of 5.3m and net tonnage of 199.38 tonnes;
 - .4 Small Craft Vessel Accommodation;
 - .1 Design vessel must accommodate a length of 6 to 9 metres and a depth of 1.5m;
 - .5 Launch ramp for small craft vessels, and;
 - .6 Harbour lighting and electrical service.
- .2 Develop a comprehensive Feasibility Report for each location documenting all consultation, site investigation, assessment, and conceptual design activities.
 - .1 Include permitting analysis and roadmap for small craft harbour construction, including all aspects of the work, and;
 - .2 Include Class 'D' estimates for construction and annual maintenance costs.

1.4 OBJECTIVES

1.4.1 GENERAL GOALS

- .1 Quality Design through the:
 - .1 Appropriateness of the real property solution for its use and location;
 - .2 Collaborative Project Delivery process – refer to Definitions;
 - .3 Economic viability of the real property solution considered and/or developed;
 - .4 Maintenance and development of effective and efficient facilities;
 - .5 Appropriate incorporation of innovations within the project delivery and solutions, and;
- .2 Provide an integrated design process involving:
 - .1 Interdisciplinary collaboration, including all stakeholders as identified, design professionals, contractors and authorities having jurisdiction;
 - .2 Agreed upon design principles and decision making protocols.
- .3 Consider the User Department's changing needs and future uses to create solutions that are flexible and that are able to evolve over time.
- .4 Enhance the local context for the benefit of both its direct users and the broader community;
- .5 Provide a design that is efficient and cost effective considering both initial cost and operation & maintenance costs over a life cycle of 50 years for all major structures.

1.4.2 ENVIRONMENTAL



- .1 Minimizing adverse effects on the environment is a government-wide goal. At all stages of work, keep in mind the need to have projects and facilities that DFO can build and maintain in an environmentally responsible manner.

1.4.3 PROJECT DELIVERY

- .1 Provide fully integrated and coordinated professional and design services for the delivery of a project in accordance with the requirements in the TOR and as contained herein.
- .2 Obtain written authorization from the Departmental Representative before proceeding from one project milestone to another.
- .3 Coordinate all services with the Departmental Representative.
- .4 Establish and maintain a Project Management Plan.
- .5 Maintain continuity of key personnel and a dedicated working team for the life of the project.
- .6 Deliver the project to be within:
 - .1 The construction Budget established during preliminary project approval, and;
 - .2 The Project Milestones in this TOR.
- .7 Conduct Quality Assurance reviews during the Project Milestones,

1.5 SUMMARY OF SERVICES AND SPECIALTIES

1.5.1 GENERAL SERVICES

- .1 Provide a full Consultant Team including the following specialist services:
 - .1 Professional/Registered Engineering Services:
 - .1 Civil Engineering;
 - .1 Marine infrastructure experience required.
 - .2 Geotechnical Engineering;
 - .1 Arctic and permafrost experience required.
 - .2 Rock quality assessment experience required.
 - .3 Coastal Engineering;
 - .4 Structural Engineering;
 - .1 Marine sheet piling experience required.
 - .5 Electrical Engineering;
 - .2 Fluvial Geomorphology and Sediment Management Science;
 - .3 Environmental Specialist;
 - .1 Fish habitat assessment and compensation experience required;
 - .2 Experience with the Nunavut environmental regulatory process required.
 - .4 Community Consultation Specialist
 - .5 Bathymetric and Topographic Surveying;
 - .6 Orthoimagery;
 - .7 Schedule Management specialist;
 - .8 Risk Management specialist;



- .9 Cost Estimating specialist;
 - .1 Certified by the Canadian Institute of Quantity Surveyors.

1.6 SCHEDULE

1.6.1 GENERAL

- .1 Deliver the project to be ready for occupancy in accordance with the project milestone listing identified below.
- .2 Prepare a Project Schedule in accordance with the milestone list.

1.6.2 ANTICIPATED MILESTONE DATES

Project Phase	Milestone Completion Date	Number of Weeks
Consultant Contract Award	Feb. 4, 2022	
Community Consultation #1	April 22, 2022	
Feasibility Report Outline	June 30, 2022	
PWGSC Quality Assurance Review		2 weeks
Bathymetric and Topographic Survey Draft	Sept. 16, 2022	
PWGSC Quality Assurance Review		2 weeks
Ortho-imagery – Raw Imagery	Sept. 16, 2022	
Bathymetric and Topographic Survey Final	Oct. 28, 2022	
PWGSC Quality Assurance Review		2 weeks
Ortho-imagery – Final Derived Imagery	Oct. 28, 2022	
PWGSC Quality Assurance Review		2 weeks
First Draft Feasibility Report	Nov. 10, 2022	
PWGSC Quality Assurance Review		2 weeks
Draft Site Investigations and Studies <i>Biological Environment and Socio-Economic Study</i> <i>Wave Climate and Agitation Study</i> <i>Geotechnical Site Investigation and On-Site Sub-Bottom Profiling</i> <i>Coastal Processes and Sedimentation Study</i> <i>Ice Assessment Study</i> <i>Quarry Investigation</i> <i>Landform and Soil Studies</i>	Nov. 25, 2022	
PWGSC Quality Assurance Review		2 weeks
Community Consultation #2 - Open House	Jan. 13, 2023	
Final Site Investigations and Studies	Jan. 27, 2023	



<p><i>Biological Environment and Socio-Economic Study</i></p> <p><i>Wave Climate and Agitation Study</i></p> <p><i>Geotechnical Site Investigation and On-Site Sub-Bottom Profiling</i></p> <p><i>Coastal Processes and Sedimentation Study</i></p> <p><i>Ice Assessment Study</i></p> <p><i>Quarry Investigation</i></p> <p><i>Landform and Soil Studies</i></p>		
PWGSC Quality Assurance Review		2 weeks
Second Draft Feasibility Report	Feb. 3, 2023	
PWGSC Quality Assurance Review		2 weeks
100% Feasibility Report Submission	March 17, 2023	

1.7 EXISTING DOCUMENTATION

1.7.1 AVAILABLE FOR THE CONSULTANT

- .1 Department of Fisheries and Oceans Harbour Accommodations Guidelines, Version 1.2 (2015).
- .2 Small Craft Harbour Floating Wharf Design Standards.
- .3 Repulse Bay (Naujaat) Harbour Facility – DFO Small Craft Harbour Wave Climate and Agitation Study, 2005.
- .4 Small Craft Harbour Feasibility Studies – Arctic Bay & Clyde River; Advisian, 2020.

1.7.2 DISCLAIMER

- .1 Reference information will be available in the language in which it is written.
- .2 The documentation may be unreliable and is offered, “as is” for the information of the Consultant.
- .3 The Consultant is responsible for verifying the accuracy of the information incorporated into the final report.
- .4 Existing documentation listed in Section 1.7.1 will be provided to the Consultant upon award and is not publicly available.

1.8 CODES, ACTS, STANDARDS, REGULATIONS

1.8.1 GENERAL

- .1 In addition to Provincial/Territorial and Municipal Acts, Codes, By-laws and Regulations appropriate to the area of concern, the following Codes, Acts, Standards and Guidelines are applicable to this project (in the event of a conflict between codes, the more stringent shall take precedence):
 - .1 NRC National Building Code of Canada 2015;
 - .2 CSA Canadian Electrical Code 2018;
 - .3 CSA/B561-18, Accessible Design for the Built Environment;



- .4 The Canada Labour Code (CLC);
- .5 The Canada Occupational Health and Safety Regulations;
- .6 PSPC Seismic Standard bulletin, 2018-03-02;
- .7 Department of Fisheries and Oceans Harbour Accommodations Guidelines, Version 1.2 (2015), and;
- .8 Aboriginal Consultation and Accommodation (2011).
- .2 The Authorities Having Jurisdiction (AHJ) on this project are:
 - .1 Treasury Board of Canada Secretariat, accessed through the Departmental Representative;
 - .2 Government of Nunavut;
 - .3 Nunavut Planning Commissions (NPC);
 - .4 Nunavut Impact Review Board (NIRB);
 - .5 Fisheries and Oceans Canada (DFO);
 - .6 Environment and Climate Change Canada (ECCC);
 - .7 Nunavut Research Institute (NRI);
 - .8 Nunavut Water Board (NWB);
 - .9 Transport Canada (TC);
 - .10 Crown-Indigenous Relations and Northern Affairs Canada (CIRNAC);
 - .11 Hamlet of Chesterfield Inlet;
 - .12 Hamlet of Coral Harbour;
 - .13 Hamlet of Naujaat;
 - .14 Hamlet of Sanikiluaq;
 - .15 Nunavut Land Claim Agreement, and;
 - .16 Any authority that is triggered by NIRB/NPC review.
- .3 Identify, analyse and design the project in accordance with the requirements of all AHJs and all applicable Codes, Acts, Standards and Guidelines and Legislation:
 - .1 Be versed with the legislation and requirements that are unique to Federal Government buildings in Canada;
 - .1 Standard Operation Procedures to meet CLC.
 - .2 Be versed with the legislation and requirements that are unique to Federal Government projects tendered through Public Works and Government Services Canada.

1.8.2 HEALTH AND SAFETY

- .1 Be responsible for ensuring the health and safety of project team (own employees, sub-consultants, and other specialists) when working on-site.
- .2 Abide by all relevant Legislation, Regulations, Codes, and Standards and ensure sub-consultants and other specialists are equally compliant.
- .3 Assess hazards inherent in the fieldwork.
- .4 Provide all necessary safety training and personnel protective equipment as required to address hazards.



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- .5 Immediately address health and safety non-compliance issues identified by the AHJ or by the Departmental Representative and provide the Departmental Representative with written report of action taken.



2 REQUIRED SERVICES

2.1 GENERAL REQUIREMENTS

2.1.1 SERVICES

- .1 Cost Management
- .2 Community Consultation
- .3 Site Investigation and Analysis
- .4 Feasibility Study Service

2.2 PROJECT REVIEW AND ACCEPTANCE

2.2.1 GENERAL

- .1 Comply with all applicable laws and regulatory requirements as required by the General Conditions of the Contract.

2.2.2 QUALITY ASSURANCE REVIEWS, ACCEPTANCE AND PRESENTATIONS

- .1 Each submission at each Project Milestone is subject to reviews by the Departmental Representative, the User Department, PWGSC Architecture and Engineering Centre of Expertise (AECOE) and other project stakeholders.
- .2 The federal government generally defers to provincial and municipal authorities for specific regulations, standards and inspections but in areas of conflict, the more stringent authority prevails.
- .3 At each submission:
 - .1 Review submissions to be posted on the project FTP site (e.g. Autodesk BIM 360 Docs) in searchable PDF format;
 - .2 Expected turnaround time for each review is ten (10) working days;
 - .3 The Consultant Team will receive review comments in the form of an editable MS Word document or MS Excel document;
 - .1 Provide a single coordinated written response within five (5) working days of receiving review comments;
 - .2 The purpose of this review is information and awareness for PWGSC and not quality control for the Consultants. The Consultant Team must employ their own quality control program and remain fully responsible for the design and services provided.

2.3 RISK MANAGEMENT

2.3.1 CONTEXT

- .1 The Departmental Representative prepares the Risk Management Plan.
- .2 Assist the Departmental Representative with the identification of risk items and factors arising from the technical requirements of the project.

2.4 COST MANAGEMENT SERVICE

2.4.1 GENERAL

- .1 In addition to the cost estimating requirements in the *Doing Business with PWGSC Documentation and Deliverables Manual* include the following cost management services:



- .1 Cost estimates and Consultant billing are also required to be broken down by fiscal year (i.e. April 1 - March 31);
- .2 Include a cost breakdown for commissioning activities in all cost estimates.

2.4.2 DELIVERABLES

- .1 One (1) cost estimate.
 - .1 Refer to Feasibility Study Service for cost estimate deliverables.

2.5 COMMUNITY CONSULTATION

2.5.1 GENERAL

- .1 A minimum of two key Consultant team members responsible for the design and community consultation will attend the Consultations.
- .2 Travel costs from Winnipeg are to be charged against the Disbursement Allowance.
 - .1 Travel costs include only transportation costs to site (taxi, flights).
 - .2 Hotels, meals, and any other rentals are to be included in the fixed fee.
- .3 The consultant is responsible for arranging the Community Consultation sessions in each community and all associated costs including the rental of meeting space, the provision of refreshments and snacks, and supplying simultaneous interpretation services in the community for each consultation meeting.
 - .1 The Community Consultation sessions will require consultation with elders that receive honoraria. The honoraria are to be paid from the disbursement allowance.
 - .2 Assume 15 attendees to each of the three consultation meetings for each community.

2.5.2 SCOPE AND SERVICES

- .1 The Consultant shall be responsible for supporting SCH consultation throughout the project with project stakeholders. The stakeholders may include but are not limited to:
 - .1 Hamlet of Chesterfield Inlet;
 - .2 Hamlet of Coral Harbour;
 - .3 Hamlet of Naujaat;
 - .4 Hamlet of Sanikiluaq;
 - .5 Hunters and Trappers Association (HTA);
 - .6 Knowledge Holders;
 - .7 Guardian Programs;
 - .8 RCMP;
 - .9 Conservation Officers;
 - .10 Public;
 - .11 Shoreline Residents & Businesses;
 - .12 Arctic Fisheries Alliance;
 - .13 Sea-Lift Services (NSSI and NEAS), and;



- .14 Fuel Re-Supply – Woodward’s Oil Limited.
- .2 Coordinate and participate in two (2) on site consultation sessions with each community in coordination with DFO:
 - .1 Develop a rapport with key community stakeholders to be further developed at any other consultations;
 - .2 All consultation documents presented to the community shall be provided in English and Inuktitut (local community Dialect).
 - .3 The Consultant is to provide consultation summary reports for each community consultation.
 - .4 Community Consultation One:
 - .1 Provide community workshops and ad-hoc consultations to develop a clear understanding of the perspectives and needs of the communities and the various users of the harbour, and to facilitate the Traditional Knowledge study;
 - .1 Arrange consultation meeting with the Hamlet, HTA, Guardians and any other applicable community groups to discuss the feasibility study;
 - .2 Listen to and consider the opinions of key community members and stakeholders, and;
 - .3 Develop a good understanding of the site limitations by obtaining local and Inuit knowledge of the site conditions and land use.
 - .2 Consult with the community on the upcoming field work that will be undertaken as part of Section 2.7 Site Investigations and Studies.
 - .5 Community Consultation Two:
 - .1 Arrange one pre-open house consultation meeting with the Hamlet, HTA, Guardians and any other applicable community groups to review material that will be presented in a community open-house, including:
 - .1 The results of any completed field work, and;
 - .2 The conceptual harbour layouts and solicit feedback on the preferred option.
 - .2 Arrange a community open-house to present the following to the community and solicit feedback:
 - .1 The results of the completed fieldwork;
 - .2 The conceptual harbour layout options;
 - .3 The permitting process for potential harbour construction;
 - .4 The results of the Traditional Knowledge study - Land Use Map;
 - .5 Potential Quarry Locations and Haul Routes;
 - .6 Other items that arise during the feasibility study process;
 - .3 Arrange a post-community open house consultation meeting with the Hamlet, HTA, Guardians, and any other applicable community groups to:



- .1 Discuss the feedback received in the open house, and;
- .2 Choose one of the conceptual harbours layouts as the preferred option if the harbour proceeds to the detailed design and construction phase.

2.6 PERMITTING SERVICES

2.6.1 SCOPE AND ACTIVITIES

- .1 The Consultant will be responsible for the submission of permits required to completed the work included in the Feasibility Study, with the exception of the Archaeology Permit, which must be submitted by the archaeologist of the successful firm.
 - .1 All communication with regulatory authorities shall be through the Departmental Representative.
 - .2 All permit and applications must be approved by the Departmental Representative prior to submission.
- .2 The consultant shall supply all documentation required for the work included in this feasibility study, including, but not limited to permit applications and all associated documents, and permit reporting documents, for:
 - .1 Nunavut Planning Commission (NPC) – Land Use Approval;
 - .2 Nunavut Impact Review Board (NIRB) – Project Screening;
 - .3 Nunavut Research Institute – Scientific Research Licences for Physical & Natural Sciences and Social Sciences & Traditional Knowledge;
 - .4 Government of Nunavut – Economic Development and Transportation – Land Use Permit;
 - .5 Government of Nunavut - Culture and Heritage – Archaeology Permit;
 - .6 Crown-Indigenous Relations and Northern Affairs Canada (CIRNAC) – Land Use Permit, and;
 - .7 Any other authority listed in the NIRB determination.
- .3 The NPC and NIRB project proposals and supporting documents shall include for future geotechnical drilling at each site.
- .4 The consultant shall provide permitting support to the departmental Representative. Permitting support includes, but is not limited to, conducting meetings and consultations, meeting with regulatory bodies, and providing responses and to inquiries by regulatory bodies.
- .5 The consultant shall provide the Departmental Representative with a comprehensive list of required permits including timelines for issuing, level of effort, contact information, and application requirements.

2.7 SITE INVESTIGATIONS AND STUDIES

2.7.1 GENERAL

- .1 The investigations, studies, and assessments are to be completed for each of the four locations as background information required to inform the Feasibility Study.



- .2 Site specific reports are required for each investigation, study, and assessment.
- .3 The investigations, studies, and assessments are to be collated into a single site specific package for submittal as per Schedule 1.6.
- .4 The Consultant is to schedule site visits as required. Advise the Departmental Representative of the scheduled visits for each community.
 - .1 Travel costs incurred to complete the investigations must be included in the fixed fee and not charged to the Disbursement Allowance.

2.7.2 BATHYMETRIC AND TOPOGRAPHIC SURVEY

- .1 Provide a comprehensive Bathymetric and Topographic Survey;
- .2 The consultant shall establish permanent control points at each of the harbour locations that are convenient for future use and in a position likely to be safe from damage during the construction of the harbours. Permanent control points are to be specifically identified on all drawings produced and shall be used during construction. Planned locations for permanent control points shall be determined in consultation with Departmental Representative. The monument type for the control points shall be brass cap/plug type, installed into bedrock or other suitable location. New permanent control points shall be occupied (logging GNSS data) for a minimum duration of 24 hours. Differential levelling techniques shall be used to tie-in new permanent control point elevations to existing benchmarks, existing benchmarks to tie-in to be determined in consultation with Departmental Representative.
- .3 The consultant shall, for Naujaat, NU and Chesterfield Inlet, NU, occupy (logging GNSS data) an existing Canadian Hydrographic Service (CHS) benchmark for a minimum duration of 24 hours simultaneously with the new permanent control point stated above. Location of existing CHS benchmark at each site shall be determined in consultation with Departmental Representative. Location assumed to be within 10km via land or sea of (AREA TO BE SURVEYED) of the "Site Survey Plan" shown in Appendix A.
- .4 Survey must be conducted in accordance with the CHS Standards for Hydrographic Surveys: <http://www.charts.gc.ca/documents/data-gestion/standards-normes/standards-normes-2021-eng.pdf>
- .5 The survey shall be undertaken by a Hydrographer, a Certified Hydrographer is preferred, but not mandatory.
- .6 The bathymetric survey shall be undertaken using a multi-beam echosounder and result in complete 100% coverage of the total bathymetric survey area.
- .7 Horizontal Control:
 - .1 All points to be in UTM coordinates referenced to NAD83 (CSRS) datum.
 - .2 Primary shore control points shall be established by ground survey methods to a relative accuracy of 1 part in 100,000. When geodetic



satellite positioning methods are used to establish such points, the error shall not exceed 10 cm at 95% confidence level with respect to NAD 83 (CSRS).

.8 Vertical Datum:

- .1 All depths must be reduced to a low water datum.
- .2 In tidal waters, soundings are reduced to Lowest Low Water Large Tide (LLWLT). Sounding datum must be referred to a minimum of 3 vertical benchmarks whose elevations must be determined to the accuracy stated in the Canadian Tidal Manual.
- .3 Geodetic datum shall be chart datum and used for the Site Plan and associated CAD files. Chart datum is presently established at Sanikiluaq, NU and Naujaat, NU. Shift values from CGVD2013 to chart datum to be provided by Departmental Representative for Sanikiluaq, NU and following receipt of occupation data on CHS benchmark at Naujaat, NU. CHS is in the process of establishing chart datum at Coral Harbour, NU; a tide gauge is deployed and will be retrieved in Summer 2022, shift values will be provided following gauge retrieval (August/September 2022). An interim chart datum is established at Chesterfield Inlet, NU and Shift values from CGVD2013 to interim chart datum to be provided by Departmental Representative following receipt of occupation data on CHS benchmark.
- .9 Undertake a topographic/sounding survey to the limits of the harbour area that is accurate in all planes to within +/- 0.05m of the reference point for points on land and +/- 0.1m for points underwater.
- .10 Survey lines are to start at the limits of the upland area and extend into the water to the limits of the water area. Survey lines are to be spaced at a maximum offset of 10m. A minimum of one (1) topographic survey point along each survey line shall overlap the bathymetric data coverage such that there is no gap between the topographic and bathymetric data.
- .11 Survey points along the lines are to have a maximum spacing of 5m for points underwater and a maximum spacing of 5m for points on land. Additional survey points may be required along or between the lines to completely identify significant site features.
- .12 Significant site features to be surveyed include but are not limited to the following:
 - .1 Locations and elevations of any existing structures (buildings, wharves, floats, launch ramps, power poles, concrete pads, parking lots, culverts, etc.);
 - .2 Shoulder of roads;
 - .3 Top of slope and toe of slope of any breakwater, shore line or naturally sloped feature;
 - .4 Extents of any topographical or geological features (bedrock outcrops, cliffs, ravines, streams, ditches);
 - .5 Location of any ditches/streams draining into the harbour area and elevations of upstream ditches and culverts;



- .6 Location of any evidence of high water lines in addition to Ordinary High Water Mark;
- .7 Locations of any navigational aids (lights, ranges, buoys);
- .8 Edge of water on the given day;
- .9 Existing benchmarks;
- .10 Property pins, and;
- .11 Any other site conditions that may impact the development of a harbour at the site.
- .13 The Consultant shall prepare a report that includes the following items:
 - .1 Site Plan that illustrates the findings of the field work. Drawing is to be to a scale that shows the limits of the field investigation on ARCH D sized paper.
 - .2 Copies of any Field Notes recorded on site.
 - .3 Copies of the raw data collected on site.
 - .4 Details of survey method used, equipment used and any pertinent site information.
 - .5 Details of permanent control points that were established and their installation method.
 - .6 Electronic copy of the Site Plan in an AutoCAD format with all features drawn on separate layers.
 - .7 Electronic copies of all raw data collected on site, with attributes including but not limited to for each point: coordinates, date and time, horizontal and vertical precision.
 - .8 Electronic copies of survey data in raw, CGVD2013, and chart datum; in CSV, and point cloud or similar format.
 - .9 Solution reports for occupied new permanent control points and CHS control points in Canadian Spatial Reference System Precise Point Positioning (CSRS-PPP) format.

2.7.3 ORTHOIMAGERY

Acquire new high resolution (6.5 cm/pixel or better) digital colour imagery of four potential harbour locations within the limits (AREA TO BE SURVEYED) of the "Site Survey Plan" shown in Appendix A plus a 100m buffer. Following acquisition the contractor shall prepare an ortho-rectified, geo-referenced image for each photographed harbour.

- .1 Imagery Acquisition: Environmental Conditions
 - .1 Imagery must meet the following requirements:
 - .1 Less than 5% cloud cover unless deemed acceptable by the Departmental Representative.
 - .2 At least 25 degrees sun angle.
 - .3 Clear atmospheric conditions: no haze, smoke, dust, fog, or combination thereof or other effects limiting visibility.
 - .4 No snow cover on ground.
 - .5 No sea ice unless deemed acceptable by the Departmental Representative. Acceptance must be given prior to flying if it appears there is sea ice cover at harbour sites.



- .6 Low tide conditions (within + or – two (2) hours of a predicted daily low tide) unless deemed acceptable by the Departmental Representative. Acceptance must be given prior to flying for image acquisition outside of the four hour tidal window.
- .2 There will be no additional payment for any expenses incurred while waiting for acceptable environmental conditions.
- .2 Imagery Acquisition: Bands and Resolution
 - .1 The imagery must be captured at a Ground Sampling Distance (GSD) of 6.5 cm or better.
 - .2 The imagery must be captured using a mapping camera.
 - .3 Imagery acquisition must be RGB colour or better.
- .3 Image Acquisition: Accuracy and Flight Parameters
 - .1 The imagery must have a minimum of 60% forward overlap and 30% side overlap.
 - .2 Global Positioning System (GPS) technology must be used to capture x and y image centre positions.
- .4 Ortho-imagery Deliverable: Bands and Resolution
 - .1 The final imagery mosaic for each site must be 6.5 cm per pixel or better, true colour or RGB, ortho-rectified, geo-referenced and seamless.
 - .2 Adjacent images used to develop the final mosaics must be tone and contrast matched to give the appearance of a continuous image.
 - .3 There must be no gaps or slivers between image tiles in the final mosaics.
 - .4 There must be no smears or blurred imagery in the final mosaics.
- .5 Ortho-imagery Deliverable: Accuracy
 - .1 Internal (within an ortho-image) measurements between readily defined points must be within 0.5 meters of ground measured distances.
 - .2 Absolute accuracy (relationship to actual UTM co-ordinates) must be less than 2.0 meters.
 - .3 The imagery must be compensated for all factors such as, but not limited to: terrain relief, lens distortion, and other camera and viewing angle parameters that affect the accuracy of the ortho-image.
- .6 Ortho-imagery Deliverable: Digital Format
 - .1 A single mosaic for each site encompassing the entire Collection Area is required, delivered in the following formats:
 - .1 Uncompressed TIFF (not Geo Tiff) format (.tif) with associated TFW (.tfw) file(s).
 - .2 Compressed JPEG (.jpg) format with associated JGW (.jgw) file(s).
 - .3 Compressed ER Mapper (.ecw).



- .2 The TIFF and JPEG formats must be readable by non-GIS Windows-based image viewers such as Windows Picture and Fax Viewer and must not contain embedded 'Pyramid' schemes or other artifacts.
- .3 The JPEG format images must have a maximum file size of 10 MB.
- .7 Raw imagery Deliverable: Digital Format
 - .1 A single raw imagery mosaic for each site encompassing the entire Collection Area is required, delivered in the following formats:
 - .1 Compressed JPEG (.jpg) format.
 - .2 The JPEG format must be readable by non-GIS Windows-based image viewers such as Windows Picture and Fax Viewer and must not contain embedded 'Pyramid' schemes or other artifacts.
 - .3 The Raw imagery mosaic is not required to be ortho-rectified.
 - .4 The JPEG format images must have a maximum file size of 10 MB.
- .8 Ortho-imagery Deliverable: Visual Quality Control
 - .1 Prior to delivery, a visual inspection of the images must be performed by the contractor to verify the quality of the imagery. Items of particular concern include areas of inconsistent tone relative to the surroundings and areas of apparently smeared or blurred imagery.
 - .1 Linear features including but not limited to buildings, roads, bridges, wharves, railways, and other structures must appear straight or as smooth curves where appropriate and unwavering. Any anomalies that might occur during capture or processing must be corrected prior to delivery.
 - .2 Mismatching of linear features at seams must not be noticeably visible and therefore not exceed 2x (two times) the pixel size.
 - .3 Adjacent images used to develop the final mosaics must be tone and contrast matched to give the appearance of a continuous image.
 - .4 There must be no gaps or slivers between image tiles in the final mosaics, to give the appearance of a continuous image.
 - .5 There must be no solar hot spots, light streaks, or lens flare in the imagery.
- .9 Coordinate Systems for Digital Elevation Models and Ortho-imagery
 - .1 The geo-referenced ortho-imagery, Digital Elevation Model (DEM, DSM, DTM), and other data for each site must be delivered in the North American Datum 1983 (NAD83) Canadian Spatial Reference System (CSRS), and the Universal Transverse Mercator (UTM) projection in the appropriate zone.
- .10 Delivery Media and Method
 - .1 Digital information for each site is to be delivered on the project FTP site (e.g. Autodesk BIM 360 Docs). Alternatively, an FTP site may also be developed by the contractor. Any such ftp site must be accessible by and approved by the Departmental Representative prior to use.



- .2 If digital data for more than one site is included in one delivery, the data for each site should be in separate directories and sorted by Location Name, and Image Format.
 - .1 Directory Name by Location Name
 - .1 Directory name must be unique through the contract and be formatted as: Location Name Territory for example "Coral Harbour NU"
 - .2 First sub-directory Names by Deliverable
 - .1 First sub-directory names must be unique throughout the contract and be formatted as: Deliverable, for example "Orthoimagery".
 - .3 Second sub-directory Names by Image Format
 - .1 For the Orthoimagery sub-directories, second sub-directory names must be unique throughout the contract and be formatted as: Image Format, for example "JPEG", "ECW", or "TIFF".
 - .2 File Names: Orthoimagery
 - .1 Image file names must be unique throughout the contract and be formatted as:
 - .1 LocationName_Territory_DDMMYYYY_O.extension
 - .2 Where DDMMYYYY is the date the image was captured. See the example below to fully understand the Upper and Lower case letters in the name, without a space, the month format and the numbering format. For Example:
 - .1 CoralHarbour_NU_15JUL2022_O.jpg (or .tif, .ecw)
 - .3 File Names: Flight Reports
 - .1 Flight report file names must be unique throughout the contract and be formatted as:
 - .1 LocationName_Territory_FlightReport.pdf

2.7.4 BIOLOGICAL ENVIRONMENT AND SOCIO-ECONOMIC ENVIRONMENT ASSESSMENT:

- .1 These assessments are to cover all areas impacted by the project, including, but not limited to the proposed harbour site(s), proposed quarry site(s), and proposed disposal at sea site.
 - .1 Traditional Knowledge Study;
 - .1 The Traditional Knowledge sessions will require consultation with elders that receive honoraria. The honoraria are to be paid from the disbursement allowance.
 - .2 The structure of the Traditional Knowledge consultations is not prescribed, assume 2-3 sessions with 5 attendees each, for each location.
 - .3 The consultant is responsible for arranging the Traditional Knowledge sessions in each community and all associated costs including the rental of meeting space, the provision of refreshments and snacks, and supplying simultaneous



interpretation services in the community for each consultation meeting.

- .2 Fish and fish habitat assessment;
 - .1 Habitat map of proposed harbour and disposal at sea areas;
 - .2 Existing fish and marine mammal community information;
 - .1 Spatial extent to include both immediate harbour footprint and surrounding bay area for those species that are migratory – focus to be within the harbour footprint.
 - .2 Diversity study for habitat richness, life stage and abundance, not to be used for population/stock assessment estimates but to be used qualitatively.
 - .3 Identify for the fish species are using the habitat (spawning, nursery, rearing, feeding, migration).
 - .4 Identify presence of food sources – invertebrate/plankton. Sampling to capture peak period of biological activity.
 - .3 Understanding of water circulation patterns and water quality parameters and the impact of tidal fluctuation.
- .3 Migratory and marine bird assessment;
- .4 Terrestrial vegetation assessment;
- .5 Wildlife assessment;
- .6 Marine mammal assessment;
- .7 Species at Risk assessment;
- .8 Archeological and Cultural Historic Site assessment; note that the assessment must provide a fully-covered site investigation of the proposed project areas and buffer zones, and;
- .9 Identification of permitting requirements relevant to the Authorities Having Jurisdiction.

2.7.5 WAVE CLIMATE AND AGITATION STUDY:

- .1 Perform a parametric wind-wave hindcast to peak significant wave height and peak wave periods, and to estimate the extreme wave heights by return period (25, 50, 100 year period);
- .2 Provide numerical wave modeling to provide an estimate of wave generation, propagation and transformation under select wind conditions for each of the alternatives;
- .3 Modelling will take into consideration attenuation of wave energy due to shallow water effects;
- .4 Breakwater Analysis will consider the preliminary location, alignment, dimensions and options associated with the breakwater(s), and;
- .5 Estimated wave climate at the harbour entrance and harbour basin for design concepts.

2.7.6 GEOTECHNICAL SITE INVESTIGATION AND ON-SITE SUB-BOTTOM PROFILING:

- .1 Provide factual summaries of:
 - .1 Existing geotechnical information gathered, and;
 - .2 Existing permafrost information gathered.



- .2 Conduct a geophysical sub-bottom profiling survey to identify changes in bottom hardness and to recommend locations for future geotechnical drilling programs, and;

2.7.7 COSTAL PROCESSES AND SEDIMENTATION STUDY:

- .1 Characterization of sediment and identification of transport pathways;
- .2 Numerical modeling to determine the current flow of sediments, sedimentation rates, source of sediment, siltation patterns;
- .3 Shoreline change through historical aerial photographs if available;
- .4 Identify the rate of littoral drift;
- .5 Identify the rate of accretion of sediment on the proposed site, and;
- .6 Assessment of how proposed structures will affect littoral drift.

2.7.8 ICE ASSESSMENT STUDIES:

- .1 Assessment of level ice thickness, mean maximum, and extreme maximum;
- .2 Early and late break-up period;
- .3 Ice breakup pattern within each harbour, and;
- .4 Ice development and cracking patterns along the shoreline.

2.7.9 QUARRY INVESTIGATION:

- .1 Investigate existing or potential quarry sites to evaluate the potential for developing both large and small crushed rock;
 - .1 Geotechnical drilling is not required.
- .2 Investigate limits and legal boundaries of existing potential quarry sites and proposed quarry footprints and determine if expansion is required, or if a new quarry site is required, investigate and propose quarry footprint;
- .3 Materials sampling, identification and testing, including hardness tests;
- .4 Assess availability of materials for harbour construction, and;
- .5 Assessment of haul roads and bridges from quarry to harbour location.

2.7.10 LANDFORM AND SOIL STUDIES:

- .1 Collect samples of soils encountered for classification testing;
- .2 Grain size analysis and visual classification, and;
- .3 Surface sediment samples and testing to meet the minimum sampling required as described in the Disposal at Sea Guidelines.

2.7.11 DELIVERABLES

- .1 Six (6) submissions are required, refer to Schedule 1.6.2.
 - .1 Bathymetric and Topographic Survey
 - .1 Draft and final submission
 - .2 Orthoimagery
 - .1 Raw imagery and final submission
 - .3 Site Investigations and Studies
 - .1 Draft and final submission
- .2 Site Investigations and Studies



- .1 For the draft and completed submissions, collate the reports into individual site specific documents.
- .2 Revise as required
- .3 Provide one (1) electronic searchable PDF copy on the project FTP site.

2.8 FEASIBILITY STUDY SERVICE

2.8.1 SCOPE AND ACTIVITIES

- .1 Participate in meetings, prepare agenda, minutes and decision logs.
- .2 Visit the project site, analyse site conditions and document any conditions that will impact project delivery and design.
- .3 Provide Community Consultation to assess and document:
 - .1 Current usage existing harbour and docking facilities
 - .2 Boat sizes and number forecasts
 - .3 Impact of ice break-up and flushing
 - .4 Potential for sedimentation
 - .5 Ability to accommodate (room and board, fuel) the contractors work force
 - .6 Equipment availability in the community for construction and/or maintenance
 - .7 Assess the labour potential, including local contractors, from the local community to assist in the construction of the harbour or even to execute as the general contractor
- .4 Review, assess, and document:
 - .1 Existing facilities and operations:
 - .1 Any existing small craft facilities, including breakwaters, docks, and loading ramps;
 - .2 Fishing and hunting activities;
 - .3 Fuel re-supply, and;
 - .4 Cargo handling and sea-lift.
 - .2 Existing site conditions:
 - .1 Location, temperature, daylight hours, rainfall, snow, and wind;
 - .2 Seismic;
 - .3 Tides, water levels, wave action, storm surge, overtopping, currents, and sea ice.
 - .3 Existing resources available in each community:
 - .1 Fuel supply available for future construction activities
 - .2 Available land based construction equipment for construction and maintenance
 - .3 Available manpower for construction and maintenance
- .5 Identify any potential constraints to the development and construction of a small craft harbour, including but not limited to: permitting, local contracting capabilities, source of materials, road access, etc.



- .6 Conduct conceptual design studies exploring potential technical and environmental strategies which are viable for development. Each Design option must include:
 - .1 Breakwater(s) to ensure that wave agitation within the harbour does not exceed the design criteria outlined in the DFO Harbour Accommodation Guidelines, Version 1.2. A wave agitation study shall be undertaken to verify that each of the recommended design options meets this criteria.
 - .2 Harbour basin and/or entrance channels with sufficient depth to support the navigation of small craft vessels and the design vessel to the fixed wharf at low tide conditions. Sedimentation analysis shall be completed to ensure that any future maintenance dredging requirements are minimized and the estimated cost and frequency of future dredging requirements shall be included in the report.
 - .3 A fixed wharf for a design vessel that has a length of 28.53m, breadth of 7.77m, depth of 5.3m and net tonnage of 199.38 tonnes (similar to the Arctic Fisheries Alliance vessels Suvak and Kiviug 1). The fixed wharf shall be accessible to the design vessel at low tide conditions.
 - .4 Launch ramp for small craft vessels of 6 metre to 9 metres in length.
 - .5 Accommodation for small craft vessels ranging in length from 6 metres to 9 metres and a depth of 1.5m, utilizing SCH standard floating wharves, or by mooring bollards depending on the preference of each community.
 - .6 Harbour lighting and electrical service to the fixed wharf
- .7 Identify concerns expressed in Consultation meetings and proposed strategies to address concerns;
- .8 Analyse each conceptual design for compliance with the project functional and technical requirements;
- .9 Analyse each conceptual design for compliance with applicable codes, acts and regulations. If applicable, present alternate solutions for consideration by both the Departmental Representative;
- .10 Identify and document risks for each conceptual design and recommend corrective measures;
- .11 Consult with the local community stake holders to present preliminary results from field investigations and to determine their preferred conceptual option:
 - .1 Feedback on harbour layout options;
 - .2 Opportunities for expanding the harbour in the future at minimal cost, and;
 - .3 Mooring/float concept, including removal and reinstallation procedures (if applicable).
- .12 Update the Budget, schedule and risk analysis and identify any conflicts that will need to be addressed with respect to scope, quality, schedule, and cost:



- .1 Prepare a Class 'D' Cost Estimate for each option;
 - .1 CSC/CSI UniFormat™ 2010;
 - .2 Indicative (+/- 25%), UniFormat™ Level 2 detail is required;
 - .3 Include the Basis of Estimate (BOE) – refer to Definition.
- .2 For each conceptual option:
 - .1 Break down estimate by each component of the harbour:
 - .1 Wharf;
 - .2 Breakwater;
 - .3 Basin/channel dredging;
 - .4 Floating docks/mooring bollards;
 - .5 Launch ramp, and;
 - .6 Electrical.
 - .2 Include estimate for all approvals, engineering investigations and studies required for detailed design, and construction;
 - .3 Include cost and frequency of required maintenance and dredging.
- .13 Provide recommendation of preferred design option with a priority on minimizing future dredging and maintenance requirements;
- .14 Provide recommendation of further studies required for design development;
- .15 Provide projected timelines for completion of approvals, engineering investigations and studies required for detailed design, design work, permitting and construction for the recommended design option;
- .16 Facilitate a presentation of the Feasibility Report involving the Departmental Representative and User Department Representatives, and;
- .17 Anticipate minor revisions to the conceptual designs prior to sign-off by the Departmental Representative and User Department.

2.8.2 DELIVERABLES

- .1 Four submissions are required, refer to Schedule 1.6.2.
 - .1 Feasibility Report Outline
 - .2 First Draft
 - .3 Second Draft
 - .4 Completed Document
- .2 Feasibility Report Outline
 - .1 Provide a draft document indicating each section of to be included in the report.
 - .2 Include any currently collected information and describe information to be acquired in future studies or community consultations.
- .3 Feasibility Report documenting the Feasibility Study Service Scope and Activities.
 - .1 For the draft reports and completed submission, provide individual site specific documents.
 - .2 Revise as required.



-
- .3 Provide one (1) electronic searchable PDF copy on the project FTP site.



3 PROJECT ADMINISTRATION

3.1 GENERAL REQUIREMENTS

- .1 The administration requirements outlined in this section are applicable to all PWGSC projects in the Western Region, unless otherwise indicated in the TOR.

3.2 LANGUAGE

- .1 Construction documents must be prepared in English.

3.3 MEDIA

- .1 The Consultant shall not respond to any media inquiry.
- .2 Direct all media requests to the Departmental Representative.

3.4 PROJECT MANAGEMENT

3.4.1 GENERAL

- .1 PWGSC administers the project on behalf of Canada and exercises continual control over the project during all phases of development.
- .2 The PWGSC project management team, the Consultant Team, the Contractor and the User Department teams are to work cooperatively at every stage of the design and construction process in order to assure the creation of a successful project.

3.5 LINES OF COMMUNICATION

- .1 All communications will be through the Departmental Representative, unless directed otherwise.
 - .1 This includes formal contact between the Consultant Team, the Contractor, the PWGSC Project Team and the User Department.
- .2 Direct communication between members of the PWGSC Project Team on routine matters may be required for resolution of technical issues.
 - .1 However, this shall not alter project scope, Budget or schedules, unless confirmed in writing by the Departmental Representative.
- .3 During construction tender call, PWGSC will conduct all correspondence with bidders and award the contract.

3.6 MEETINGS

3.6.1 GENERAL

- .1 The Departmental Representative will arrange meetings throughout the project, with representatives from:
 - .1 The User Department;
 - .2 PWGSC, and;
 - .3 The Consultant Team.
- .2 Standing agenda items shall include:
 - .1 Project Schedule;
 - .2 Cost;
 - .3 Risk;
 - .4 Quality, and;



- .5 Health and Safety.
- .3 Project Start-up Meeting:
 - .1 Shall be arranged and facilitated by the Departmental Representative, and;
 - .2 Includes the PWGSC AECO Design Manager, User Department Representatives and the Consultant Team.

3.6.2 MEETING LOCATIONS

- .1 Meetings with PWGSC and the Consultant Team will normally be held via teleconference.
- .2 The Project Start-up Meeting with PWGSC, the User Department and the Consultant Team will be held:
 - .1 DFO Small Craft Harbours, Winnipeg, MB.
- .3 The Community Consultations, refer to Section 2.5, will be held in the respective community location.
 - .1 Community Consultation 1, one (1) meeting in each of:
 - .1 Chesterfield Inlet, NU
 - .2 Coral Harbor, NU
 - .3 Naujaat, NU
 - .4 Sanikiluaq, NU
 - .2 Community Consultation 2 and Open House, two (2) meetings in each of:
 - .1 Chesterfield Inlet, NU
 - .2 Coral Harbor, NU
 - .3 Naujaat, NU
 - .4 Sanikiluaq, NU

3.7 CONSULTANT RESPONSIBILITIES

- .1 The Consultant Team includes the Consultant's staff, sub-consultants and specialists.
 - .1 This team must maintain the same, or better, level of expertise, as presented in their proposal, for the duration of the project;
 - .2 The team must include qualified registered architectural and engineering professionals with extensive relevant experience and who are capable of providing all required services;
 - .1 Professional registrations / certifications must remain current.
 - .3 Team members may be qualified to provide services in more than one discipline, and;
 - .4 The Consultant may expand the team to include additional disciplines.
- .2 The Consultant is responsible for:
 - .1 Obtaining Departmental Representative Acceptance for each project phase before proceeding to the next phase;
 - .2 Accurately communicating design, budget, and scheduling issues to staff, sub-consultants and specialists;



- .3 Coordinating input for the Departmental Representative's Risk Management Plan, and;
- .4 Developing and coordinating a comprehensive quality assurance process to ensure that submissions are accurate, complete and meet TOR requirements.

3.7.2 PROJECT MILESTONES

- .1 Attend meetings.
- .2 Record the issues and decisions.
- .3 Prepare and distribute minutes within two (2) working days of the meeting.
- .4 Ensure sub-consultants attend all required meetings.

3.8 PWGSC RESPONSIBILITIES

3.8.1 ADMINISTRATION

- .1 PWGSC administers the project and exercises continual control over the project during all phases of development.
- .2 The following administrative requirements apply during all phases of the project delivery.

3.8.2 REVIEWS

- .1 PWGSC will review the Work at various stages and reserves the right to reject unsatisfactory Work at any stage.

3.8.3 ACCEPTANCE

- .1 PWGSC Acceptance of submissions from the Consultant simply indicates that - based on a general review - the material complies with governmental objectives and practices, and meets overall project objectives.
- .2 Acceptance does not relieve the Consultant of professional responsibility for the Work or compliance with the contract.

3.8.4 PWGSC PROJECT MANAGEMENT

- .1 The Project Manager assigned to the project is the Departmental Representative.
- .2 The Departmental Representative is directly responsible for:
 - .1 The progress and administration of the project, on behalf of PWGSC;
 - .2 Day-to-day project management and is the Consultant's single point of contact for project direction, and;
 - .3 Providing authorizations to the Consultant on various tasks throughout the project.
- .3 Unless directed otherwise by the Departmental Representative, the Consultant obtains all Federal approvals necessary for the Work.

3.8.5 PWGSC ARCHITECTURE AND ENGINEERING CENTRE OF EXPERTISE (AECOE)

- .1 Provides advisory services and Quality Assurance Reviews of Consultant deliverables.



- .2 Participates regularly in design and construction Project Milestones and may attend meetings as and when required.
- .3 Provides a Design Manager for the project who will coordinate the services of AECO.

3.9 USER DEPARTMENT RESPONSIBILITIES

3.9.1 USER DEPARTMENT PROJECT LEADER

- .1 Is accountable for the expenditure of public funds and delivery of the project in accordance with the terms accepted by the Treasury Board.
- .2 Reports to the senior User Department executive management.
- .3 Will play several critical roles for the successful implementation of the project, including:
 - .1 Coordination of the quality, timing and completeness of information and decisions relating to issues related to the functional performance of the facility.

3.10 TECHNICAL REPORTS

- .1 Technical Reports are official government documents, which are used to support an application for approval or to obtain authorization or Acceptance. Technical Reports must:
 - .1 Be complete, clear and professional in appearance and organization, with proper reference to related parts and contents in the report;
 - .2 Clearly outline the intent, objectives, process, results and recommendations;
 - .3 Present the flow of information and conclusions in a logical, easy to follow sequence;
 - .4 Be in written narrative, graphic, model (traditional and/or computer generated), and photographic format, which can be web enabled;
 - .5 Have all pages are numbered in sequence, and;
 - .6 Be printed double-sided, if hard copies are produced.
- .2 Standard practice for the organization of technical reports include:
 - .1 A cover page, clearly indicating the nature of the report, the date, the PWGSC project number and who prepared the report;
 - .2 A Table of Contents;
 - .3 An Executive Summary;
 - .1 A true condensed version of the report following the identical structure, including only key points and results/recommendations requiring review and/or approval;
 - .4 The body of the report is to be structured such that the reader can easily review the document and locate, respond to and/or reference related information contained elsewhere in the report easily;
 - .5 Appendices are to be used for lengthy segments of the report, supplementary and supporting information and/or for separate related documents.
- .3 The report content must:



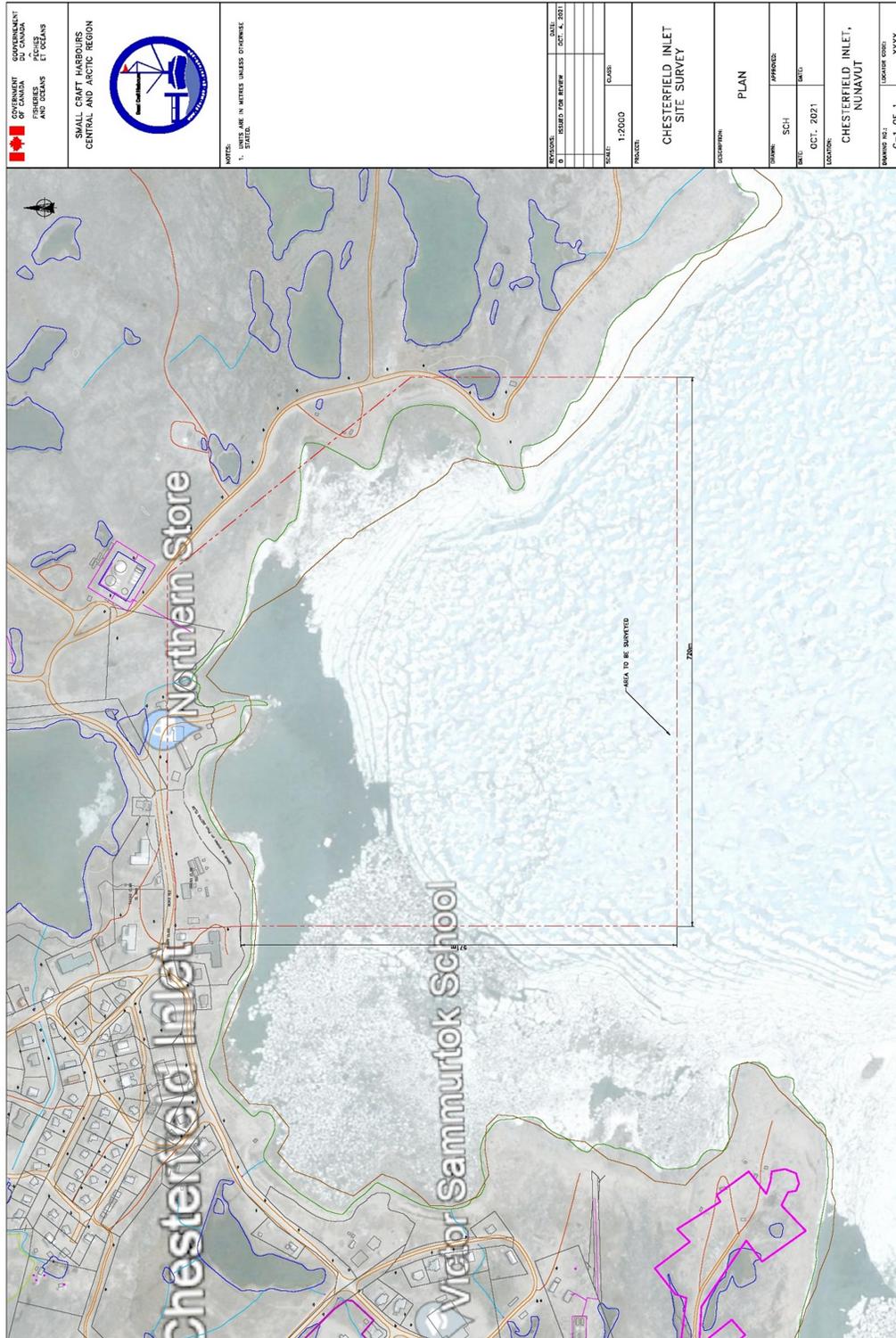
- .1 Use a proper numbering system (preferably legal numbering), for ease of reference and cross-reference;
 - .1 The use of 'bullet points' are to be avoided.
- .2 Use proper grammar, including using complete sentences, for clarity, to avoid ambiguity and facilitate easy translation into French, if required;
 - .1 The use of undefined technical terms, industry jargon and cryptic phrases are to be avoided.
- .3 Be written as efficiently as possible, with only essential information included in the body of the report and supporting information in an appendix if needed.



4 APPENDIX A

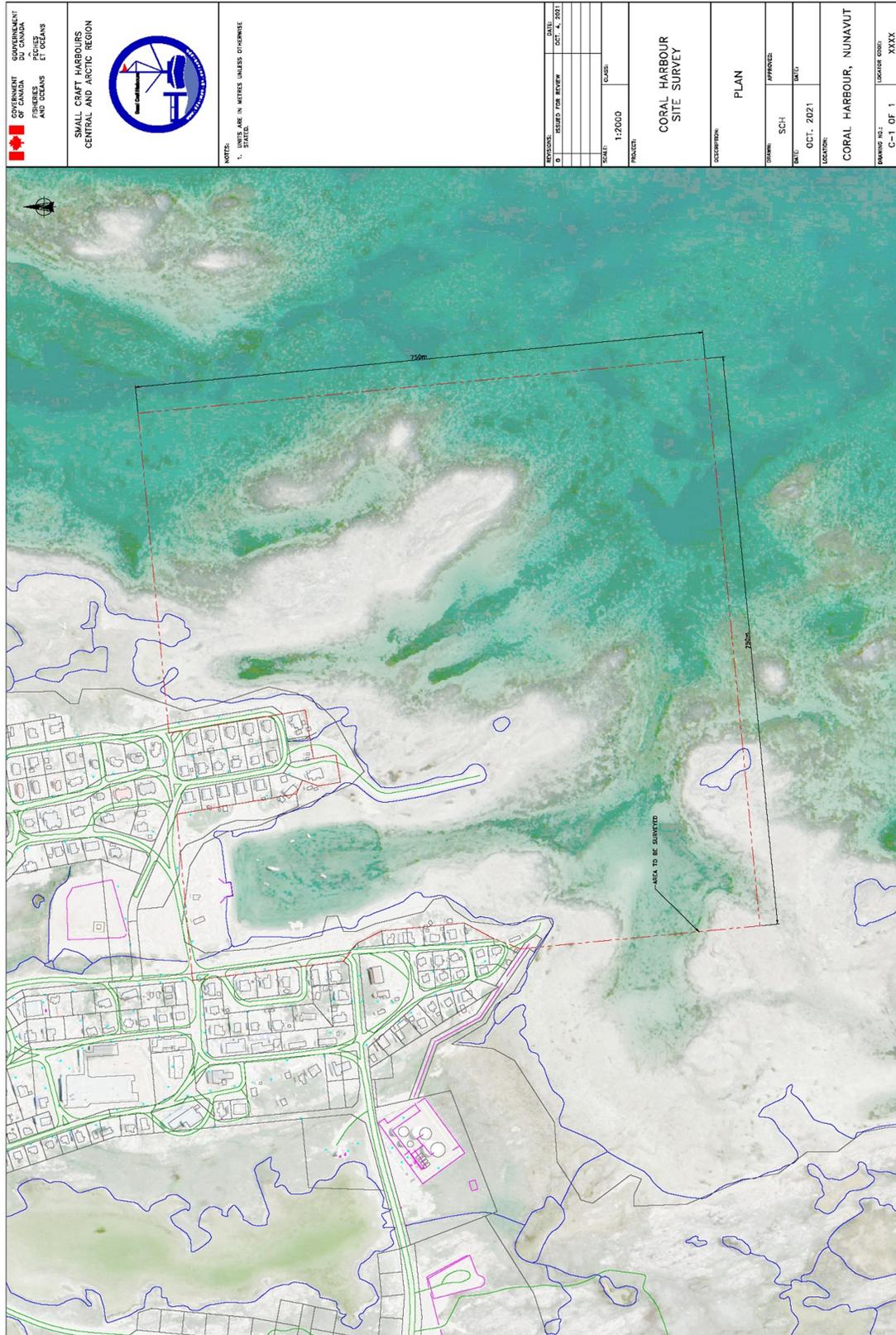
4.1 SITE LOCATIONS

4.1.1 CHESTERFIELD INLET, NU





4.1.2 CORAL HARBOUR, NU





4.1.3 NAUJAAT, NU





4.1.4 SANIKILUAQ, NU





5 DEFINITIONS

5.1 PURPOSE

5.1.1 DOCUMENT DEFINITIONS:

- .1 Definition of words and phrases in the Terms of Reference (TOR), and *Doing Business with PWGSC – Documentation and Deliverables Manual* to:
 - .1 Expand the detail associated with the services and deliverables addressed in the above Documents, and;
 - .2 Provide a clear understanding of the project scope, procedures, and quality performance requirements.

5.2 DEFINITIONS

5.2.1 ACCEPTANCE

- .1 A formal action taken by an assigned person with authority (contractual or otherwise) to declare some aspect of the project is permitted to proceed.

5.2.2 BASE BUILDING

- .1 As per Government of Canada Workplace Fit-Up standards.

5.2.3 BASIS OF DESIGN (BOD)

- .1 Refer to CSA Z320 Article 3, Definitions.
 - .1 For further detail refer to ASHRAE 202, Article 8 – Basis of Design, Article 8.2 – Requirements.
- .2 A dynamic narrative document throughout the Project Milestones, recording the rationale for decisions and confirming to the Project Team design conformance to the ideas, concepts and criteria considered important to the owner as contained in the Owner Project Requirements (OPR) - for OPR see Definition;
 - .1 As the Consultant BOD also outlines the intended systems for the project, the Consultant's Cx Process Manager/Cx Authority, using a compliance evaluation/tracking matrix, confirms the BOD's compliance to the OPR.
- .3 Documents the primary thought processes and assumptions behind design and implementation decisions.
- .4 Text and graphics are organized to facilitate future use as a building reference document.
 - .1 The O&M Manual describes "what" components/systems have been selected, the BOD describes "why" and "how" the design achieves the performance requirements of the OPR, and;
 - .2 BOD and OPR are components of the Cx Manual.
 - .1 OPR - refer to Definition for further information.
- .5 Includes:
 - .1 A Summary:
 - .1 Project's conceptual framework;



- .2 Compliance with OPR statement (including new Owner directives);
- .3 Compliance with the Functional Program, and;
- .4 Rationale for decisions made throughout the specific Project Milestone.
- .2 Design assumptions, such as:
 - .1 Anticipated future changes not included in the project, and;
 - .2 Selected assembly and system performance requirements.
- .3 A Unifomat™ Level 3 detail narrative description and statement on the purpose of the selected components, assemblies, systems and methods – see PPDFormat™ Definition, including:
 - .1 Areas served by the respective components, assemblies and systems, and;
 - .2 Illustrations of system configurations, including single line and plan drawings of each system.
- .4 Design options and analysis considered during the:
 - .1 Life Cycle Costing and Value Engineering workshops, and;
 - .2 Development of sustainable features and strategies.
- .5 Calculations and option analysis matrixes, organized by discipline, including:
 - .1 Connected or related loads and system capacities, and;
 - .2 Design criteria and the applicable codes/standards used in the calculations.
- .6 Special features or unique supply items/sources, general control strategies, sequences, and reset schedules, such as:
 - .1 Building components and connectivity;
 - .2 Seasonal switch-over procedures, and;
 - .3 Emergency procedures during a fire condition, power or equipment failure, including:
 - .1 Reference to Standard Operating Procedures requirements and definition.
- .7 Interfaces with existing systems, and;
- .8 Maintenance issues.

5.2.4 BASIS OF ESTIMATE (BOE)

- .1 A “living” document throughout the project design, construction process and project life cycle.
- .2 Provides a framework for progress monitoring and reporting.
- .3 Prepared and updated to facilitate the understanding, assessment and validation of the estimated value breakdowns, independent of any other supporting documentation.
- .4 Includes:
 - .1 Level of consensus between concurrent/third party estimates;
 - .2 Estimate methodology;
 - .3 Basis of pricing - cost data sources, and allowances;



- .4 Description of information obtained and used in the estimate including the date received; such as, background supporting material – Scope, Description of mark-up & add-ons, etc.
- .5 Notable assumptions, exclusions and inclusions;
- .6 Listing of items/issues carrying notable risks;
- .7 Opportunities, and any deviations from standard practices;
- .8 Record of pertinent communications and agreements that have been made between the estimator and other project stakeholders;
- .9 Major changes relative to previous estimates; in tabular or spreadsheet format, including:
 - .1 Cost reconciliation and cost variance with detail narrative, and;
- .10 Significant market events that may influence the costs.
- .5 With the last submission include:
 - .1 Variances related to:
 - .1 Change Orders;
 - .2 Work Package estimate, and;
 - .3 Estimate Construction Cost.
 - .2 Price quotes from suppliers, guidelines that are used to guide estimates, bottom-up estimates, parametric estimates-details to generate estimates, analogous estimate-details of the historical project used, third party estimates, analysis-details of any analysis, validations & approvals.
- .6 Detailed Elemental Cost Estimates; must be itemized separately to Material, Labour and Equipment Cost.
- .7 Refer also to the "Cost Estimate" Definition.

5.2.5 BUDGET

- .1 Developed using Cost Estimates and the Project Schedule.
- .2 Provides a view of how much the project is estimated to cost both in total and periodic terms.
- .3 Determines the cost performance baseline for use in cost management variance analysis such as, determining earned performance value.
- .4 Is aligned with funding limits to confirm funding availability/appropriation.
- .5 Also refer to - Estimated Construction Cost definition.

5.2.6 "CANADA", "CROWN"/"HER MAJESTY"

- .1 Her Majesty the Queen in right of Canada.

5.2.7 COLLABORATIVE PROJECT DELIVERY

- .1 The Collaborative Project Delivery approach promotes and facilitates knowledge collaboration between design and construction professionals and subject matter experts to create optimal design and construction solutions and methodologies in order to achieve an appropriate, timely and fiscally responsible Quality project delivery.
 - .1 Recognizes that project success is tied to all Project Team members' success in the integrated process.



- .1 The Collaborative Project Delivery process starts at the Pre-Design with Departmental Representative as Lead Partnering Session and the Consultant, as Lead, project start-up meeting early in Schematic Design.
 - .1 Collaborative Project Delivery is an interactive process which continues throughout the project life cycle.
- .2 Joint Project Team goals include:
 - .1 Ownership and focus on Quality including, Owner Project Requirements (OPR), Basis of Design (BOD) as well as Budget and schedule performance;
 - .2 Focus on optimizing the design and construction as a whole to fulfill the PWGSC Quality expectations;
 - .3 Mutual support for the project procedures and management;
 - .4 Leveraging Value Engineering, Life Cycle Costing and commissioning skills, and;
 - .5 Creation of an innovative learning environment.

5.2.8 COMMISSIONING AUTHORITY

- .1 Refer to the:
 - .1 Commissioning Process Manager (CPM) Definition for description of Cx Authority and part of the Consultant Team;
 - .2 CSA Z 320, Article 3 Definitions for Third Party description;
 - .3 TOR for the requirement of a Cx Authority as a part of the Consultant Team membership or of an independent third party Cx Authority to be separately engaged by PWGSC.

5.2.9 COMMISSIONING EVALUATION REPORT

- .1 A Cx Manual component.
- .2 Includes a debriefing report, with aspects such as:
 - .1 A complete assessment of the project;
 - .2 Lessons learned;
 - .3 Variances between the actual and planned levels of performance;
 - .4 A listing of components and systems not commissioned and the reasons;
 - .5 Recommended follow-up actions including Re-commissioning.

5.2.10 COMMISSIONING (Cx) MANUAL

- .1 Deliverable by Consultant's Cx Process Manager/Cx Authority.
- .2 Contains the following:
 - .1 Updated Owner Project Requirements (OPR);
 - .2 Updated Basis of Design (BOD);
 - .3 Updated Commissioning Plan;
 - .4 Static Verification, start-up and Functional Performance Testing reports;
 - .5 Commissioning Report;
 - .6 User and operator training reports;
 - .7 Occupancy and operations evaluation reports;



- .8 All relevant project reports and correspondence, and;
- .9 Recommendations for Re-commissioning and frequency by equipment type and system.
- .3 Requires Cx Process Manager/Cx Authority sign-off at a Construction Contract Substantial Performance and Completion (final) milestones.

5.2.11 COMMISSIONING (Cx) PLAN

- .1 Deliverable by Consultant's Cx Process Manager/Cx Authority.
- .2 Refer to CSA Z320 Article 4.2.3 Commissioning Plan.
 - .1 For further detail refer to the following ASHRAE 202 Articles:
 - .1 Article 7 – Commissioning Plan, Article 7.2 – Requirements;
 - .2 Article 10 – Design Review, Article 10.2 – Requirements;
 - .3 Article 11 – Commissioning Submittal Review – Article 11.2 Requirements;
 - .4 Article 15 – Training, Article 15.2 Requirements.
 - .3 A dynamic document throughout the project life cycle.
 - .4 Outlines a Plan to execute the scope of Work.
 - .1 The ongoing Plan development is carried out through iterative reviews, workshops, and meetings to ultimately become the complete plan including construction and occupancy milestones of the project.
 - .5 "Design Phase" (Pre-Design) Cx Plan:
 - .1 Cx Plan is based on the Programming, OPR and Acceptance of risk and Budget;
 - .1 Outlines a preliminary execution plan including activities, Cx Team roles and responsibilities, schedules and deliverables for pre design and subsequent design and BOD ultimately be updated and completed during the construction and occupancy milestones.
 - .6 "Design Phase" (Schematic Design, Design Development and Construction Documents) Cx Plan:
 - .1 Cx Plan is updated to address the remaining Project Milestones including construction documentation, construction and occupancy. The Cx Plan includes;
 - .1 Detailed tasks, roles and responsibilities, schedule, work flow processes and a list of the systems to be commissioned, and;
 - .2 Coincides with the design documents such as the specifications so that the Commissioning Team is clear on the goals and process.
 - .3 Refer to CSA Z320 Article 4.3. – Design Phase, Article 4.3.1, General.
 - .1 For further detail refer to ASHRAE 202, Article 10 Design Review – Article 10.2 Requirements.
 - .7 "Construction Phase" Cx Plan:
 - .1 During the Construction milestone, the updated Cx Plan continues to outline the Cx Team's roles and responsibilities, implementation of



issues resolution protocol, the procedures and forms for documenting commissioning activities and the schedules for commissioning activities, reporting and deliverables.

- .2 Refer to CSA Z320 Article 4.4 – Construction Phase, Article 4.4.1, General.
 - .1 Add the following requirements:
 - .1 Cx schedule, and Installation start-up lists.
 - .2 For further detail refer to ASHRAE 202, Article 11 Commissioning Submittal Review –Article 11.2 Requirements.

5.2.12 COMMISSIONING (Cx) PROCESS

- .1 Refer to CSA Z320 Article 4, Commissioning Process.
- .2 A dynamic document throughout the project life cycle.
- .3 The process by which the design and construction documents (plans, sections, specifications, BOD, etc.) are confirmed to be consistent with each other; includes the commissioning requirements and the OPR.
- .4 During the Cx design reviews the Consultant is ultimately responsible for the project design and final decisions regarding the design expected performance.
 - .1 Supporting the Cx Process may also be the Consultant’s Commissioning Process Manager/Cx Authority to lead the Cx Team in the design and implementation of the Process that may involve, for example either;
 - .1 A third party Cx Provider company, procured by PWGSC) or,
 - .2 A Contractor’s Cx Agent.

5.2.13 COMMISSIONING PROCESS MANAGER (CPM)

- .1 Cx functional entity:
 - .1 May also be identified as Cx Authority entity.
- .2 Member of the Consultant Team.
- .3 Overall functional responsibilities is to lead the Commissioning Team in the:
 - .1 Design of the Commissioning Process so that it begins with commissioning of individual components and progresses to commissioning the complete integrated building system as a whole, and;
 - .2 Update of the BOD and OPR during design and construction.
- .4 Dependent the requirement for independence from the design and construction management, the CPM may include the functional role and be identified as a functional Commissioning Authority entity in, for example, the Cx Plan Specification, article - Roles and Responsibilities of the Cx Team:
 - .1 Regarding “independent Commissioning Authority” requirements, refer to Canada Green Building Council (CGBC).
- .5 Requires a unique combination of engineering, design fundamentals and building operations knowledge including: energy systems design, installation and operation, commissioning planning and process



management, hands-on field experience with energy systems performance, interaction, start-up, balancing, testing, troubleshooting, operation and maintenance procedures, and energy systems automation and controls.

- .6 Responsible for Cx deliverables, such as:
 - .1 Sequencing;
 - .2 Means and methods;
 - .3 Verification of installation and performance to BOD and OPR;
 - .4 Documentation and related sign-offs, and;
 - .5 Manuals.
- .7 Cx Process Manager/Cx Authority, unless otherwise stated, will only make recommendations, and observations during the design review.

5.2.14 COMMISSIONING RECORD CHECKLIST

- .1 Refer to CSA Z320 Article 4.9, Final Documentation.
 - .1 Add to Article 4.9.3, Additional Commissioning Documentation, the following requirements:
 - .1 Certificate of Interim Acceptance;
 - .2 Final Certificate of Completion;
 - .3 Deferred Cx Test Report;
 - .4 System and Environmental Check Reports e.g. Storage Tanks;
 - .5 Final Cx Report;
 - .6 Cx Evaluation Report, and;
 - .7 Final Standard Operation Procedures.
 - .2 Cx Record Checklist outlines the deliverables to be assembled and updated over the course of the Design, Construction and Delivery Close Out.
 - .3 Cx Record Checklist may include sections such as:
 - .1 Commissioning Plan;
 - .2 Commissioning Schedule;
 - .3 Owner's Project Requirements (OPR);
 - .4 Basis of Design (BOD);
 - .5 Project Team, complete with functional entity titles;
 - .6 Design QA Review compiled reports;
 - .7 Project Issues/Resolutions Logs;
 - .8 Cx Issues/Resolutions Logs;
 - .9 Commissioning meeting minutes;
 - .10 Commissioning specifications;
 - .11 Commissioning forms and check sheets;
 - .12 Commissioning site reports;
 - .13 Coordination drawings;
 - .14 Testing and inspection procedures;
 - .15 System start-up plans;
 - .16 Construction Checklists;



- .17 Inspection reports;
- .18 Test reports;
- .19 Commissioning test certifications;
- .20 Training plans;
- .21 Training documentation – electronic and hard copy;
- .22 Deferred testing documentation;
- .23 Post-construction review/re-inspection report;
- .24 Systems Manual;
- .25 Operations and Maintenance Manual; and
- .26 Re-commissioning Manual.

5.2.15 COMMISSIONING REPORT

- .1 Deliverable by Consultant’s Cx Process Manager/Cx Authority.
- .2 A Cx Manual Component (at Construction Contract Substantial Performance and Completion – final/post Warranty) milestone.
 - .1 Requires CPM/Cx Authority sign-off and Consultant verification at Substantial Performance and Completion.
- .3 The Cx Report (at Substantial Performance) is based on:
 - .1 Final BOD and OPR;
 - .2 System components list requiring commissioning;
 - .3 Final performance verification forms and check sheets: component, systems and integrated systems - design values to actuals;
 - .1 Static, installation, start-up, functional performance and integrated system verification;
 - .4 All commissioning site review reports;
 - .5 Commissioning issue logs and progress reports;
 - .6 Final training sessions;
 - .7 Post occupancy changes;
 - .8 Deferred commissioning; and
 - .9 Current information not available or incomplete at Interim Acceptance/Substantial Performance.
- .4 A Final Commissioning Report (prior to end of Warranty Period), which includes:
 - .1 Final Cx Evaluation Report;
 - .2 Updated Cx Report from Substantial Performance;
 - .3 Post-Occupancy test results and evaluations; and
 - .4 Updated Issues/Resolutions Log – highlighting documented Cx resolutions.
- .5 All progressive/interim Acceptances requiring all Project Team members to sign-off.

5.2.16 COMMISSIONING RISK ASSESSMENT

- .1 Deliverable by Consultant’s Cx Process Manager/Cx Authority.



- .2 The Cx Risk Assessment aligns the rigor of the Commissioning Process with the following 2 risk items associated with Architectural and Engineering systems:
 - .1 Building: The function and performance; and
 - .2 Deliverables: The deficiencies, such as, inaccurate as-built documentation, ineffective owner/occupant training, lack of documented system performance testing, and lack of comprehensive systems manuals.
- .3 The Cx Risk Assessment is often summarized in a matrix and accompanied by a basis of assessment narrative.
- .4 The premise of the Cx Risk Assessment is to identify:
 - .1 Building type and the intended use as a guide for Cx risk associated with the intended building systems; and
 - .2 How the performance of each system will affect the performance of all other systems, and how non-performance in the building may have a negative impact on function and operational confidence.

5.2.17 COMMISSIONING SCOPE

- .1 Facilitated deliverable by Consultant's Cx Process Manager/Cx Authority.
- .2 Conducted by a Cx Team.
- .3 An integrated developmental process for determining the level of Cx effort based on the scope, rigor, OPR, building operation and function, including:
 - .1 Cx prioritization; and
 - .2 Cx Risk Assessment.

5.2.18 COMMISSIONING TEAM (CX TEAM)

- .1 The objective of the team is to encourage interdisciplinary collaboration to confirm the Cx Process is completed and the facility criteria has been achieved.
- .2 Cx Team composition is first identified and defined at the Pre-Design milestone, followed by an integrated development of a Cx Process and the assignment of the Cx roles and responsibilities and corresponding services and deliverables.
- .3 Size and membership varies depending on the project size, complexity and phase of design and construction.
- .4 Team make-up may consist of a:
 - .1 Departmental Representative – including PWGSC Cx Manager;
 - .2 User Department – O&M Personnel;
 - .3 Consultant(s) (dependant on the TOR, including Consultant's Cx Authority);
 - .4 Contractor's Agent; and
 - .5 Contractor's Agencies.

5.2.19 CONTRACTOR'S COMMISSIONING AGENCIES

- .1 To be identified as the in the specifications as the "Contractor's Sub-Contractor Commissioning Agency/Agencies" (CS-CCxA) functional



entity/entities, in the Cx Plan Specifications, article - Roles and Responsibilities of the Cx Team. Includes Agencies, such as:

- .1 Installing contractor/sub-contractor;
 - .2 Equipment manufacturers, such as, elevators, emergency generators;
 - .3 Specialist Cx Agency, Cx Work outside the scope or expertise of other Cx Agencies, Work such, as environmental space condition, air quality; and
 - .4 TAB Agency, such as adjusting flow rated and pressure related to ducted air and hydronic systems, fans and pumps.
- .2 Available for emergency and troubleshooting service during the first year of occupancy and modification outside the responsibilities of the O&M personnel.

5.2.20 CONTRACTOR'S COMMISSIONING AGENT

- .1 Responsibilities are distinct from the Contractor's site supervisor.
- .2 To be identified in the specifications (Cx Plan Section, article – Roles and Responsibilities of the Cx Team,) as the "Contractor's Commissioning Agent" (CCxA) functional entity.
- .3 Responsible for the implementation of all commissioning activities required by the specifications, including demonstrations, training, testing, preparation and submission of testing reports.
- .4 Available for emergency and troubleshooting service during the first year of occupancy and modification outside the responsibilities of the O&M personnel.

5.2.21 CONSTRUCTABILITY

- .1 The extent to which the design of the building facilitates the ease of construction, which is subject to the overall requirements for the completed building project.
- .2 The effective and timely integration of construction knowledge into the conceptual planning, design, construction, and field operations of a project to achieve project goals and building performance at the optimal level by:
 - .1 Implementing a Quality project delivery process which also meets the project objectives in the best possible time and accuracy at the most cost-effective levels; and
 - .2 A balance of various project, environmental and market constraints.

5.2.22 CONSTRUCTION CHECKLIST – CHECKS AND TESTS

- .1 Also known as Contractor's Cx "systems readiness checklist".
- .2 Confirms specified equipment is provided, undergone Static Verification, properly installed, initially Started-up and checked out in preparation for full operation and Functional Performance Testing.
- .3 Refer to CSA Z320 Article 4.4 – Construction Phase.
 - .1 Add to Article 4.4.2 – Pre-construction the following requirements:
 - .1 Cx schedule, and Installation start-up lists.

5.2.23 CONSULTANT



- .1 Architectural/Interior Design/Engineering firm acting in the capacity of Prime Consultant and professional of record for the provision of services described in the TOR.
 - .1 The Consultant manages and coordinates the Consultant Team (refer to Definition).

5.2.24 CONSULTANT TEAM

- .1 The Consultant (architectural/interior design/engineering firm and Prime Consultant) and their sub-consultants including professionals and advisors with whom PWGSC has contracted to provide other services described in this TOR.

5.2.25 COST ESTIMATE

- .1 Refer to the *Doing Business with PWGSC Documentation and Deliverables Manual*, Section 3 - Cost Estimates for further Cost Estimate details.
- .2 Cost Estimate as compared to the Budget – see Definition.
- .3 Estimates cost of the Work associated with the overall project at each Project Milestone, and tender packages, Division 01 General Requirements and other supporting activities within the project lifecycle.
- .4 Cost breakdown estimating is formatted as per PPDFormat™ and MasterFormat™ National Master Specifications:
 - .1 During Schematic Design (SD) – Uniformat™ Level 3 detail;
 - .1 For further detail refer to Preliminary Project Description (PPD/PPDFormat™) Definition.
 - .2 During Design Development (DD) – as per Uniformat™ Level 4 detail;
 - .1 For further detail refer to Preliminary Project Description (PPD/PPDFormat™) Definition, and;
 - .3 During Construction Documentation (CD) – as per Uniformat™ Level 5 detail and as per MasterFormat™ - Divisional and Sectional details;
 - .1 National Master Specifications (NMS) is the basis for construction specifications.
- .5 For all Cost Estimates include the Basis of Estimate (BOE) – refer to Definition.

5.2.26 CONSTANT DOLLAR ESTIMATE

- .1 This is an estimate expressed in terms of the dollars of a particular base fiscal year.
- .2 It includes no provisions for inflation.
- .3 Cash Flow over a number of fiscal years may also be expressed in constant dollars of the base year including no allowance for inflation in the calculation of costs.
 - .1 For Current Dollar Estimates – see Definitions.

5.2.27 CURRENT DOLLAR ESTIMATE

- .1 Budget Year Dollars is also to be referred to as Nominal dollars.



- .2 An estimate based on costs arising in each Fiscal Year (FY - ending March 31) of the project schedule.
- .3 Escalated to account for inflation and other economic factors affecting the period covered by the estimate.
- .4 Costs and benefits across all periods should initially be tabulated in Budget Year Dollars for the following reasons:
 - .1 It is the form in which financial data is usually available;
 - .2 Tax adjustments are accurately and easily made in Budget year dollars; and
 - .3 It enables during analysis, the construction a realistic picture which takes into account changes in relative prices.
- .5 Constant Dollar Estimate – see Definitions.

5.2.28 DEPARTMENTAL REPRESENTATIVE (DR)

- .1 The person designated in the Contract, or by written notice to the Contractor/Consultant, to act as the Departmental Representative for the purposes of being a Contract entity.

5.2.29 ESTIMATED CONSTRUCTION COST

- .1 The Budget identified in the TOR or subsequently in writing by the Departmental Representative:
 - .1 Also stated as “Cost Estimate”.

5.2.30 FACILITY TURNOVER

- .1 Refer to CSA Z320 Article 4.7, Facility Turnover Activities.
 - .1 Add to Article 4.7 the following review requirements:
 - .1 Review signatories, client/stakeholder, of a document agreeing to accept project outcomes and/or on the condition that all recorded deficiencies are to be addressed as appended;
 - .1 Facility Turnover Activities are required where the project or part of the project (“partial interim occupancy”) is being turned over.

5.2.31 FIT-UP STANDARDS

- .1 Space and cost (funding) allocation and workplace configuration and furnishing as per Framework for Office Accommodation and Accommodation Services – Government of Canada Workplace Fit-Up Standards, GCworkplace Design Guide and the GCworkplace Space Planning Workbook.
 - .1 Departmental Representative will provide electronic copies.

5.2.32 FUNCTIONAL PERFORMANCE TESTING

- .1 Refer to CSA Z320 Article 4.5, Functional Performance Testing.
 - .1 For further detail refer to ASHRAE 202, Article 13 Issues and Resolution Documentation – Article 13.2 Requirements.
 - .1 Review Functional Performance Testing data entry in the Issues and Resolutions log according to ASHRAE 202, Section 13, including:
 - .1 Tests at peak load conditions as identified in the Cx Plan.



5.2.33 FUNCTIONAL PROGRAM

- .1 May be included in the RFP or may be a Pre-Design deliverable stating the end state functional and operational goals.
 - .1 The term “Functional Programming” is only one component of a “Programming” service which may also include technical programming, Master Schedules and program requirement cost estimates.
 - .2 Functional Programming documentation and supporting templates (e.g. questionnaires, workshops) are included in the GCworkplace documents for office accommodation projects (fit-ups).
- .2 Defines the design problem by determining the details for achieving the goals. Goals may include, but are not limited to, design considerations regarding:
 - .1 Architecture/Interior Design: Area needs, adjacencies, circulation, acoustics, health and safety, personnel forecasts, user characteristics, organizational structure, Budget and costs and project schedule;
 - .2 Engineering: HVAC, plumbing, electrical, security, and communications.
- .3 One of Three Program Levels of effort are use based on complexity and risk:
 - .1 Level 1 Program is used for small, relatively simple or repetitive types of projects where the standard requirements are well understood, includes;
 - .1 A summary of required useable spaces, along with net areas and general notes outlining specific space requirements;
 - .2 The approximate gross useable area required to accommodate the program;
 - .3 A description, in general terms, of the relationships between spaces and groups of spaces, in sufficient detail to commence the Schematic Design Stage;
 - .2 Level 2 Program is used for larger projects with some degree of complexity, includes;
 - .1 A summary of required useable spaces, along with net areas;
 - .2 An outline of specific technical and functional requirements for each space;
 - .3 The approximate gross area required to accommodate the program, determined by developing component diagrams;
 - .4 Relationship diagrams indicating adjacencies and flow patterns between spaces and groups of spaces, and;
 - .3 Level 3 Program is used for major projects and projects with a high degree of complexity, includes;
 - .1 A qualitative (functional) and quantitative (net area and gross area) description of all required spaces;
 - .2 Detailed Program Areas including;



- .1 Net useable area requirements for each space;
- .2 Component Gross area requirements for all component groups, and;
- .3 Gross Area Summary needed to accommodate the program;
- .3 An outline of specific Technical Requirements, indicating general Architectural, Structural, Mechanical, Electrical and Security systems applicable to the entire building and/or to each similar space types;
- .4 Room / Space Data Sheets, indicating specific requirements for each space type not covered in the technical requirements;
- .5 Space Concept Plans, associated with each Space Data Sheet, indicating all fixed equipment and any special features;
- .6 Component (Group or Department) concept planning diagrams indicating required relationships between all spaces in each component group;
- .7 Component Relationship Diagrams, indicating relationships between all component groups;
- .8 A Demonstration plan (to scale) to confirm that:
 - .1 Net to gross area ratios are reasonable; and
 - .2 Component group relationships can reasonably be achieved either within the established gross building area for new buildings or within the limitations of the building floor plate(s) for existing buildings.
- .9 Mechanical Schematic Zoning and Directional Air Flow Diagrams for laboratory projects.
- .4 Program Level selection and the associated level of detail is also determined by the Cx complexity and risk, providing further supporting information to the OPR development.

5.2.34 INTERIM ACCEPTANCE

- .1 Refer to CSA Z320 Article 4.6, Interim Acceptance.
 - .1 Add to Article 4.6 (i) the following requirements:
 - .1 System Operations Manual and Standard Operating Procedures, including;
 - .1 Normal and emergency mode of operations, and;
 - .2 Life and Safety Compliance Report.
 - .2 Interim Acceptance will be synonymous with Substantial Completion as per GC's of the Construction and Consultant Contract.

5.2.35 ISSUES/RESOLUTION (I/R) LOG

- .1 The I/R Log contains description of project issues and/or variances ranging from specifics such as with the Owner Project Requirements (OPRs) to general design and construction and related processes and deliverables.
 - .1 On an ongoing basis the log maintains the status of current/ongoing and resolved issues;



- .2 Issues are identified and tracked as encountered during all design phases, construction and operations of the facility.
- .2 I/R Log is also included as an item in:
 - .1 The meeting Design and Construction agenda; and
 - .2 The monthly construction phase report on the Cx Plan.
- .3 For more information on what needs to be documented also refer to ASHRAE Guideline, The Commissioning Process.

5.2.36 LIFE CYCLE COSTING (LCC)

- .1 LCC methodology, used during investment analysis and planning, design, construction and procurement, employs a comprehensive economic comparison of competing options.
- .2 Comparison of competing options is to be made between ideas similar in nature that are designed to satisfy the same basic function or set of functions.
- .3 LCC interpretation, as related to competing options assessment.
 - .1 The sum of the present values that are associated with investment costs, capital costs, installation costs, energy costs, operating costs, maintenance costs, and disposal costs, over the lifetime of the project.
- .4 Refer to industry standard practices for measuring life cycle costs of the building and building systems such as, ASTM Standards.
- .5 Also refer to Value Engineering (Assessment) Definition.

5.2.37 MASTER SCHEDULE (MASTER PROJECT SCHEDULE)

- .1 Refer to the *Doing Business with PWGSC Documentation and Deliverables Manual*.

5.2.38 MOVE PLAN

- .1 Identifies move tasks, dependencies, and task duration.
- .2 Explores potential move optimization and risk minimization.
- .3 Includes:
 - .1 Phasing, specific timeline/Gantt chart, order and process for relocations, hoteling (office) and final moves;
 - .2 Security protocols for interim and final moves;
 - .3 Drawings showing;
 - .1 All project furniture including new and reused, loose furniture, filing systems, equipment and appliances,
 - .2 Electrical and data services connections to furniture and interconnected panels (separate from electrical construction drawings).
 - .4 Swing space and interim storage requirements.

5.2.39 MOVE PROCESS

- .1 Requires coordination with the User Department's processes and protocols, including:
 - .1 Move specific resources and a Roles and Responsibilities matrix;
 - .2 Move activities and logistics associated with;



- .1 Pre-Move - supply of boxes, packing, data labeling requirements, etc.
- .2 Move Day - preventative operational downtime logistics,
- .3 Post Move – unpacking and walkthroughs, and
- .4 IT Moves – equipment/infrastructure disconnect/reconnect.
- .3 Meeting Schedule;
- .4 Checklists;
- .5 Occupational Health and Safety as per the Canada Labour Code; and
- .6 Compliance with the Contractor’s site specific safety plan.

5.2.40 OPERATION AND MAINTENANCE MANUAL(S) (O&M)

- .1 Developed throughout the project lifecycle.
- .2 Produced by the Construction Manager/Contractor and is part of the Collaborative Project Delivery integrated process and is supported by the Consultant and Departmental Representative.
- .3 Requires Cx Process Manager sign-off at contract Substantial Performance.
- .4 Prepared using product information report forms/data provided by Subcontractors, Own Forces and information from other sources as required.
- .5 Refer to NMS Division 01 General Requirements document for further detail.

5.2.41 OWNER PROJECT REQUIREMENTS (OPR)

- .1 Refer to CSA Z320 Article 3, Definitions.
 - .1 For further detail refer to ASHRAE 202, Article 6 - Owner’s Project Requirements, Article 6.2 – Requirements.
- .2 Developed by the Consultant, in consultation with “the Owner” - PWGSC/User Department, during the Pre-Design Project Milestone.
- .3 Text and graphics are organized to facilitate future use as a building reference document.
 - .1 BOD and OPR are components of the Cx Manual.
- .4 A dynamic document throughout the project lifecycle that defines the Owner’s values and end goals; their ideas, concepts and end state quantifiable and measurable performance benchmarks/criteria by usage, by systems and/or by occupancy classification associated with topics such as:
 - .1 Project Program – pertinent Functional (Space) Program extracts, such as;
 - .1 Basic facility data (such as, area, number of stories Occupancy and construction type(s)), user/area usage schedules, restrictions and limitations, expandability, flexibility and durability (life span).
 - .2 Environmental and Sustainability Goals including;
 - .1 LEED® certification, CO₂ monitoring, and resource reuse.



- .3 Energy Efficiency Goals including;
 - .1 Measures affecting lighting and HVAC energy efficiency such as orientation shading, ventilation and renewable power.
- .4 Indoor Environmental Quality Requirements regarding;
 - .1 Lighting, temperature and humidity, acoustics, air quality, ventilation and filtration, controls adjustability, after hour's accommodations, natural daylighting, ventilation and views.
- .5 Equipment and system Expectations, such as;
 - .1 Levels of quality, reliability, flexibility, maintenance, complexity and target efficiencies, building system technologies regarding manufactures, acoustics, vibration, degree of integration, automation and functionality for controls load shedding and demand and response energy management.
- .6 Building Occupant and O&M Personnel Expectations;
 - .1 Building operation description and by whom and at what capability, level of training and orientation for occupants and O&M staff.
- .7 Cx Process Manager Information;
 - .1 Name of Agency/Firm and contact person(s) and address name, address and personnel contact.
- .5 Starting with the Pre-Design project milestone the OPR is the foundation of the Commissioning Process - an integral part of Commissioning and future Re-Commissioning.
 - .1 Working through the various other Project Milestones is supported by the BOD documenting that the various decisions, concepts, designs, calculations, and product selections to meet the OPR.

5.2.42 PARTNERING SESSION WORKSHOP(S)

- .1 Partnering is used in the architecture, engineering and construction industry and is intended to assist Project Teams with setting goals, resolving disputes and improving project outcomes.
- .2 Workshop(s) are facilitated by the Consultant or designate. Participants include the Owner/User Department, Project Team and other stakeholders. Initial workshops establish relationships and ground rules, and then draw out essential client needs and design requirements.
- .3 Topics include, but are not limited to:
 - .1 Role and responsibilities matrix;
 - .2 Rules of engagement;
 - .3 Communication plan;
 - .4 Project status, goals, objectives, elements, scope, funding, and preliminary schedule;
 - .5 Deliverables plan;
 - .6 Measures of percentage complete and delivered;
 - .7 Issues tracking and documentation systems;
 - .8 Project risks and the initial Risk Management Plan;



- .9 Review of existing available documentation and project site conditions;
- .10 Schedule of biweekly (or as otherwise determined by the Departmental Representative) project and milestone meetings; and
- .11 Communication and document control plan.

5.2.43 PERMITS AND FEES

- .1 Refer to the Contract Documents, General Conditions (GCs).

5.2.44 PRELIMINARY PROJECT DESCRIPTION (PPD/PPDFORMAT™)

- .1 PPDFormat™ is a guideline document published by the Construction Specification Institute (CSI).
 - .1 A tool to evaluate the design practicality during the design phase.
 - .2 The guide assists with an appropriate level of documenting qualitative and quantitative descriptions of “functional elements” – Elements and their respective Elemental Components, systems and assemblies comprising the project during the Schematic Design (SD) and Design Development (DD) Project Milestones.
 - .1 Associated deliverables are integral documents of the SD and DD Reports.
 - .3 PPD is organized using the Uniformat™ hierarchical structure and corresponding Level of Detail (LoD) - levels 1–5.
 - .1 Elemental and Elemental Components LoD breakdowns parallel preliminary project cost estimating formats, providing corresponding quantitative cost estimates per functional element, elemental component and related qualitative descriptions.
 - .2 The Consultant and Departmental Representative are to agree on the LoD based on the required accuracy of the Cost Estimate to secure funding, manage cash flow or address risk.
 - .4 LoD may also be dependent on factors such as:
 - .1 How PPD may be used to throughout the design and documentation process to provide for opportunities, such as;
 - .1 Tracking decision progressions during design options development and final selection of preferred/optimum solution;
 - .2 Function elements complexities, and;
 - .3 Design decisions progression, such as, designing from the exterior into the interior.
- .2 Preferred delivery format during the SD and DD Project Milestones is the “Outline Format Full Page Example” on page number 25 of the PPDFormat™ Guide.
 - .1 The Outline Format facilitates design progression tracking throughout the design phase Project Milestones.
- .3 With reference to the “Outline Format Full Page Example” and the outlined Element Levels, the LoD during the SD and DD Project Milestones is as follows:



- .1 SD, Level 3 detail, complete with a "Description" article providing a generic description of the Level 3 functional element supported by a Basis of Design narrative may also be substantiated by the OPR;
 - .1 Corresponding, per Level 3 detail, Cost Estimate – Class 'C', +/- 15%.
 - .2 DD, Level 4 detail, complete with a "Description" article providing a generic description of the functional element supported by a Basis of Design narrative may also be substantiated by the OPR;
 - .1 Corresponding, per Level 4 detail, Cost Estimate – Class B, +/- 10%.
- .4 Construction Documents, Level 5 detail:
 - .1 While Levels 1-4 may be defined in PPDFormat™ for Levels 5 and beyond, UniFormat™ 2010 considers these Levels discretionary requiring user definition;
 - .2 Level 5 detail includes, as per "Outline Format Full Page Example", the following articles:
 - .1 Functional Requirements addressing Element overall requisite including;
 - .1 Performance Requirements of the assembly that are quantifiable, measurable and,
 - .2 Design Requirements that, for example, may affect cost or be related to design quality regarding aesthetic, utility, performance or impact, but are not directly component attributes.
 - .2 Components, a parts listing making up the functional element, complete with attributes that are prescriptive and/or performance based;
 - .1 Each Component is accompanied by a corresponding MasterFormat™ Section number to be the basis for Construction Documentation (CD) specifications.
 - .3 Additional outline headings to be considered include;
 - .1 Alternates, for consideration of their effect on cost or schedule,
 - .2 Material/equipment Location Schedules,
 - .3 Workmanship and Fabrication requirements affecting cost,
 - .4 Reports associated with Codes, fire and zoning searches.
 - .3 Corresponding, per Level 5 detail, Cost Estimate – Class 'A', +/- 5%.

5.2.45 PROJECT PROCEDURES PLAN

- .1 A dynamic and evolving Plan to establish how the design, construction and closeout process will be structured to deliver projects on time and within budget and scope.
- .2 A measure against which performance is evaluated and success is judged.
- .3 Includes items such as:



- .1 Organization and communication charts;
- .2 Master Project Schedule complete with a detailed Work Breakdown Structure;
- .3 Quality Management Plan, a procedures and documentation plan to determine for example documentation completeness and suitability, testing, inspection and submissions requirements;
- .4 Construction procurement options and /or number and sequence of tender packages;
- .5 Contracting/procurement strategies, bid packaging description, bidders' cost breakdowns;
- .6 Site mobilization;
- .7 Swing space;
- .8 Commissioning Plan;
- .9 Commissioning Issues Log;
- .10 Project Decision Log;
- .11 Risk issues log;
- .12 Record management plan (including e-mails) establishing procedure regarding collection recording, tracking, access and storage.

5.2.46 PROJECT MILESTONES

- .1 Pre-Design (PD)
 - .1 The Consultant Required Service includes activities such as:
 - .1 Analyse the Departmental Representative's information as may be presented at the time of Solicitation and the Project Start-up meeting; and
 - .2 Confirm, that based on the provided information, the Consultant is prepared to proceed with the Design Contract with regards to schedule, Cost Estimate, scope of Work and quality;
 - .1 Prior to proceeding with the design, the Consultant and the Departmental Representative may discuss additional services from the Consultant or Specialty Consultants,
 - .2 The TOR may pre-establish additional services, such as providing,
 - .1 OPR, and,
 - .2 Programming,
 - .3 Pre-Design documentation become the project delivery guiding documents, utilized throughout the project life cycle.
 - .2 Final Deliverable:
 - .1 Pre-Design Report.
 - .3 Progressive Deliverables, such as:
 - .1 OPR;
 - .2 Functional Program; and
 - .3 Response to PWGSC QA reviews.
- .2 Schematic Design (SD)
 - .1 The Consultant Required Service includes activities such as:



- .1 Based on the project criteria established during PD, facilitate and provide conceptual design related documents, as per the pre-established number of required distinction options, to facilitate a decision on the preferred and/or optimum solution to proceed to Design Development;
 - .1 Submit the analysis the different design options against the Owner's Project Requirements (OPR) and Functional Program (FP).
- .2 Provide SD documents such as drawings, reports, and other documentation or media to illustrate general scope, scale and relationships of project components, including;
 - .1 Plan form and massing;
 - .2 Site plan and appearance of the project in relation to orientation, topography, land use and utilities;
 - .3 Preliminary selection of assemblies, systems and load calculations;
 - .4 Approach to structural, mechanical and electrical systems, and
 - .5 Elemental and Elemental Component descriptions and Cost Estimates to PPDFormat™, Uniformat™ respective Levels of Detail as agreed upon with the Departmental Representative for the development the Preliminary Project Description PPD);
 - .1 Preliminary Project Description (PPD/PPDFormat™) – refer to Definition for further detail.
- .2 Final Deliverable:
 - .1 Schematic Design Report.
- .3 Progressive Deliverables, such as:
 - .1 Updated BOD and OPR;
 - .2 Cx Plan; and
 - .3 Response to PWGSC QA reviews.
- .3 Design Development (DD)
 - .1 The Consultant Required Service includes activities such as:
 - .1 Based on the SD design option selected, facilitate and provide documentation to define and describe all aspects of the project, with the purpose that all that remains is the formal Construction Documentation;
 - .2 Resolve any issues/coordination carried over from SD, refine design and coordinate all discipline details and finalize spatial, functional and operational performance requirements to minimize risk of modifications during Construction Documentation;
 - .3 Provide DD documents such as drawings, reports, and other documentation or media to illustrate and define the design concept in terms of, such as;
 - .1 Siting;



- .2 Plan form and massing;
- .3 Character and materials;
- .4 Structural, mechanical and electrical systems, and;
- .5 Elemental and Elemental Component descriptions and Cost Estimates to Unifomat™ Level of Detail 4;
 - .1 Refer to Preliminary Project Description (PPD/PPDFormat™) Definition for further detail;
- .6 Preliminary modeling and simulations (such as energy analysis and daylight simulation), and;
- .7 Cx Plan and Cx construction cost including testing procedures and check sheets/forms (as per CAN/CSA Z320) associated with;
 - .1 Static Verification;
 - .2 Start-up, and;
 - .3 Functional Performance Testing.
- .2 Final Deliverable:
 - .1 Design Development Report.
- .3 Progressive Deliverables, such as:
 - .1 Updated BOD and OPR;
 - .2 Cx Plan, and;
 - .3 Response to PWGSC QA reviews.
- .4 Construction Documentation:
 - .1 Refer to *Doing Business with PWGSC Documentation and Deliverables Manual*.
- .5 Tender:
 - .1 The Consultant Required Service includes activities such as;
 - .1 Provide assistance and advisory services as may be necessary to the Departmental Representative in, obtaining a competitive bid and in awarding a construction contract.
 - .2 Deliverables, such as;
 - .1 Addenda;
 - .2 Written responses to questions, and
 - .3 Bid analysis and/or recommendations.
- .6 Construction:
 - .1 The Consultant Required Services includes activities such as;
 - .1 Provide assistance and advisory contract administration services to the Departmental Representative to administer the construction contract as set out in the general conditions of the contract for construction;
 - .1 The Consultant is not an "Agent" of the Crown nor responsible for Contractor's performance.
 - .2 Act as Departmental Representative's professional advisor in interpreting the contract documents;
 - .3 Consult on the Contractor's performance, and;



- .4 Review the construction.
- .2 Deliverables;
 - .1 Multiple deliverables as per;
 - .1 Consultant's contract general conditions, and;
 - .2 TOR specified Deliverables.
- .7 Close Out:
 - .1 The Consultant Required Service includes activities such as;
 - .1 Provide assistance in the use and occupancy of the facility.
 - .2 Assist and advise Departmental Representative with;
 - .1 The Contractor's performance and guarantees documentation;
 - .2 Prior to the 12 month warranty period, review defects or deficiencies observed by the Departmental Representative;
 - .1 Compile items that require the Contractor's attention to complete the terms of the Contract.
 - .2 Final Deliverable;
 - .1 Year End Warranty Review – defect status.
 - .3 Progressive Deliverables, such as;
 - .1 Lessons learned.

5.2.47 PROJECT TEAM

- .1 Typically includes entities, such as:
 - .1 Departmental Representative,
 - .2 Consultant Team;
 - .3 Independent third parties also in contract with PWGSC, and;
 - .4 User Department and Operational personnel.

5.2.48 PWGSC COMMISSIONING MANAGER (PWGSC Cx MGR)

- .1 Government commissioning liaison amongst all project stakeholders and reports to the Departmental Representative.
- .2 Undertakes Quality Assurance Reviews of Cx submissions.

5.2.49 QUALITY

- .1 The degree to which the Work meets or exceeds the Project requirements and expectations.

5.2.50 QUALITY ASSURANCE (QA) REVIEWS

- .1 PWGSC QA Reviews are an advisory service to the Project Team and stakeholders where respective submission/deliverable accountabilities remain in effect as per contractual conditions or other forms of commitment.
 - .1 The Consultant remains professionally accountable for the design validation and verification required of the Project Milestone submissions during the project life cycle.
- .2 QA Reviews, supported by commentary, conclude with a risk assessment associated with Quality of design and documentation deliverables, and include:



- .1 Parameters to confirm at the onset of a review whether deliverables are appropriately scoped and detailed with respect to current Project Milestones or phase/progressive submissions.
- .3 QA Reviews focus on Quality Indicators (QI) parameters associated with Design Quality Indicators (DQI) and Quality Deliverable Indicators (QDI).
- .4 Design Quality Indicators (DQI):
 - .1 3 Aspects of DQI:
 - .1 Functionality – design utility;
 - .2 Build Quality – design performance, and;
 - .3 Impact – project contextual interactivity (such as cultural, market, environmental conditions/factors):
 - .1 Project impact on context, and vice versa;
 - .2 Context impact on project.
 - .2 Each DQI Aspect is considered against Good Design Protocols, such as;
 - .1 Creativity and Technical Competence;
 - .2 Functional Suitability;
 - .3 Whole-of-Life Performance;
 - .4 Health, Safety and Security;
 - .5 Inspiring and Attractive;
 - .6 Appropriate Innovation, and;
 - .7 Sustainable and Enduring.
 - .3 As each DQI Aspect is considered against Good Design Protocols, each Aspect is also assessed against the same Characteristics such as:
 - .1 Conceptual Integrity;
 - .2 Functionality;
 - .3 Operability;
 - .4 Constructability, and;
 - .5 Claims Prevention.
- .5 Quality Deliverable Indicators (QDI):
 - .1 Focus on documentation delivery.
 - .1 Submitted documentation is assessed against 6 characteristics:
 - .1 Clarity;
 - .2 Completeness;
 - .3 Compliance;
 - .4 Consistency;
 - .5 Correctness, and;
 - .6 Decision Traceability.

5.2.51 QUALITY MANAGEMENT PLAN

- .1 Quality Management goal is to assure:
 - .1 Design Quality;



- .1 Confirmation design satisfies the Project Requirements,
- .2 Complementary design principles,
- .3 Planning/layout efficiency,
- .4 Accuracy, adequacy, conformance to standards of practice, compliance with codes and standards, cost effectiveness, quality, and fitness for purpose and function as per the TOR.
- .2 Construction Quality;
 - .1 Construction preparation – review schedule and check points,
 - .2 Follow-up of inspection and testing to confirm on-going performance compliance,
 - .3 Final acceptance.
- .3 Management Quality;
 - .1 Management assignments,
 - .1 Managers associated with design, project and construction,
 - .2 Quality process reporting and resolution forums,
 - .3 Decision making protocols.
 - .2 Document control,
 - .3 Risk management program.

5.2.52 RECOMMISSIONING MANUAL

- .1 Deliverable by Consultant's Cx Process Manager/Cx Authority.
- .2 Refer to CSA Z320 Article 4.9.4, Recommissioning manual.

5.2.53 RISK MANAGEMENT PLAN

- .1 Departmental Representative (DR) initiates and maintains a PWGSC RM Program.
- .2 The objective of the Plan is to develop a methodology to improve risk management by:
 - .1 Establishing risk policies to confirm acceptable levels of non-compliance as per DR Risk Management Plan;
 - .2 Focusing on external and internal risk parameters, and;
 - .3 Articulating an approach/framework to identifying risk and its impact in advance and managing the risk with the goal of reducing, transferring or avoiding risk where appropriate.
- .3 Program and Plans are collaboratively monitored and amendments are proposed to the DR by the Project Team as required for an effective project delivery.

5.2.54 STANDARD OPERATING PROCEDURES

- .1 Systems Operations Manual component.
- .2 Procedures are to meet the Canada Labour Code requirement of "every employer" (User Department) by way of "a qualified person to set out, in writing, instructions for operations, inspections, testing, clearing and maintenance" of various components, systems and integrated systems.
 - .1 Updated throughout the building lifecycle for continued safety and consistent Work practices.



- .2 Capable of being the basis for the development of Departmental policies.
- .3 Includes site specific:
 - .1 Equipment, chemicals and other concerns such as life safety compliance, emergency provisions/procedures, security, access, sustainability and the environment.
 - .2 Series of flow charts designed to model the actions, activities and network of interconnected activities associated with systems and related operations and maintenance.

5.2.55 STATIC VERIFICATION

- .1 Refer to CSA Z320 Article 4.4.4, Static Verification.
 - .1 Add to Article 4.4.4 the following review requirements:
 - .1 Review select equipment certificated of authenticity (such as, circuit breakers).

5.2.56 SUB-PROJECT

- .1 User Department/Departmental Representative project Work completed by a Departmental Service Provider requiring a coordinated delivery in a main capital Works project, for example:
 - .1 IT Works, Furniture delivery and installation;
- .2 If Work takes place in the same space and time as capital Works then capital Work's health and safety plan governs Sub-Project Work.

5.2.57 SYSTEMS

- .1 Refer to CSA Z320 Article 5, Specific systems.
 - .1 Require confirmation of other systems, such as those that may relate to, for example:
 - .1 Civil Engineering;
 - .1 CSA Z320 currently considers related systems outside the building foot print and therefore not included in the Standard;
 - .2 Sound Masking;
 - .1 As part of CSA Article, 5.1.3.4, Interior Space, Functional Performance Testing;
 - .3 Duct Pressure Tests and Indoor Air Quality (IAQ) Tests;
 - .1 As part of CSA Article, 5.4.3.4, Mechanical Systems, Functional Performance Testing.

5.2.58 SYSTEMS OPERATIONS MANUAL (SYSTEMS DESCRIPTIONS/SYSTEMS MANUAL)

- .1 Developed throughout the project lifecycle.
- .2 Refer to CSA Z320 Article 3, Definitions.
- .3 Extend the CSA Definition to include in emergency conditions as a mode of operation.
- .4 Normally produced by the Construction Manager/Contractor and as part of the Collaborative Project Delivery integrated process with Support by the Consultant and Departmental Representative.



- .1 Requires Cx Process Manager sign-off at contract Substantial Performance.
- .5 Standard Operating Procedures document is a component of the Systems Operations Manual – see Definition.

5.2.59 UNIFORMAT™

- .1 A uniform, hierarchical classification structure of construction systems and assemblies.
 - .1 Current version – CSI/CSC Uniformat™, 2010 edition.
- .2 UniFormat™ organizational structure also guides the development and delivery of:
 - .1 Cost estimates – refer to Definition for further detail and;
 - .2 PPDFormat™, Preliminary Project Descriptions during the design phase – refer to Definition for further detail.
 - .3 Alphanumeric designations followed by MasterFormat™ followed by the line item.

5.2.60 VALUE ENGINEERING (VE)

- .1 Value Engineering (Assessment) methodology, as related to competing options assessment, emphasizes the return-on-investment aspect of decision making in terms of LCC to maintain or improve the desired levels of capability and performance during planning, design, construction and procurement.
 - .1 When the options satisfy the required function, then the best value option is to be identified by comparing the first costs and life-cycle costs of each alternative.
- .2 Refer to industry standard practices for value methodologies associated with buildings and building systems such as, SAVE and ASTM Standards.
- .3 Also refer to Life-Cycle Costs definition.

5.2.61 WORK

- .1 Refer to Contract Documents: General Conditions (GCs).

5.2.62 WORK BREAKDOWN STRUCTURE (WBS)

- .1 Integral to schedules and project execution plans.

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