



Engineering Services **TERMS OF REFERENCE**

Heavy Civil Engineering Standing Offer Agreement

For:
Various Federal Projects
In the Western Region

August, 2017



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1 PROJECT DESCRIPTION

1.1 GENERAL

1.1.1 PURPOSE OF TERMS OF REFERENCE (TOR)

- .1 Public Works and Government Services Canada (PWGSC) requires the services of a firm (Consultant) with expertise in the Heavy Civil Engineering discipline for the provision of services.
 - .1 Heavy Civil Engineering comprises the design and construction of entire engineering projects (e.g., highways, dams, and all municipal works including roads, traffic signage, parking lots, security fences, water main, waste water, storm drainage pipes and treatment plants, etc.)
- .2 This generic Terms of Reference (TOR) provides the Terms of Reference for the common services required for the various projects.
- .3 The Consultant will be engaged through individual project specific “Call-Ups” which will include a project specific TOR.

1.1.2 THE PWGSC GENERAL PROCEDURES AND STANDARDS DOCUMENT (GP&S)

- .1 The project specific TOR, issued at the time of the Call-Up, will describe project-specific requirements, services and deliverables while the GP&S document outlines minimum standards and procedures common to all projects.
- .2 This generic Terms of Reference (TOR) document must be used in conjunction with the GP&S, as the two documents are complementary.
- .3 In the case of a conflict between the three documents, the requirements of the project specific TOR override the generic TOR and GP&S Document.

1.1.3 PROCUREMENT OF GOODS AND SERVICES

- .1 Public Procurement
 - .1 For further information refer to the following web link:
 - .1 <http://www.tbs-sct.gc.ca/pol/doc-eng.aspx?id=14494#>

1.1.4 PROJECT INFORMATION

Project Information	
Project Title:	Consultant Standing Offer Agreement for Various Projects
Project Address:	Various locations throughout Alberta, Saskatchewan, and Manitoba
Solicitation Number:	TBD
PWGSC Project Number:	TBD
PWGSC Contracting Officer:	TBD

1.2 BACKGROUND INFORMATION

1.2.1 USER DEPARTMENT NEED

- .1 The project specific TOR - for various Call-Ups - may require the heavy civil engineering firm to provide a multi-disciplinary team of sub-consultants. Refer also to TOR, 1.4.1.
- .2 Services will be required for design and construction projects involving highways; dams, dredging, parks and trails, and all municipal works including roads, traffic



- signage, parking lots, security fences, water main, waste water, storm drainage pipes and treatment plants, etc. ; including related environmental requirements.
- .3 Excluded from Heavy Civil Engineering are construction activities of buildings.
 - .4 A project may consist of:
 - .1 An investigation/report;
 - .2 Heavy Civil Engineering
 - .3 Geotechnical investigation.
 - .4 Topographic survey;
 - .5 Material Quality assurance testing
 - .6 Environmental Requirements;
 - .7 Prime Consultant Services.

1.2.2 USER DEPARTMENT

- .1 The User Department will vary and be identified in the project specific TOR.

1.2.3 EXISTING CONDITIONS

- .1 The location and specific details will be outlined in the project specific TOR.

1.2.4 CONSTRAINTS AND CHALLENGES

- .1 The Consultant will be required to become familiar with the project site and obtain local information as required.
- .2 The Consultant is required to obtain security clearances for all his/her firm's personnel as well as any sub-consultants to visit the project site for reasons, such as, site reviews, attendance for site design meetings, etc. Security clearance checks may include credit checks.
- .3 All site visits must be arranged through the Departmental Representative.
- .4 The project scope must be tailored to meet the User Department's budget. Diligent cost estimating and cost control is required.
- .5 Additional project specific constraints and challenges will be identified in the project specific TOR.

1.2.5 HAZARDOUS MATERIALS

- .1 Known hazardous materials will be identified in the project specific TOR.

1.2.6 PROJECT DELIVERY APPROACH

- .1 The majority of projects will use a design-bid-build approach. Construction will be procured through a Call-Up or through a publicly advertised bid process.
- .2 Some projects may use a construction management approach. Construction will be procured with multiple tender packages through the Construction Manager.
 - .1 Anticipated tender packages will be described in the project specific TOR.

1.3 SUMMARY OF DESIGN WORK

1.3.1 INVESTIGATIONS AND REPORTS

- .1 The goals of the investigation and report will be outlined in the Call-Up.
- .2 Examples of past investigations and reports:
 - .1 Options Analysis for....;
 - .2 Feasibility Study for...;
 - .3 Infrastructure Condition Report for.....



- .4 Geotechnical Investigation
- .5 Topographic survey.

1.3.2 HEAVY CIVIL ENGINEERING SERVICES

- .1 The project assignment requirements – including the project history and/or existing conditions - will be identified in the Call-Up.
- .2 See hypothetical project examples in SRE 3.2.6 of the Submission Requirements and Evaluation section of the RFSO document.

1.4 OBJECTIVES

1.4.1 GENERAL

- .1 The Consultant shall produce designs that:
 - .1 Respond to the operational and functional needs of the User Department as identified in the project specific TOR;
 - .2 Are effective and efficient;
 - .3 Meet current Codes, Standards and Guidelines;
 - .4 Optimize performance of the systems;
 - .5 Are designed for ease of maintenance;
 - .6 Minimize long-term maintenance costs through provision of suitable, industry proven materials that are high quality, durable and are constructed with the best workmanship possible;
 - .7 Are cost effective considering both initial cost and operation & maintenance costs over a life cycle prescribed in the project specific TOR.
 - .8 Employ advanced systems and technologies to support contemporary operating requirements with the capacity for growth and change.

1.4.2 HERITAGE

- .1 Heritage requirements will be described in the project specific TOR.
- .2 The project will follow a conservation approach based on accepted principles and practices described in the Standards and Guidelines for the Conservation of Historic Places in Canada.
- .3 Heritage requirements may include detailed heritage information and/or a FHBRO Heritage character statement.

1.4.3 ENVIRONMENTAL/SUSTAINABLE DEVELOPMENT

- .1 Environmental and sustainability targets will be described in the project specific TOR.

1.4.4 STEWARDSHIP EXCELLENCE

- .1 Through the application of Stewardship Excellence, real property design and implementation solutions will consider the following to support the project mandate:
 - .1 The appropriateness of the real property solution for its use and place;
 - .2 The technical competence of the project team and their deliverables;
 - .3 The economic viability of the real property solutions considered and/or developed;
 - .4 The successful incorporation of environmentally sustainable solutions;
 - .5 The maintenance and development of effective and efficient facilities;
 - .6 The appropriate incorporation of innovation within project delivery and solutions;



- .7 The achievement of excellence in the design and delivery of public policy, program and services to Canadian citizens resulting in inspiring and timeless solutions.
- .2 The following questions are to be considered in the delivery of federal real property services by Real Property Branch and/or any private sector service provider. The questions have been developed to support the assessment of whether the services promote Stewardship Excellence.
 - .1 Appropriate for its use and place
 - .1 How does the solution integrate with its unique context?
 - .1 How does the visual expression of the design relate to its surroundings?
 - .2 How and what materials have been selected that fit with the climate and locally available materials suitability.
 - .3 Does the design provide clarity and consistency
 - .4 How does the solution support the Treasury Board Secretariat Policy on Management of Real Property as it applies to federal heritage infrastructure and buildings
 - .2 Technically competent;
 - .1 Is the Project team composed of members who have relevant experience to support project scope and complexity?
 - .2 Are the deliverables completed to professional standards to outline, demonstrate or support solutions that address the project scope?
 - .3 How are workmanship and craftsmanship addressed in this project?
 - .4 How does the solution meet all applicable codes and standards?
 - .3 Economically viable;
 - .1 Does the proposed solutions provide best value to the Crown?
 - .2 Can the proposed solution, or recommendation, be supported through a documented life cycle cost analysis?
 - .4 Environmentally sustainable;
 - .1 Has suitable recycle materials been used??
 - .2 Has the departmental sustainability objectives/targets been achieved?
 - .3 How does the design response to local materials and weather patterns?
 - .4 How does the choice of materials contribute to longevity of the real property asset?
 - .5 How is the design adaptable and flexible to support future program requirements?
 - .5 Effective and efficient
 - .1 How does the project address way-finding and circulation, for site planning ?
 - .2 How does the design solution satisfy the project requirements?
 - .3 How does the solution address the project scope/program?
 - .4 Is the solution flexible and adaptable?
 - .5 Is the solution able to respond to changes in the needs of the user and potential technological developments?
 - .6 Innovative;
 - .1 How has innovation been incorporated into the solution?
 - .2 How is the solution different from comparable projects?
 - .7 Inspiring;



- .1 How does the design enable social inclusion that fosters civic pride and collective identity as a nation?
- .2 How is the design an appropriate expression for a Canadian Crown asset?
- .3 How is the design expressing dignity appropriate to the scope, exemplifying; inclusiveness, creativity, natural legacy, harmony, community, freedom, peace, security and unity?
- .4 How is the design promoting stewardship of the asset in both the short and long term?
- .5 How is the solution supporting excellence in the design and delivery of public policy, program and services to Canadian citizens?
- .6 How is the design timeless?

1.5 SUMMARY OF SERVICES AND SPECIALTIES

1.5.1 GENERAL SERVICES

- .1 The Coordinating Registered Professional will provide professional Heavy Civil Engineering services and a full consulting team relevant to the nature of the project.
 - .1 Professional Heavy Civil Engineering services:
 - .1 Registered / licensed to practice in the applicable province.
 - .2 The consultant team shall be comprised of qualified technical experts with experience relevant to the project who are eligible to work in the applicable province.
 - .3 The consultant team is required to maintain its expertise for the duration of the project
- .2 Each project will require other specialties which will be engaged as required through Consultant Sub-Agreements as described in the project specific TOR. Sub-consultants may be required for the following specialist services;
 - .1 Municipal, Structural, Mechanical, Electrical and Geotechnical Engineering;
 - .2 Materials Testing;
 - .3 Landscape Architecture;
 - .4 Commissioning;
 - .5 Topographical Surveying;
 - .6 Cost Estimating / Quantity Surveying;
 - .7 Conservation Engineer/Architecture specialist;
 - .8 Schedule Management;
 - .9 Risk Management;
 - .10 Others as required.

1.5.2 SECURITY

- .1 Security requirements are specific to the specific user department and nature of the project.
- .2 The consultant will be subject to security clearance checks as necessitated by the nature of the project and identified in the project specific TOR.
- .3 The consultant team is expected to reasonably protect documents in their care and information related to the user department and project to which they have access.

1.6 SCHEDULE

1.6.1 GENERAL



- .1 The project is to be delivered and ready for acceptance in accordance with the project specific TOR.
- .2 The consultant will be required to prepare a schedule in accordance with the milestone list provided in the project specific TOR.

1.7 COST

1.7.1 CONSTRUCTION BUDGET

- .1 The construction budget will be identified in the project specific TOR, if known.

1.8 EXISTING DOCUMENTATION

1.8.1 AVAILABLE FOR THE CONSULTANT

- .1 Documentation relative to the project and as available will be detailed in the project specific TOR Codes, Acts, Standards, Regulations

1.9 CODES, ACTS, STANDARDS, REGULATIONS

1.9.1 GENERAL

- .1 A listing of Codes, Acts, Standards and Guidelines potentially applicable to this project are contained in the GP&S Document. Additional standards and updates will be added to the project specific TOR.
- .2 The Authorities Having Jurisdiction (AHJ) on this project are:
 - .1 The local AHJs;
 - .2 The designated Crown Fire Protection Engineer (where applicable);
 - .3 Treasury Board of Canada Secretariat, accessed through the Departmental Representative;
- .3 The Consultant must 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 The applicability of various Codes, Acts, Standards and Guidelines listed in the GP&S document arise out of direct and indirect references in documents which apply to Federal Government properties / buildings and infrastructures, such as the Canada Labour Code;
 - .2 The consultant team must be fully versed with the legislation and requirements that are unique to Federal Government properties / buildings and infrastructures in Canada;
 - .3 The consultant team must be fully versed with the legislation and requirements that are unique to Federal Government projects tendered through Public Works and Government Services Canada.



2 REQUIRED SERVICES

2.1 GENERAL REQUIREMENTS

2.1.1 GENERAL

- .1 The project specific TOR will identify the project specific requirements including:
 - .1 Services Required;
 - .2 Project Stages and Deliverables.

2.1.2 SERVICES

- .1 Following is a list of Services typically required for a project which may be required for an Investigation, a Report or for Design and Contract Documentation. The project TOR will outline the consultant services required to suit project scale and scope:
 - .1 Investigation Services such as condition report;
 - .2 Geotechnical Investigation;
 - .3 Topographic Survey.
 - .4 Pre-Design Service;
 - .5 Schematic Design Service;
 - .6 Design Development Service;
 - .7 Construction Document Service;
 - .8 Tender Services;
 - .9 Construction Support Service;
 - .10 Resident Construction Service;
 - .11 Post Construction Service.
 - .12 Commissioning Service.
 - .13

2.1.3 PWGSC PROCEDURES AND STANDARDS

- .1 In addition to adhering to the Section 2 Required Services Standards contained in the GP&S document, the Consultant shall comply with the project specific requirements in this section.
- .2 Article 2.7.1 General:
 - .1 Add article 3 - *The use of asbestos in PWGSC construction projects is prohibited.*
- .3 Article 2.7.2 PWGSC Documents available from PWGSC Project Manager:
 - .1 Remove article 5 - *PWGSC Commissioning Manual CP-1 version 2006.*
- .4 Article 2.7.3 Codes and Regulations:
 - .1 Replace article 1 with - *NRC National Building Code of Canada 2015;*
 - .2 Replace article 2 with - *NRC National Fire Code of Canada 2015;*
 - .3 Replace article 3 with - *NRC National Plumbing Code of Canada 2015;*
 - .4 Replace article 4 with - *NRC National Energy Code of Canada for Buildings 2015.*
- .5 Article 2.7.6 Standards and Guidelines:
 - .1 Replace article 26 with - *CSA/B561-12 Accessible Design for the Built Environment.*
- .6 Article 2.8 Commissioning Process:



- .1 Replace article 2.8 with - *Project commissioning is to comply with the CSA Z320-11 Standard.*
- .7 Article 2.9.5.3 Submissions:
 - .1 Replace article 2.9.5.3 with;
 - .1 *GC Buy and Sell;*
 - .1 *Consultant shall provide both an electronic true copy and AutoCAD copy of the final documents (specifications and drawings) without password protection and printing restrictions.*
- .8 Article 2.10.3 Specification Organization:
 - .1 Replace article 2.10.3.1 with - *Narrow scope sections describing single units of work are to be used unless otherwise accepted in writing by the Departmental Representative.*
- .9 Article 2.10.22 Contracting Issues:
 - .1 Remove article 2.10.22.3.4.
- .10 Article 2.11.9.1 and 2.11.9.2 Prints:
 - .1 Revise to read:
 - .1 *Submissions are to be searchable pdf and AutoCAD 2013.*

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 Request for Standing Offer.

2.2.2 FEDERAL GOVERNMENT

- .1 The federal authorities having jurisdiction over this project are:
 - .1 Crown Fire Protection Engineer for fire prevention engineering services and life safety;
 - .2 User Department; and
 - .3 PWGSC.
- .2 Any additional federal authorities having jurisdiction will be project specific and will be identified in the project specific TOR.

2.2.3 PWGSC REVIEWS, ACCEPTANCE AND PRESENTATIONS

- .1 Each submission at each stage of the project is subject to reviews by, the Departmental Representative, User Department representatives and the PWGSC Architectural and Engineering Centre of Expertise (AECOE.) group.
- .2 Project delivery team acceptance includes both the PWGSC Architectural & Engineering Centre of Expertise (AECOE) reviews and User Department acceptance:
 - .1 The purpose of each review is technical quality (including fire protection, health and life safety) and to ascertain for PWGSC that the Consultant has reasonably fulfilled the objectives of this project;
 - .2 Expected turnaround time for each review is 10 working days;
 - .3 The consultant team will receive review comments in the form of an editable MS Word document or MS Excel document;
 - .4 The consultant shall provide a single coordinated written response to the comments within two (2) weeks;
 - .1 Add comments to the active document provided and returned as an active document once all consulting team comments are included and complete.



2.3 COMMISSIONING SERVICE

2.3.1 GENERAL

- .1 The purpose of the Commissioning Service is to ensure that a fully functioning project, meeting the Owner's Project Requirements, is delivered to the User Department through appropriate design and construction verifications.
- .2 Commissioning (Cx) is an integral part of the Consultants' required services and therefore, required activities and deliverables are listed within each project phase service.
- .3 Provide Commissioning Service on the basis of CSA Z320-11, Canadian Standards Association Building Commissioning Standard.

2.3.2 SCOPE AND ACTIVITIES

- .1 Refer to Pre-Design to Post-Construction Services for commissioning scope and activities.

2.3.3 DELIVERABLES

- .1 Commissioning cost estimate.
- .2 Commissioning schedule.
- .3 Commissioning Owner Project Requirements (OPR) and Basis of Design (BOD).
- .4 Commissioning Plan in conformance with the OPR and BOD.
- .5 Commissioning issues log.
- .6 Commissioning specifications in Division 01.
- .7 Signed Letter of Acceptance from the Engineer of Record.
- .8 Final Cx. Report.
- .9 Accepted Operations and Maintenance manuals.

2.4 PRE-DESIGN SERVICE

2.4.1 GENERAL

- .1 Pre-Design services occur before the commencement of the Schematic Design phase.
- .2 The Consultant team will review and analyse all available project information, consult with the Departmental Representative and deliver a comprehensive Pre-Design Report that may include the following:
 - .1 Feasibility Study / Options Analysis;
 - .2 Project Approach;
 - .3 Infrastructure Condition Report;
 - .4 Engineering / Geotechnical / Topographic survey or Other Investigations;
 - .5 Environmental Requirements;
 - .6 Regulatory Issues;
- .3 The Pre-Design Report will consolidate and confirm the project scope, identify applicable codes, standards and guidelines to support the project scope and will be utilized as the benchmark project control document to monitor progress of the project

2.4.2 FEASIBILITY STUDY / OPTIONS ANALYSIS

- .1 Objective:
 - .1 To prepare a report that outlines the research and subsequent analysis to determine the viability and practicality of a project. A feasibility study analyzes economic, financial, market, regulatory, environmental / sustainable and technical issues. The purpose at this stage is to investigate and analyze site



conditions, including soil conditions, zoning, bylaws, traffic reports, service capacities, support systems, special purpose support systems, and provide recommendations.

.2 Scope and Activities:

- .1 Attend project start up meeting;
- .2 Visit the site, investigate and analyze the needs of the project;
- .3 Investigate the requirements for the particular site, including existing and new technologies;
- .4 Analyze the project requirements/program;
- .5 Review all available existing material related to the site;
- .6 Investigate and analyze all applicable codes, regulations standards;
- .7 Evaluate existing infrastructure including: municipal, civil, environmental, functional adaptability, code compliance;
- .8 Identify and verify all Authorities having Jurisdiction over the project;
- .9 Establish a policy for this project to minimize environmental impacts consistent with the project objectives and economic constraints, and the application of the Canadian Environmental Assessment Act (CEAA);
- .10 Review the proposed project milestones for verification that all dates are achievable;
- .11 Review the cost plan/budget for verification that the costs are realistic and achievable;
- .12 Prepare recommendations on the feasibility of the project;
- .13 Test the feasibility study recommendations using a minimum of three (3) options, schematic (sketch) only;
- .14 List pros and cons of each option;
- .15 Execute financial analysis (Class 'D') including life cycle analysis and best value for operation and maintenance;
- .16 Indication of the preferred option.

.3 Deliverables:

- .1 Comprehensive summary of the requirements, conditions, feasibility and options analysis, demonstrating an understanding of the scope of work, including the following:
 - .1 Report on existing infrastructure including its condition, deficiencies and life expectancy,
 - .2 Report on existing facilities and systems requirements,
 - .3 Report on all applicable codes, regulation, standards and authorities having jurisdiction,
 - .4 Report on environmental impact, sustainability and implement all environmental assessment recommendations,
 - .5 Report on recommendations and options analysis,
 - .6 Confirmed or adjusted project cost and time plans,
 - .7 Provide written identification of the problems, conflicts or other perceived information/clarifying assumptions for the acknowledgment of the Departmental Representative,
 - .8 Report on Class 'D' order of magnitude cost for each option.

2.4.3 PROJECT APPROACH

.1 Objective:



- .1 To prepare a written statement which describes various criteria and data for a project including design objectives, site requirements and constraints, equipment and systems and requirements. The purpose of this stage is to describe the requirements which must be met to satisfy the requirements of the project. The process seeks to answer the following questions;
 - .1 What is the nature and scope of the problem?
 - .2 What information is required to develop a proper engineering solution to the problem?
 - .3 How much and what type of construction is needed?
 - .4 What are the future requirements of this site?
- .2 Scope and Activities:
 - .1 In preparing a functional program, the consultant's main task is to examine the project/ site in detail so as to define the clients' needs and objectives. These requirements will establish criteria for evaluating potential design solutions and other strategic alternatives;
 - .2 The consultant must understand: the impacts of the project on the environment, the social impacts of its program on the community, the impacts on the existing infrastructure and long term maintenance requirements and operational needs;
 - .3 The consultant shall then develop approximate sketches and technical requirements for the proposed works including details for proposed works and environmental criteria;
 - .4 The Consultant shall also advise Departmental Representative on alternatives such as the engineering and financial implications of various options. The consultant shall assist in assessing the advantages or benefits and the disadvantages or costs of each alternative.
- .3 Deliverables:
 - .1 The final Project Review is a report including (but not limited to) the following:
 - .1 Site requirements;
 - .2 Explicit space requirements for the future of the site including: definition of the function of each type of infrastructure; the functional relationships between different types of infrastructure or areas; site and sketch of the different infrastructures; and special technical requirements of each of the items;
 - .3 Financial requirements and a preliminary order of magnitude Class "D" budget;
 - .4 Scheduling and time frame for the project;
 - .5 Other requirements including, regulatory issues, requirements from other Authorities having Jurisdiction, community goals and concerns, and ecological and environmental concerns;
 - .6 A recommended construction delivery method (traditional design-bid-build, design-build, construction management).

2.4.4 INFRASTRUCTURE CONDITION REPORT

- .1 Objective:
 - .1 The purpose of this stage is to identify and evaluate existing infrastructure including but not limited to civil, municipal, structural infrastructure, mechanical



and electrical equipment and all other infrastructure which will be utilized in the current and future operation of the site.

.2 Scope and Activities:

- .1 Prepare a detailed inventory of existing infrastructure and equipment found on the site. Include drawings identifying existing location and layout;
- .2 Based on parameters developed in conjunction with the Departmental Representative and the User Department, prepare an evaluation report that assesses the condition of existing infrastructure and equipment;
- .3 Assess the current inventory against the client department's functional requirements;
- .4 Include an examination of reusing/refurbishing existing infrastructure and equipment, procuring/ constructing new infrastructure and equipment, and current technologies and innovative solutions for the site;
- .5 Prepare a detailed Class 'D' cost analysis that compares the reuse/refurbishment of existing infrastructure and equipment, with the purchase of new. Consideration should be given to cost effectiveness and time frames required for refurbishment of existing infrastructure and equipment and/or the procurement of new.

.3 Deliverables:

- .1 A Condition Report

2.4.5 ENGINEERING / GEOTECHNICAL / TOPOGRAPHICAL SURVEY OR OTHER INVESTIGATIONS

.1 Objective:

- .1 The purpose of this stage is to research and carry out engineering, geotechnical, topographical survey or other investigations required to complete the requirements of the site or project.

.2 Scope and Activities:

- .1 Conduct investigations to obtain the required information such as but not limited to engineering, Geotechnical, topographical survey or other information to prepare and carry out the activities necessary to establish the required infrastructure for the site or project;
- .2 Prepare report on each investigation clearly describing what information was required, why it was required and what the results were.

.3 Deliverables

- .1 An Investigation Report

2.4.6 ENVIRONMENTAL REQUIREMENTS

.1 Objective:

- .1 The purpose is respond to requirements or recommendations for a water management, waste management and environmental protection plans for regulatory, construction and post construction stages.

.2 Scope and Activities:

- .1 Prepare any required reports or permitting requirements in support of water management, waste management and environmental protection plans for regulatory, construction and post construction stages;
- .2 Implement recommendations of applicable environmental assessments to minimize environmental effects.

.3 Deliverables:



- .1 Reports, permitting requirements and recommendations as noted in "Scope and Activities".

2.4.7 INITIATE THE COMMISSIONING PROCESS

- .1 Define the Commissioning Team (including roles and responsibilities) for all project phases.
- .2 Review project objectives and functional requirements to outline a preliminary commissioning scope.
- .3 Develop a draft Commissioning (CX.) Plan as per CSA Z320-11 and the Owner Project Requirements (OPR) based upon the functional requirements.
- .4 Establish and develop a draft commissioning cost estimate for all components, systems and integrated systems within the context of each discipline.
- .5 Deliverables:
 - .1 Draft Cx Plan;
 - .2 OPR.
 - .3 Draft Cx Cost Estimate.

2.5 SCHEMATIC DESIGN SERVICE

2.5.1 GENERAL

- .1 Formal direction from the Departmental Representative to proceed to the Schematic Design Stage must be received in advance of commencing Schematic Design Services.
- .2 The Consultant Team will develop distinct options in support of the project requirements.
- .3 Out of this process one option will be selected as the basis to proceed to Design Development.

2.5.2 SCOPE & ACTIVITIES (MAY INCLUDE THE FOLLOWING)

- .1 Synthesize project requirements and develop distinct design options to support project requirements.
- .2 Provide alternative design options exploring possible technical and environmental strategies which are viable and have potential for development.
- .3 Analyze each solution with regard to the project goals and objectives established in the Pre-Design phase including cost and schedule.
 - .1 Provide Class "C" cost estimates for each option.
- .4 Write a preliminary project-description report outlining the various components and system options.
- .5 Produce a Canadian Environmental Assessment Act (CEAA) Screening Report, if requested.
- .6 Identify viable construction procurement strategies for each design option.
- .7 Based upon the options analysis, recommend one design option for further detail development and evaluation.
- .8 Update the project schedule.
- .9 Compile and present information as part of a Schematic Design Report to be signed-off and deemed ready to proceed to Design Development Services.
- .10 Facilitate an options presentation meeting involving Departmental Representative and project Stakeholders.
- .11 Conduct minor revisions prior to the preferred design for Sign-off.
- .12 Develop a preliminary sustainability strategy for the project requirements.



- .13 Update the risk analysis and identify any conflicts that will need to be addressed with respect to scope, quality, schedule, and cost.
 - .1 Prepare/update risk issues log and participate in the Departmental Representative's Risk Management Plan session.
- .14 Develop the Basis of Design (BOD) documentation for each option to demonstrate how the option meets the Owner Project Requirements (OPR) documented in the Pre-Design report.
- .15 Update the Commissioning (CX.) Plan design documents.

2.5.3 DELIVERABLES

- .1 Schematic Design Report that will contain at a minimum:
 - .1 Content as per the GP&S document;
 - .2 Necessary sections to document and present the items noted in the "Scope and Activities" section.

2.6 DESIGN DEVELOPMENT SERVICE

2.6.1 GENERAL

- .1 Further develop the option selected for refinement at the completion of Schematic Design. The design is to be finalized with the integration of all major components.
- .2 The Consultant must obtain written authorization from the Departmental Representative before proceeding with Design Development Services.

2.6.2 SCOPE AND ACTIVITIES (MAY INCLUDE THE FOLLOWING)

- .1 Further develop the selected schematic design option and expand the intent for each design discipline to complete the Design for this project.
- .2 Finalize the selected design option in an integrated manner to ensure that all major components have been considered in a collaborative environment and that the design continues to support the project specific Objectives and Goals documented in the approved Pre-Design report.
- .3 Present / submit the design for review and approval to review groups and authorities having jurisdiction as required.
- .4 Prepare a class 'B' cost estimate.
 - .1 Include a commissioning cost breakout for each discipline in the cost estimate.
- .5 Update the schedule, the risk analysis and identify any conflicts that will need to be addressed with respect to scope, quality, schedule and cost.
- .6 Continue to review all applicable statutes, regulations and by-laws in relation to the design of the project and conduct a detailed code analysis to demonstrate compliance.
 - .1 If there are non-compliance issues, develop alternative solutions to support the design and submit for approval to the local AHJ.
- .7 Develop outline specifications for all systems, principle components and equipment, including manufacturer's literature.
 - .1 Include commissioning specifications.
- .8 Update the sustainable design strategy and report on sustainability targets.
- .9 Analyse the constructability of the project and advise on the construction phasing process and duration.
- .10 Commissioning:
 - .1 Update the Basis of Design (BOD) document and Owner Project Requirements (OPR);



- .2 Update the Commissioning Plan;
- .3 Identify and provide a system components list to be commissioned;
- .4 Commissioning issues logs and tracking logs specific to the project;
- .5 Develop pre-functional and functional verification and test forms specific to each component, system and integrated systems as per CSA Z320-11;

2.6.3 DELIVERABLES

- .1 Design Development Report that will contain at a minimum:
 - .1 Content as per the GP&S document;
 - .2 Necessary sections to document and present the items noted in the “Scope and Activities” section.

2.7 CONSTRUCTION DOCUMENTS SERVICE

2.7.1 GENERAL

- .1 The objective of this stage is to translate the Design Development phase into construction drawings and specifications for the purpose of tendering.
- .2 The Consultant must obtain written authorization from the Departmental Representative before proceeding with Construction Documents.

2.7.2 SCOPE AND ACTIVITIES (MAY INCLUDE THE FOLLOWING)

- .1 Create construction documents in accordance with the GP&S Document.
- .2 Update the project schedule.
- .3 Participate in partnering, team building and value engineering sessions when required in a project specific TOR.
- .4 Design according to the budget and schedule.
- .5 Coordinate the work of various disciplines including scope changes required to remain within budget;
- .6 In consultation with the Departmental Representative approve construction materials, processes and specifications considering sustainability and commissioning.
- .7 Apply a process of continuing cost control with increasing level of detail during production of contract/construction documents.
- .8 Continue to review all applicable statutes, codes, regulations and by-laws in relation to the design of the project and accordingly.
- .9 Advise Departmental Representative and resolve issues other governmental authority officials raise, and adjust Construction Documents as required.
- .10 Participate in the risk management process.
- .11 Update Project Log tracking approved major decisions.
- .12 Establish quality control process for construction and contract administration phase.
- .13 Update the BOD and OPR.
- .14 Provide commissioning forms and check lists specific to each component, system and integrated system including:
 - .1 Component verification;
 - .2 Installation verification;
 - .3 Start up;
 - .4 Pre-functional system performance verification for static operation;
 - .5 Integrated System Functional performance verification for dynamic operation;
 - .6 Expected design performance parameters;



- .7 Observed performance including indication of whether or not this performance is acceptable;
- .8 Design Engineer of Record date and signatures along with those performing and witnessing the test.
- .15 Update and incorporate CX. Plan, CX. forms and training requirements into CX. construction documents within the context of the Division 01 specifications.
- .16 Provide written response to PWGSC comments at all review stages and integrate comments into final construction documents.

2.7.3 DELIVERABLES

- .1 Construction documents are to be submitted at various stages as identified in the project specific TOR.
- .2 Include items listed in the "Scope and Activities" section above, the PWGSC GP&S document and items listed below.
- .3 Updated report at each submission noting any deviations from earlier Basis of Design submissions and, as necessary, reconfirming key Owner Project Requirements, goals and objectives, along with:
 - .1 An updated estimate demonstrating compliance with the Construction Cost Plan;
 - .2 An updated project log, tracking approved major decisions.
- .4 33% and 66% complete Construction Documents:
 - .1 Updated Class "B" estimate;
 - .2 Updated OPR and BOD documents;
 - .3 Updated project schedule;
 - .4 Construction Drawings;
 - .1 Drawings should reflect 33% / 66% completeness with all planned and required drawings / sheets shown.
 - .5 Specifications;
 - .1 Draft specifications (including all sections to be used for the project),
 - .2 Draft Division 01 including,
 - .1 Health and Safety Requirements (Section 01 35 29),
 - .2 Commissioning sections.
 - .3 Updated Commissioning document,
 - .1 CX. cost estimate,
 - .2 CX. risk and complexity assessment,
 - .3 Draft. CX. Construction Document specification Division 01,
 - .4 LEED CX. related specification check sheets and forms as applicable.
- .5 99% complete Construction Documents (fully coordinated as if ready for tender):
 - .1 This submission incorporates all revisions required by the review of the previous submission and a written response to the PWGSC 66% review;
 - .2 The Consultant shall submit documents to the Departmental Representative, local municipality, or any other Authority having jurisdiction;
 - .3 Class "A" estimate;
 - .4 An updated project schedule;
 - .5 Construction Drawings;
 - .1 Drawings should reflect 99% completeness as a complete design without any incomplete drawings (as if ready for tendering).
 - .6 Complete Specifications;



- .1 Specifications should be complete with all sections and thoroughly coordinated with the drawings,
- .2 Bidders' price breakdown form (for submission at tender closing);
- .3 Commissioning specifications, including forms applicable to static verification, start-up and functional performance testing.
- .7 Updated Commissioning Plan.
- .6 Final (100%) Construction Documents ready for tendering:
 - .1 This submission incorporates all revisions required by the review of the previous submission and a written response for the PWGSC 99% QA review;
 - .2 Advise the Departmental Representative of all issues raised by other officials;
 - .3 The submittal shall include:
 - .1 Signed and sealed documents,
 - .2 An updated Class 'A' cost estimate (include CX. cost breakout),
 - .3 An updated project schedule,
 - .4 Construction Drawings & Specifications as per the GP&S document.
 - .5 An updated Commissioning Plan;
 - .1 Updated CX. issues and resolution log.
 - .4 The Consultant must confirm in writing that;
 - .1 The documents are ready to be issued for tender,
 - .2 The checklist in the GP&S Document has been reviewed in concert with the requirements of the Consultant Agreement and
 - .3 A full review and coordination of the Contract Documents are complete and in accordance with professional standard of care.

2.8 TENDER SERVICES

2.8.1 GENERAL

- .1 The object of this phase is to support the Departmental Representative with the tender.
- .2 The Contract Authority for this project is the PWGSC Real Property Contracting (RPC) branch.
- .3 Tendering will be using the Public Works and Government Services Canada internet procurement system (<https://buyandsell.gc.ca>).

2.8.2 SCOPE AND ACTIVITIES

- .1 When requested, the Consultant will be required to:
 - .1 Provide the Departmental Representative with information required by bidders to interpret construction documents;
 - .2 Prepare addenda in response to all questions within two (2) business days during the bidding period and submit to the Departmental Representative;
 - .3 Attend pre-tender site visits;
 - .4 If PWGSC decides to re-tender the project, or any specific tender package, provide full services to the Departmental Representative;
 - .5 During Bid Review and Analysis assist the Departmental Representative as required by analyzing and reconciling any differences between pre-tender estimates and submitted bids.

2.8.3 DELIVERABLES

- .1 Addenda.



- .2 Written responses to all questions.
- .3 Bid analysis and/or recommendations.

2.9 CONSTRUCTION SUPPORT SERVICE

2.9.1 GENERAL

- .1 The object of this phase is to support the Departmental Representative with the construction phase and ensure the quality, budget and schedule meet the project requirements.

2.9.2 SCOPE AND ACTIVITIES (MAY INCLUDE THE FOLLOWING)

- .1 The Consultant shall share all project information with PWGSC:
 - .1 All material specifications, mixes and test results shall be turned over to the Departmental Representative for future maintenance by PWGSC and others.
- .2 General Services:
 - .1 Review shop drawings, test reports and other submissions;
 - .2 Update the project log tracking approved major decisions, including those impacting project scope, budget and schedule;
 - .3 Prepare and issue a communications protocol and a shop drawing review protocol in consultation with the Departmental Representative;
 - .4 Review and comment on Contractor's commissioning submittals including:
 - .1 Contractor's Commissioning Plan;
 - .2 Project and Project Commissioning Issues Logs;
 - .3 CX. Report;
 - .4 CX. Schedule reflecting the Performance Verification Tests;
 - .5 Outstanding activities.
 - .5 Assist the Contractor and provide required documentation in order to obtain the building permit.
- .3 Construction & Contract Administration:
 - .1 Provide field reviews (frequency may be specified in the project specific TOR) as required to fulfill the Consultant's professional obligations to monitor the construction activities throughout the construction period and keep the Departmental Representative informed of work progress;
 - .1 Reject unsatisfactory work,
 - .2 Provide written reports.
 - .2 Provide construction progress reports based on Contractor's submissions and on-site performance;
 - .3 Furnish supplemental instructions to the Contractor with reasonable promptness or in accordance with a schedule for such instructions agreed to by PWGSC and the Contractor;
 - .4 Provide additional drawings to clarify, interpret or supplement the contract documents;
 - .5 Review and comment on various documents such as the Contractor's Progress Claims and updated schedules;
 - .6 Offer timely technical advice on all disputes and claims between PWGSC and the Contractor;
 - .7 Authorize special tests, inspections and minor works that do not impact project cost and schedule;



- .8 Determine the amounts owing to the Contractor based on work progress and certify payments to the Contractor;
- .9 Assist the Departmental Representative to prepare the Certificate of Substantial Completion and provide sign-off;
- .10 Provide a Post-Construction Evaluation report.
- .4 Cost Services:
 - .1 After issue of contract provide details for evaluating the project's cost performance;
 - .2 Assist the construction team with cost management advice, if requested;
 - .3 Evaluate change orders, claims, work completed and cash flow.
- .5 Changes to the Work:
 - .1 Assist the Departmental Representative to prepare Contemplated Change Notices (CCNs) and Change Orders (COs) to be issued by the Departmental Representative.
- .6 Review, witness, verify test, approve and sign off all commissioning submittals for performance parameters before test and after test and for adherence to OPR and BOD including but not limited to:
 - .1 All factory test reports and data;
 - .2 Quality Control Material Testing and as built Topographic Survey Reports.
 - .3 Installation, start-up and TAB;
 - .4 Components based checks;
 - .5 Systems based checks;
 - .6 Integrated systems based checks;
 - .7 CX. forms and verification checklists, process and procedures specific to components, systems and different levels of integration between systems;
 - .8 CX. schedule;
 - .9 Deferred, seasonal and re-test system deficiency;
 - .10 Review and assist with O & M and Owner Training Manual;
 - .11 Oversee and Document Functional Performance Testing;
 - .12 Follow up on testing issues as required;
 - .13 Update CX. Issues Log;
 - .14 Conduct field reviews complete with CX. site reports verifying components and systems being commissioned in accordance with the OPR and the BOD;
 - .15 Chair CX. Team meetings and report progress on a bi-weekly basis c/w minutes for distribution;
 - .16 Provide verification of final reports upon completion of the entire project;
 - .17 Lead and facilitate the CX. Team's Interim Acceptance Report sign-off;
 - .18 Engineer(s) of Record shall provide a Letter of Acceptance;
- .7 Provide Final Commissioning Report documenting all final commissioning work, testing, verification and results achieved during the project construction specific to components, equipment, systems, integrated systems and assemblies.
Commissioning Report must at a minimum:
 - .1 Executive summary report;
 - .2 Identification of components, systems, different levels of integration between systems and/or assemblies that required commissioning;
 - .3 Deferred CX. testing;



- .4 Static verification check sheets;
- .5 Factory test reports;
- .6 Installation verification check sheets;
- .7 Start-up check sheets;
- .8 Functional system performance verification;
- .9 Integrate systems functional performance verification;
- .10 CX. issue logs and progress report;
- .11 All commissioning Site review report;
- .12 Final Commissioning Plan;
- .13 Final OPR and BOD report;
- .14 Engineer of Record provide a letter of Acceptance.

2.9.3 DELIVERABLES

- .1 Approved shop drawings, test reports/certificates and other submissions.
- .2 Office Furniture Support Services (OFSS).
- .3 Clarifications, Supplemental Instructions, Contemplated Change Notices and Change Order Recommendations.
- .4 Site Visit/Field Review Reports.
- .5 Reviewed Contractor Progress Claims.
- .6 Comments to Contractor Schedule, Change Orders.
- .7 Completed Certificate of Substantial Completion.
- .8 CX. Deliverables:
 - .1 Final Commissioning Report;
 - .2 Final OPR and BOD;
 - .3 Certified Substantial Completion.

2.10 RESIDENT CONSTRUCTION SERVICE

2.10.1 GENERAL

- .1 The purpose of this phase is to represent the Departmental Representative on site during construction.

2.10.2 SCOPE AND SERVICES (MAY INCLUDE THE FOLLOWING)

- .1 Provide full time resident inspection, coordination and monitoring during the construction work.
- .2 Maintain daily records of all construction work including:
 - .1 Weather conditions - particularly unusual weather relative to construction activities in progress;
 - .2 Major material and equipment deliveries;
 - .3 Daily activities and completion of major work;
 - .4 Start, stop or completion of activities;
 - .5 Presence of inspection and testing firms, tests taken and results;
 - .6 Unusual site conditions experienced;
 - .7 Significant developments and remarks;
 - .8 Special visitors on-site;
 - .9 Authorities given to the Contractor to undertake certain or hazardous works;
 - .10 Environmental incidents;
 - .11 Reports and instructions from Appropriate Authorities Response Actions;



- .12 Stop work requests by PWGSC.
- .3 Inspect all phases of the work in progress for compliance with the tender documents.
 - .1 Reject unsatisfactory work.
- .4 Verify quantities of materials received;
- .5 The Resident Site representatives shall attend all job-site meetings.
- .6 Stop work or give orders to protect the safety of the workers or Crown property in Emergencies.
- .7 Provide information regarding job conditions to the Departmental Representative that may impact the project scope, schedule or budget.
- .8 Notify the Departmental Representative of any potential change orders.
- .9 Provide evaluation of Change Orders.
- .10 Prepare CCN's and COs to be issued by the Departmental Representative.
- .11 Convey the Consultant's instructions regarding the required standards of workmanship to the Contractor.
- .12 Communicate formally with the Contractor in writing via memorandum.
- .13 Accompany PWGSC representatives on inspections.
- .14 Prepare weekly reports for the Departmental Representative that includes:
 - .1 Progress relative to schedule;
 - .2 Major activities commencing or completed during the week; main activities now in progress;
 - .3 Major deliveries of materials and / or equipment;
 - .4 Difficulties which may cause delays in completion;
 - .5 Materials and labour needed immediately;
 - .6 Cost estimates of work completed and materials delivered (cost plus contracts);
 - .7 Outstanding information or action required by Consultant or PWGSC;
 - .8 Work force;
 - .9 Weather;
 - .10 Remarks;
 - .11 Accidents on-site;
 - .12 Life safety or building hazards caused by the work, the Contractor or his agents.
- .15 Maintain Site Records that include:
 - .1 Contract and Tender Documents updated with all changes;
 - .2 Approved shop drawings;
 - .3 Approved samples;
 - .4 Quality Control Material Testing and As Built Topographic Survey Reports
 - .5 Site Instructions;
 - .6 Contemplated Change Orders;
 - .7 Change Orders;
 - .8 Memoranda;
 - .9 Test and deficiency reports;
 - .10 Updated progress schedule;
 - .11 Correspondence and minutes of meetings;
 - .12 Names, addresses, telephone numbers of PWGSC representatives, Consultant, Contractors, and sub-trades key personnel associated with the contract, including home telephone numbers in case of emergencies.



- .16 Follow approved protocol for the security and protection of documents and information held on-site.
- .17 Review monthly the accuracy of as-built marked up drawings kept by the Contractor and report any discrepancies or deficiencies to the Consultant.
- .18 Report if materials and equipment are being incorporated into the project prior to approval of relative shop drawings or samples.
- .19 Assist in the preparation of all deficiency, interim, preliminary, and final reports in collaboration with PWGSC and Consultant representatives.
- .20 Be responsible for the measurement of all work to be done on a unit-cost basis.
- .21 Examine all site conditions and methods to be used by the Contractor undertaking hazardous operations.
- .22 Inspect the areas where hazardous work is under way to ensure that the Contractor is maintaining the agreed safety standards.
- .23 The Resident Site representatives shall not:
 - .1 Authorize deviations from the contract documents;
 - .2 Approve shop drawings or samples;
 - .3 Provide Advice in any matter without obtaining guidance from Departmental Representative;
 - .4 Accept any work or portions of;
 - .5 Enter into the area of responsibility of the Contractor's Field Superintendent;
 - .6 Stop the work unless convinced that an emergency exists as noted above.

2.10.3 DELIVERABLES

- .1 Weekly written reports.
- .2 Memorandum issued to the Contractor.
- .3 Other reports or surveys as may be requested by the Departmental Representative.
- .4 A copy of the Site Representative's daily log.

2.11 POST CONSTRUCTION SERVICE

2.11.1 GENERAL

- .1 The purpose of this phase is to support the Departmental Representative in obtaining all final documents required for project close out.

2.11.2 SCOPE AND ACTIVITIES (MAY INCLUDE THE FOLLOWING)

- .1 Project Close-out Services:
 - .1 Revise documentation to reflect all changes, revisions and adjustments after completion of commissioning;
 - .2 Prepare record drawings (AutoCAD format as per GP&S requirements) and specifications based on Contractor's as-built.;
 - .3 Prepare and submit final Certificate of Completion and final records;
 - .4 Review the Operations and Maintenance manual;
 - .5 Participate in Lessons Learned workshops if requested.
- .2 Warranty Services:
 - .1 Monitor and certify rectification of deficiencies before expiry of warranties;
 - .2 Monitor environmental and life safety system checks to be carried out by Contractor / O&M staff before expiration of warranties;
 - .3 Sign-off on the Final Completion of the construction contract;



- .4 Participate in warranty inspections with the Departmental Representative and Contractor;
- .5 Provide warranty deficiency list.
- .3 Commissioning:
 - .1 Coordinate deferred commissioning for those systems that have been functionally tested and/or turned over where retesting and commissioning is required;
 - .2 Resolution of any warranty issues on commissioned systems during the warranty period;
 - .3 Develop and present a CX. lesson learn workshops;
 - .4 Ensure that all completed operating and maintenance manuals, warranties, guarantees and other required submittals are turned over to the Departmental Representative;
 - .5 Provide ongoing consultation with the construction teams in support of their project closeout activities and submittals related to systems and assemblies commissioning specific deliverables in compliance to the Commissioning Plan, Construction Specifications document, Owner's Project Requirements (OPR) and BOD;
 - .6 Finalize the Commissioning Report;
 - .7 Prepare final Commissioning Manual as per CSA Z320-11 including and are not limited to:
 - .1 Final O&M Manual,
 - .2 Post occupancy changes,
 - .3 Lesson learned document.
 - .8 For LEED certification purposes only;
 - .1 Contractors post-occupancy Functional Performance Testing to evaluate and document energy and operational performance as compared to designed performance defined in the BOD and Construction Documents. Evaluations will occur at:
 - .1 Three (3) months; and
 - .2 Ten (10) months of warranty expiration.

2.11.3 DELIVERABLES

- .1 Warranty Deficiency List.
- .2 Final Warranty Review Report.
- .3 Final Certificate of Completion.
- .4 As-Built Drawings and Specifications:
 - .1 Hard copies (as specified in the project specific TOR) – full size sets, and an electronic PDF copy of each record document on CD or DVD;
 - .2 Record drawings in AutoCAD - DWG file format.
 - .1 Refer to the GP&S document for AutoCAD drawing requirements and standards.
- .5 Comments to O&M Manual.
- .6 Final Certification of installation and warranty from manufacturers.
- .7 Signed final Commissioning Manual and System Manual.
- .8 Sign-off on Warranty.





3 PROJECT ADMINISTRATION

3.1 GENERAL REQUIREMENTS

3.1.1 PWGSC PROCEDURES AND STANDARDS

- .1 The consultant shall comply with the amendments and/or additions in this section in addition to adhering to the requirements contained in the GP&S section 3 (Project Administration).

3.1.2 LANGUAGE

- .1 Generally no variation from the GP&S.

3.1.3 MEDIA

- .1 Generally no variation from the GP&S.

3.1.4 PROJECT MANAGEMENT

- .1 Generally no variation from the GP&S.

3.1.5 LINES OF COMMUNICATION

- .1 Generally no variation from the GP&S.

3.1.6 MEETINGS

- .1 Meeting locations and frequency will be described in the project specific TOR.

3.1.7 CONSULTANT RESPONSIBILITIES

- .1 Generally no variation from the GP&S.

3.1.8 PWGSC RESPONSIBILITIES

- .1 Generally no variation from the GP&S.

3.1.9 USER DEPARTMENT RESPONSIBILITIES

- .1 Generally no variation from the GP&S.

3.1.10 REVIEW AND APPROVAL BY PROVINCIAL AND MUNICIPAL AUTHORITIES

- .1 Generally no variation from the GP&S.

3.1.11 BUILDING PERMITS AND OCCUPANCY PERMITS

- .1 Generally no variation from the GP&S.

3.1.12 TECHNICAL AND FUNCTIONAL REVIEWS

- .1 Remove article 3.12.2.