

THIS DOCUMENT CONTAINS A SECURITY

REQUIREMENT

REQUEST FOR PROPOSAL (RFP)

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PROPONENT INSTRUCTIONS (PI)

PI1 INTRODUCTION

1. Public Works and Government Services Canada (PWGSC) intends to retain an individual consulting firm, or joint venture, to provide professional services to modernize laboratory facilities as part of a program of work related to the Laboratories Canada (LC) Initiative. The Contract is for the Transportation Safety and Technology Science hub project.
2. This is a single-phase selection process. The nature of the requirement and the anticipated limited number of responses by the industry leads PWGSC to believe that this approach will not unduly force a large number of firms to expend an overall unreasonable amount of effort in response to PWGSC.
3. Proponents responding to this RFP are requested to submit a full and complete proposal. The proposal will cover not only the qualifications, experience and organization of the proposed Consultant Team, but also the detailed approach to the work, and the pricing offered. A combination of the technical and price of services submissions will constitute the proposal.

PI2 DEFINITIONS

In this Request for Proposal (RFP), the following words or phrases have the corresponding meaning.

"Applicable Taxes":

The Goods and Services Tax (GST), the Harmonized Sales Tax (HST), and any provincial tax, by law, payable by Canada such as, the Quebec Sales Tax (QST) as of April 1, 2013.

"Consultant Team":

The team of consultants, specialists and sub-consultants, including the Proponent, proposed by the Proponent to perform the services required.

"Key Individuals":

Specific roles or individuals identified as such in the SRE 3.2 – Rated Requirements.

"Key Personnel":

Staff of the Proponent, sub-consultants and specialists proposed to be assigned to this project.

"Price Rating":

A rating assigned to the price component of a proposal and subsequently used to establish a Price Score for inclusion as a percentage of the total score to be established following the evaluation and rating of technical proposals.

"Proponent":

The person or entity (or, in the case of a joint venture, the persons or entities) which submits a proposal. It does not include the parent, subsidiaries or other affiliates of the Proponent, or its sub-consultants.

"PWGSC Evaluation Board":

The board established to evaluate and rate proposals. Board members represent a broad cross-section of professional qualifications and experience.

"Indigenous Participation Plan Rating":

A rating assigned to the Indigenous Participation Plan component of a proposal in the selection procedure and subsequently used to establish a Indigenous Participation Plan Score for inclusion as a percentage of the total score.

"Technical Rating":

A rating assigned to the technical component of a proposal in the selection procedure and subsequently used to establish a Technical Score for inclusion as a percentage of the total score.

PI3 PROPOSAL DOCUMENTS

1. All instructions, general terms, conditions and clauses identified in the RFP by number, date and title, are hereby incorporated by reference into and form part of this solicitation and any resultant contract and are set out in the Standard Acquisition Clauses and Conditions Manual (<https://buyandsell.gc.ca/policy-and-guidelines/standard-acquisition-clauses-and-conditions-manual>) issued by Public Works and Government Services Canada.
2. The following are the proposal documents:
 - (a) Proponent Instructions (PI);
 - (b) Submission Requirements and Evaluation (SRE);
 - (c) the general terms, conditions and clauses, as amended, identified in the Agreement clause;
 - (d) Project Brief (Terms of Reference);
 - (e) the Security Requirements Check List (SRCL);
 - (f) any amendment to the solicitation document issued prior to the date set for receipt of proposals; and
 - (g) the proposal, Declaration/Certifications Form and Price Proposal Form.
3. Submission of a proposal constitutes acknowledgment that the Proponent has read and agrees to be bound by these documents.

PI4 CANADA'S TRADE AGREEMENTS

This procurement is subject to the provisions of the World Trade Organization - Agreement on Government Procurement (WTO-AGP), the Canada -European Union Comprehensive Economic and Trade Agreement (CETA), and the Canadian Free Trade

Agreement (CFTA).

PI5 INTEGRITY PROVISIONS – PROPOSAL

1. The [Ineligibility and Suspension Policy](#) (the "Policy") in effect on the date the bid solicitation is issued, and all related Directives in effect on that date, are incorporated by reference into, and form a binding part of the bid solicitation. The Proponent must comply with the Policy and Directives, which can be found at [Ineligibility and Suspension Policy](#).
2. Under the Policy, charges and convictions of certain offences against a Supplier, its affiliates or first tier sub-consultants, and other circumstances, will or may result in a determination by Public Works and Government Services Canada (PWGSC) that the Supplier is ineligible to enter, or is suspended from entering into a contract with Canada. The list of ineligible and suspended Suppliers is contained in PWGSC's Integrity Database. The Policy describes how enquiries can be made regarding the ineligibility or suspension of Suppliers.
3. In addition to all other information required in the bid solicitation, the Proponent must provide the following:
 - a. by the time stated in the Policy, all information required by the Policy described under the heading "Information to be Provided when Bidding, Contracting or Entering into a Real Property Agreement"; and
 - b. with its bid, a complete list of all foreign criminal charges and convictions pertaining to itself, its affiliates and its proposed first tier sub-consultants that, to the best of its knowledge and belief, may be similar to one of the listed offences in the Policy. The list of foreign criminal charges and convictions must be submitted using an Integrity Declaration Form, which can be found at [Declaration form for procurement](#).
4. Subject to subsection 5, by submitting a bid in response to this bid solicitation, the Proponent certifies that:
 - a. it has read and understands the [Ineligibility and Suspension Policy](#);
 - b. it understands that certain domestic and foreign criminal charges and convictions, and other circumstances, as described in the Policy, will or may result in a determination of ineligibility or suspension under the Policy;
 - c. it is aware that Canada may request additional information, certifications, and validations from the Proponent or a third party for purposes of making a determination of ineligibility or suspension;
 - d. it has provided with its bid a complete list of all foreign criminal charges and convictions pertaining to itself, its affiliates and its proposed first tier sub-consultants that, to the best of its knowledge and belief, may be similar to one of the listed offences in the Policy;
 - e. none of the domestic criminal offences, and other circumstances, described in the Policy that will or may result in a determination of ineligibility or suspension, apply to it, its affiliates and its proposed first tier sub-consultants; and
 - f. it is not aware of a determination of ineligibility or suspension issued by PWGSC that applies to it.

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5. Where a Proponent is unable to provide any of the certifications required by subsection 4, it must submit with its bid a completed Integrity Declaration Form, which can be found at [Declaration form for procurement](#).
 6. Canada will declare non-responsive any bid in respect of which the information requested is incomplete or inaccurate, or in respect of which the information contained in a certification or declaration is found by Canada to be false or misleading in any respect. If Canada establishes after award of the Contract that the Proponent provided a false or misleading certification or declaration, Canada may terminate the Contract for default. Pursuant to the Policy, Canada may also determine the Proponent to be ineligible for award of a contract for providing a false or misleading certification or declaration.

PI6 COMPOSITION OF CONSULTANT TEAM

By submitting a proposal, the Proponent represents and warrants that the entities and persons proposed in the proposal to perform the required services will be the entities and persons that will perform the services in the fulfillment of the project under any contractual arrangement arising from submission of the proposal. If the Proponent has proposed any person in fulfillment of the project who is not an employee of the Proponent, the Proponent warrants that it has written permission from such person (or the employer of such person) to propose the services of such person in relation to the services to be performed.

PI7 JOINT VENTURE

1. A joint venture is an association of two or more parties who combine their money, property, knowledge, expertise or other resources in a single joint business enterprise, sometimes referred as a consortium, to bid together on a requirement. Proponents who bid as a joint venture must indicate clearly that it is a joint venture and provide the following information:
 - a. the name of each member of the joint venture;
 - b. the Procurement Business Number of each member of the joint venture;
 - c. the name of the representative of the joint venture, i.e., the member chosen by the other members to act on their behalf, if applicable; and
 - d. the name of the joint venture, if applicable.
2. If the information is not clearly provided in the proposal, the Proponent must provide the information on request from the Contracting Authority.
3. The proposal and any resulting contract must be signed by all the members of the joint venture unless one member has been appointed to act on behalf of all members of the joint venture. The Contracting Authority may, at any time, require each member of the joint venture to confirm that the representative has been appointed with full authority to act as its representative for the purposes of the bid solicitation and any resulting contract. If a contract is awarded to a joint venture, all members of the joint venture will be jointly and severally or solidarily liable for the performance of any resulting contract.

PI8 CERTIFICATIONS

1. Integrity Provisions – Declaration of Convicted Offences

In accordance with the Ineligibility and Suspension Policy (<http://www.tpsgc-pwgsc.gc.ca/ci-if/politique-policy-eng.html>), the Proponent must **provide with its bid**, as applicable, to be given further consideration in the procurement process, the required documentation as per Proponent Instructions 5 (PI5), Integrity Provisions – Proposal, **section 3b**.

2. Federal Contractors Program for Employment Equity - Proposal Certification

- a. By submitting a proposal, the Proponent certifies that the Proponent, and any of the Proponent's members if the Proponent is a Joint Venture, is not named on the Federal Contractors Program (FCP) for employment equity "FCP Limited Eligibility to Bid" list available at the bottom of the page of the Employment and Social Development Canada (ESDC) - Labour's website <https://www.canada.ca/en/employment-social-development/programs/employment-equity/federal-contractor-program.html>
- b. Canada will have the right to declare a proposal non-responsive if the Proponent, or any member of the Proponent if the Proponent is a Joint Venture, appears on the "FCP Limited Eligibility to Bid" list at the time of contract award.
- c. Canada will also have the right to terminate the Agreement for default if a Consultant, or any member of the Consultant if the Consultant is a Joint Venture, appears on the "FCP Limited Eligibility to Bid" list during the period of the Agreement.
- d. The Proponent must provide the Contracting Authority with a completed Federal Contractors Program for Employment Equity - Certification (see Appendix B - Declaration/Certifications Form), before contract award. If the Proponent is a Joint Venture, the Proponent must provide the Contracting Authority with a completed Federal Contractors Program for Employment Equity - Certification, for each member of the Joint Venture.

PI9 LICENSING REQUIREMENTS

1. Consultant Team members and Key Personnel shall be, or be eligible to be licensed, certified or otherwise authorized to provide the necessary professional services to the full extent that may be required by provincial or territorial law in the Province or Territory in which the project is located.
2. By virtue of submission of a proposal, the Proponent certifies that the Proponent's Consultant Team and Key Personnel are in compliance with the requirements of subsection 1, above. The Proponent acknowledges that PWGSC reserves the right to verify any information in this regard and that false or erroneous certification may result in the proposal being declared non-responsive.

PI10 SECURITY

1. Industrial Security Requirement:

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- a. Prior to Contract award, the Proponent must hold a valid Security Clearance as indicated in SC1 – Security Requirement. Failure to comply with this requirement will render the Proposal non-responsive and no further consideration will be given to the Proposal.
 - b. The successful Proponent's personnel, as well as any sub-consultants and its personnel, who are required to perform any part of the work under the subsequent Contract must meet the mandatory security requirement as indicated in SC1 – Security Requirement.
2. It is the responsibility of the successful Proponent to ensure that the security requirements are met throughout the performance of the Contract. Canada will not be held liable or accountable for any delays or additional costs associated with the successful Proponent's non-responsiveness with the mandatory security requirement.
 3. Proponents are reminded to obtain the required security clearance promptly. Any delay in the award of a contract to allow the successful Proponent to obtain the required clearance will be at the entire discretion of the Contracting Authority.
 4. For additional information on security requirements, proponents should refer to the Contract Security Program of Public Works and Government Services Canada (<http://www.tpsgc-pwgsc.gc.ca/esc-src/introduction-eng.html>) website.

PI11 INSURANCE REQUIREMENTS

The successful Proponent shall be required to obtain and maintain Professional Liability and Commercial General Liability insurance coverage in accordance with the requirements set out in GC9 – Indemnification and Insurance - <https://buyandsell.gc.ca/policy-and-guidelines/standard-acquisition-clauses-and-conditions-manual/5/R/R1250D/9#insurance-requirements>

PI12 COMMUNICATIONS – SOLICITATION PERIOD

1. To ensure the integrity of the competitive bid process, enquiries and other communications regarding the RFP must be directed only to the Contracting Authority identified in the RFP. Failure to comply with this requirement may result in the proposal being declared non-responsive.
2. Enquiries should be received no later than ten (10) working days prior to the closing date identified on the front page of the Request for Proposal. Enquiries received after that date may not be answered prior to the closing date of the solicitation.
3. To ensure consistency and quality of information provided to proponents, significant enquiries received and their replies will be posted on the Government Electronic Tendering Service (GETS).

PI13 SUBMISSION OF PROPOSAL

13.1 Submission of proposal

1. Canada requires that each proposal, at closing date and time or upon request from the Contracting Authority, be signed by the Proponent or by an authorized

representative of the Proponent. If a proposal is submitted by a joint venture, it must be in accordance with section PI7 - Joint Venture.

2. It is the Proponent's responsibility to:
 - a. submit a proposal, duly completed, in the format requested, on or before the closing date and time set;
 - b. send its proposal only to Public Works and Government Services Canada (PWGSC) Bid Receiving Unit specified on page 1 of the RFP;
 - c. obtain clarification of the requirements contained in the RFP, if necessary, before submitting a proposal;
 - d. ensure that the Proponent's name, return address, the solicitation number and description, and solicitation closing date and time are clearly visible in the proposal; and
 - e. provide a comprehensive and sufficiently detailed proposal that will permit a complete evaluation in accordance with the criteria set out in this RFP.
3. The technical and price components of the proposal must be submitted in separate sections in accordance with the instructions contained in the proposal documents.
4. Timely and correct delivery of proposals to the office designated for receipt of proposals is the sole responsibility of the Proponent. PWGSC will not assume or have transferred to it those responsibilities. All risks and consequences of incorrect delivery of proposals are the responsibility of the Proponent.
5. Proposals and supporting information may be submitted in either English or French.
6. Canada will make available Notices of Proposed Procurement (NPP), bid solicitations and related documents for download through the Government Electronic Tendering Service (GETS). Canada is not responsible and will not assume any liabilities whatsoever for the information found on websites of third parties. In the event an NPP, bid solicitation or related documentation would be amended, Canada will not be sending notifications. Canada will post all amendments using GETS. It is the sole responsibility of the Proponent to regularly consult GETS for the most up-to-date information. Canada will not be liable for any oversight on the Proponent's part nor for notification services offered by a third party.
7. Proposals will remain open for acceptance for a period of not less than 160 days from the closing date of the bid solicitation, unless specified otherwise in the bid solicitation. Canada reserves the right to seek an extension of the bid validity period from all responsive proponents in writing, within a minimum of 3 days before the end of the bid validity period. If the extension is accepted by all responsive proponents, Canada will continue with the evaluation of the proposals. If the extension is not accepted by all responsive proponents, Canada will, at its sole discretion, either continue with the evaluation of the proposals of those who have accepted the extension or cancel the solicitation.

13.2 **Transmission by epost Connect or facsimile**

1. epost Connect

- a. Proposals may be submitted by using the epost Connect service provided by Canada Post Corporation
(https://www.canadapost.ca/web/en/products/details.page?article=epost_connect_send_a)

The only acceptable email address to use with epost Connect for responses to this bid solicitation is:

tpsgc.dgareceptiondessoumissions-abbidReceiving.pwgsc@tpsgc-pwgsc.gc.ca

Note: Proposals will not be accepted if emailed directly to this email address. This email address is to be used to open an epost Connect conversation, as detailed in b., or to send proposals through an epost Connect message if the proponent is using its own licensing agreement for epost Connect.

- b. To submit a proposal using epost Connect service, the Proponent must either:
 - i. send directly its proposal only to the specified PWGSC Bid Receiving Unit, using its own licensing agreement for epost Connect provided by Canada Post Corporation; or
 - ii. send as early as possible, and in any case, at least six business days prior to the solicitation closing date and time (in order to ensure a response), an email that includes the bid solicitation number to the specified PWGSC Bid Receiving Unit requesting to open an epost Connect conversation. Requests to open an epost Connect conversation received after that time may not be answered.
- c. If the Proponent sends an email requesting epost Connect service to the specified Bid Receiving Unit in the bid solicitation, an officer of the Bid Receiving Unit will then initiate an epost Connect conversation. The epost Connect conversation will create an email notification from Canada Post Corporation prompting the Proponent to access and action the message within the epost Connect conversation. The Proponent will then be able to transmit its proposal afterward at any time prior to the solicitation closing date and time.
- d. If the Proponent is using its own licensing agreement to send its proposal, the Proponent must keep the epost Connect conversation open until at least 30 business days after the solicitation closing date and time.
- e. The bid solicitation number should be identified in the epost Connect message field of all electronic transfers.
- f. It should be noted that the use of epost Connect service requires a Canadian mailing address. Should a Proponent not have a Canadian address, they may use the Bid Receiving Unit address specified in the solicitation in order to register for the epost Connect service.
- g. For proposals transmitted by epost Connect service, Canada will not be responsible for any failure attributable to the transmission or receipt of the proposal including, but not limited to, the following:
 - i. receipt of a garbled, corrupted or incomplete proposal;
 - ii. availability or condition of the epost Connect service;
 - iii. incompatibility between the sending and receiving equipment;
 - iv. delay in transmission or receipt of the proposal;
 - v. failure of the Proponent to properly identify the proposal;
 - vi. illegibility of the proposal;
 - vii. security of proposal data; or

- viii. inability to create an electronic conversation through the epost Connect service.
- h. The Bid Receiving Unit will send an acknowledgement of the receipt of proposal document(s) via the epost Connect conversation, regardless of whether the conversation was initiated by the supplier using its own license or the Bid Receiving Unit. This acknowledgement will confirm only the receipt of proposal document(s) and will not confirm if the attachments may be opened nor if the content is readable.
- i. Proponents must ensure that they are using the correct email address for the Bid Receiving Unit when initiating a conversation in epost Connect or communicating with the Bid Receiving Unit and should not rely on the accuracy of copying and pasting the email address into the epost Connect system.
- j. A proposal transmitted by epost Connect service constitutes the formal proposal of the Proponent and must be submitted in accordance with section PI13.1.

2. Facsimile

- a. Proposals may be submitted by facsimile.

The only acceptable facsimile number for responses to this bid solicitations issued by PWGSC headquarters is:

Bid Fax: (819) 997-9776

- b. For proposals transmitted by facsimile, Canada will not be responsible for any failure attributable to the transmission or receipt of the faxed proposal including, but not limited to, the following:
 - i. receipt of garbled, corrupted or incomplete proposal;
 - ii. availability or condition of the receiving facsimile equipment;
 - iii. incompatibility between the sending and receiving equipment;
 - iv. delay in transmission or receipt of the proposal;
 - v. failure of the Proponent to properly identify the proposal;
 - vi. illegibility of the proposal; or
 - vii. security of proposal data.
- c. A proposal transmitted by facsimile constitutes the formal proposal of the Proponent and must be submitted in accordance with section PI13.1.

PI14 REVISION OF PROPOSAL

A proposal submitted may be amended provided the revision is received at the office designated for the receipt of proposals, on or before the date and time set for the receipt of proposals. The revision must be on the Proponent's letterhead or bear a signature that identifies the Proponent, and must clearly identify the change(s) to be applied to the original proposal. The revision must also include the information identified in PI13.1 – Submission of Proposal, paragraph 2d.

PI15 PROPOSAL PRICE

Unless specified otherwise elsewhere in the proposal documents:

- a. the price proposal shall be in Canadian currency;
- b. the price proposal shall not include any amount for Applicable Taxes; and
- c. the requirement does not offer exchange rate fluctuation risk mitigation.
Requests for exchange rate fluctuation risk mitigation will not be considered. All proposals including such provision will render the proposal non-responsive.

PI16 LEGAL CAPACITY

The Proponent must have the Legal capacity to contract. If the Proponent is a sole proprietorship, a partnership or a corporate body, the Proponent must provide, if requested by the Contracting Authority, a statement and any requested supporting documentation indicating the laws under which it is registered or incorporated together with the registered or corporate name and place of business. This also applies to Proponents submitting a proposal as a joint venture.

PI17 FINANCIAL CAPABILITY

1. Financial Capability Requirement: The Proponent must have the financial capability to fulfill this requirement. To determine the Proponent's financial capability, the Contracting Authority may, by written notice to the Proponent, require the submission of some or all of the financial information detailed below during the evaluation of proposals. The Proponent must provide the following information to the Contracting Authority within fifteen (15) working days of the request or as specified by the Contracting Authority in the notice:
 - a. Audited financial statements, if available, or the unaudited financial statements (prepared by the Proponent's outside accounting firm, if available, or prepared in-house if no external statements have been prepared) for the Proponent's last three fiscal years, or for the years that the Proponent has been in business if this is less than three years (including, as a minimum, the Balance Sheet, the Statement of Retained Earnings, the Income Statement and any notes to the statements).
 - b. If the date of the financial statements in (a) above is more than five months before the date of the request for information by the Contracting Authority, the Proponent must also provide, unless this is prohibited by legislation for public companies, the last quarterly financial statements (consisting of a Balance Sheet and a year-to-date Income Statement), as of two months before the date on which the Contracting Authority requests this information.
 - c. If the Proponent has not been in business for at least one full fiscal year, the following must be provided:
 - i. the opening Balance Sheet on commencement of business (in the case of a corporation, the date of incorporation); and
 - ii. the last quarterly financial statements (consisting of a Balance Sheet and a year-to-date Income Statement) as of two months before the date on which the Contracting Authority requests this information.

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- d. A certification from the Chief Financial Officer or an authorized signing officer of the Proponent that the financial information provided is complete and accurate.
 - e. A confirmation letter from all of the financial institution(s) that have provided short-term financing to the Proponent outlining the total of lines of credit granted to the Proponent and the amount of credit that remains available and not drawn upon as of one month prior to the date on which the Contracting Authority requests this information.
 - f. A detailed monthly Cash Flow Statement covering all the Proponent's activities (including the requirement) for the first two years of the requirement that is the subject of the bid solicitation, unless this is prohibited by legislation. This statement must detail the Proponent's major sources and amounts of cash and the major items of cash expenditures on a monthly basis, for all the Proponent's activities. All assumptions made should be explained as well as details of how cash shortfalls will be financed.
 - g. A detailed monthly Project Cash Flow Statement covering the first two years of the requirement that is the subject of the bid solicitation, unless this is prohibited by legislation. This statement must detail the Proponent's major sources and amounts of cash and the major items of cash expenditures, for the requirement, on a monthly basis. All assumptions made should be explained as well as details of how cash shortfalls will be financed.
 2. If the Proponent is a joint venture, the financial information required by the Contracting Authority must be provided by each member of the joint venture.
 3. If the Proponent is a subsidiary of another company, then any financial information in 1. (a) to (g) above required by the Contracting Authority must be provided by the ultimate parent company. Provision of parent company financial information does not by itself satisfy the requirement for the provision of the financial information of the Proponent, and the financial capability of a parent cannot be substituted for the financial capability of the Proponent itself unless an agreement by the parent company to sign a Parental Guarantee, as drawn up by Public Works and Government Services Canada (PWGSC), is provided with the required information.
 4. Financial Information Already Provided to PWGSC: The Proponent is not required to resubmit any financial information requested by the Contracting Authority that is already on file at PWGSC with the Contract Cost Analysis, Audit and Policy Directorate of the Policy, Risk, Integrity and Strategic Management Sector, provided that within the above-noted time frame:
 - a. the Proponent identifies to the Contracting Authority in writing the specific information that is on file and the requirement for which this information was provided; and
 - b. the Proponent authorizes the use of the information for this requirement.It is the Proponent's responsibility to confirm with the Contracting Authority that this information is still on file with PWGSC.
 5. Other Information: Canada reserves the right to request from the Proponent any other information that Canada requires to conduct a complete financial capability assessment of the Proponent.
 6. Confidentiality: If the Proponent provides the information required above to Canada in confidence while indicating that the disclosed information is confidential, then Canada will treat the information in a confidential manner as permitted by the [Access to Information Act](#), R.S., 1985, c. A-1, section 20(1) (b) and (c).

7. Security: In determining the Proponent's financial capability to fulfill this requirement, Canada may consider any security the Proponent is capable of providing, at the Proponent's sole expense (for example, an irrevocable letter of credit from a registered financial institution drawn in favour of Canada, a performance guarantee from a third party or some other form of security, as determined by Canada).
8. In the event that a proposal is found to be non-compliant on the basis that the Proponent is considered not to be financially capable of performing the subject requirement, official notification shall be provided to the Proponent.

PI18 LIMITATION OF SUBMISSIONS

1. A Proponent may not submit more than one proposal. This limitation also applies to the persons or entities in the case of a joint venture. If more than one proposal is received from a Proponent (or, in the case of a joint venture, from the persons or entities), all such proposals shall be rejected and no further consideration shall be given.
2. A joint venture is defined as an association of two or more parties which combine their money, property, knowledge, skills, time or other resources in a joint business enterprise agreeing to share the profits and the losses and each having some degree of control over the enterprise.
3. An arrangement whereby Canada contracts directly with a prime consultant who may retain sub-consultants or specialist consultants to perform portions of the services is not a joint venture arrangement. A sub-consultant or specialist consultant may, therefore, be proposed as part of the Consultant Team by more than one Proponent. The Proponent warrants that it has written permission from such sub-consultant or specialist consultant to propose their services in relation to the services to be performed.
4. Notwithstanding paragraph 3 above, in order to avoid any conflict of interest, or any perception of conflict of interest, a Proponent shall not include in its submission another Proponent as a member of its consultant team, as a sub-consultant or specialist consultant.
5. Any joint venture entered into for the provision of professional services or other services must be in full compliance with the requirements of any provincial or territorial law pertaining thereto in the Province or Territory in which the project is located.

PI19 ACCEPTANCE OF PROPOSAL

1. Canada may accept any proposal, or may reject any or all proposals.
2. In the case of error in the extension or addition of unit prices, the unit price will govern.
3. While Canada may enter into an agreement or contractual arrangement without prior negotiation, Canada reserves the right to negotiate with Proponents on any procurement.
4. Canada reserves the right to cancel or amend the RFP at any time.

PI20 REJECTION OF PROPOSAL

1. Canada may reject a proposal where any of the following circumstances is present:
 - a. the Proponent has been declared ineligible for selection, following unsatisfactory performance in a previous project as determined in accordance with the department's performance review procedures;
 - b. an employee, sub-consultant or specialist consultant included as part of the proposal has been declared ineligible, for selection for work with the department in accordance with the performance review procedure referred to in paragraph 1a, which would render the employee, sub-consultant or specialist consultant ineligible to bid on the requirement, or the portion of the requirement the employee, sub-consultant or specialist consultant is to perform;
 - c. the Proponent is bankrupt or where, for whatever reason, its activities are rendered inoperable for an extended period;
 - d. evidence, satisfactory to Canada, of fraud, bribery, fraudulent misrepresentation or failure to comply with any law protecting individuals against any manner of discrimination, has been received with respect to the Proponent, any of its employees, any sub-consultant or any specialist consultant included as part of the proposal;
 - e. evidence satisfactory to Canada that based on past conduct or behavior, the Proponent, a sub-consultant, a specialist consultant or a person who is to perform the Services is unsuitable or has conducted himself/herself improperly;
 - f. with respect to current or prior transactions with the Government of Canada,
 - i. Canada has exercised its contractual remedies of taking the services out of the consultant's hands, suspension or termination for default with respect to a contract with the Proponent, any of its employees, any sub-consultant or any specialist consultant included as part of the proposal;
 - ii. Canada determines that the Proponent's performance on other contracts, including the quality of the services provided and the quality and timeliness of the delivery of the project, is sufficiently poor to jeopardize the successful completion of the requirement being bid on.
2. Where Canada intends to reject a proposal pursuant to subsection 1f, the Contracting Authority will so inform the Proponent and provide the Proponent ten (10) days within which to make representations, before making a final decision on the proposal rejection.

PI21 DEBRIEFING

Should a Proponent desire a debriefing, the Proponent should contact the person identified on the front page of the RFP within 15 working days of the notification of the results of the solicitation. The debriefing will include an outline of the strengths and weaknesses of the submission, referring to the evaluation criteria. The confidentiality of information relating to other submissions will be protected. The debriefing may be provided in writing, by telephone or in person.

PI22 PROPOSAL COSTS

No payment will be made for costs incurred in the preparation and submission of a proposal in response to the Request for proposal. Costs associated with preparing and submitting a proposal, as well as any costs incurred by the Proponent associated with the evaluation of the proposal, are the sole responsibility of the Proponent.

PI23 PROCUREMENT BUSINESS NUMBER

Proponents are required to have a Procurement Business Number (PBN) before contract award. Proponents may register for a PBN online at [Supplier Registration Information](#). For non-Internet registration, Proponents may contact the InfoLine at 1-800-811-1148 to obtain the telephone number of the nearest Supplier Registration Agent.

PI24 FAIRNESS MONITOR

Canada has engaged a Fairness Monitor to monitor this procurement process.

PI25 PERFORMANCE EVALUATION

Proponents shall take note that the performance of the Consultant during and upon completion of the services shall be evaluated by Canada. The evaluation includes all or some of the following criteria: Design, Quality of Results, Management, Time and Cost. Should the Consultant's performance be considered unsatisfactory, the Consultant may be declared ineligible for future contracts. The form [PWGSC-TPSGC 2913-1](#), SELECT - Consultant Performance Evaluation Report, is used to record the performance.

PI26 CONFLICT OF INTEREST – UNFAIR ADVANTAGE

1. In order to protect the integrity of the procurement process, Proponents are advised that Canada may reject a proposal in the following circumstances:
 - a. if the Proponent, any of its sub-consultants, any of their respective employees or former employees was involved in any manner in the preparation of the bid solicitation or in any situation of conflict of interest or appearance of conflict of interest;
 - b. if the Proponent, any of its sub-consultants, any of their respective employees or former employees had access to information related to the bid solicitation that was not available to other Proponents and that would, in Canada's opinion, give or appear to give the Proponent an unfair advantage.
2. The experience acquired by a Proponent who is providing or has provided the goods and services described in the bid solicitation (or similar goods or services) will not, in itself, be considered by Canada as conferring an unfair advantage or creating a conflict of interest. This Proponent remains however subject to the criteria established above.
3. Where Canada intends to reject a proposal under this section, the Contracting Authority will inform the Proponent and provide the Proponent an opportunity to make representations before making a final decision. Proponents who are in doubt about a particular situation should contact the Contracting Authority before bid closing. By submitting a proposal, the Proponent represents that it does not consider itself to be in conflict of interest nor to have an unfair advantage. The

Proponent acknowledges that it is within Canada's sole discretion to determine whether a conflict of interest, unfair advantage or an appearance of conflict of interest or unfair advantage exists.

PI27 LIMITATION OF LIABILITY

Except as expressly and specifically permitted in this RFP, no Proponent or Potential Proponent shall have any claim for any compensation of any kind whatsoever in relation to this RFP, or any aspect of the procurement process, and by submitting a proposal each Proponent shall be deemed to have agreed that it has no claim.

PI28 CODE OF CONDUCT FOR PROCUREMENT - PROPOSAL

The [Code of Conduct for Procurement](#) provides that Proponents must respond to bid solicitations in an honest, fair and comprehensive manner, accurately reflect their capacity to satisfy the requirements set out in the bid solicitation and resulting contract, submit bids and enter into contracts only if they will fulfill all obligations of the Contract. By submitting a bid, the Proponent is certifying that it is complying with the [Code of Conduct for Procurement](#). Failure to comply with the [Code of Conduct for Procurement](#) may render the bid non-responsive.

PI29 WEBSITES

The connection to some of the Web sites in the RFP is established by the use of hyperlinks. The following is a list of the addresses of the Web sites:

Employment Equity Act

<http://laws-lois.justice.gc.ca/eng/acts/E-5.401/index.html>

Federal Contractors Program (FCP)

<https://www.canada.ca/en/employment-social-development/programs/employment-equity/federal-contractor-program.html>

Certificate of Commitment to Implement Employment Equity form LAB 1168

<https://catalogue.servicecanada.gc.ca/content/EForms/en/Detail.html?Form=LAB1168>

Ineligibility and Suspension Policy

<https://www.tpsgc-pwgsc.gc.ca/ci-if/politique-policy-eng.html>

Code of Conduct for Procurement

<https://www.tpsgc-pwgsc.gc.ca/app-acq/cndt-cndct/cca-ccp-eng.html>

Lobbying Act

<https://laws-lois.justice.gc.ca/eng/acts/L-12.4/?noCookie>

Buy and Sell

<https://buyandsell.gc.ca/>

Supplier Registration Information

<https://srisupplier.contractscanada.gc.ca>

Solicitation No. - N° de l'invitation
EP938-212564/A

Amd. No. - N° de la modif.

Buyer ID - Id de l'acheteur
fe178

Client Ref. No. - N° de ref. du client
20212564

File No. - N° du dossier
FE178.EP938-212564

CCC No./N° CCC - FMS No./N° VME

Consultant Performance Evaluation Report Form

<https://www.tpsgc-pwgsc.gc.ca/app-acq/forms/documents/2913-1.pdf>

Vendor Performance Corrective Measure Policy

<https://buyandsell.gc.ca/policy-and-guidelines/supply-manual/section/8/180>

Canadian economic sanctions

https://www.international.gc.ca/world-monde/international_relations-relations_internationales/sanctions/index.aspx?lang=eng

National Joint Council (NJC) Travel Directive

<http://www.njc-cnm.gc.ca/directive/travel-voyage/index-eng.php>

SUBMISSION REQUIREMENTS AND EVALUATION (SRE)

- SRE 1 General
- SRE 2 Phased Bid Compliance Process
- SRE 3 Mandatory / Rated Requirements and Evaluation
- SRE 4 Submission Requirements - Checklist

SRE 1 GENERAL

1.1 Total Score

For this project the Total Score will be established as follows:

Technical Rating x 80%	=	Technical Score (Points)
IPP Rating x 10%	=	IPP Score (Points)
<u>Price Rating x 10%</u>	=	<u>Price Score (Points)</u>
Total Score	=	Maximum: 100 Points

1.2 Proposal Format

The following Proposal format information should be implemented when preparing the Proposal.

- a) Submit one electronic copy in a format compatible with Microsoft Office Suite 2010 or Adobe Acrobat 10.0 using e-post.
- b) Page size should be - 216mm x 279mm (8.5" x 11").
- c) The use of shading should be minimized.
- d) Black text on white background is preferred.
- e) Minimum font size – 10-point Arial, 11-point Calibri, or equivalent font.
- f) Minimum margins - 12 mm left, right, top, and bottom.
- g) One 'page' means one side of a 216mm x 279mm (8.5" x 11")
- h) 279mm x 432 mm (11" x 17") fold-out sheets for spreadsheets, organization charts etc. will be counted as two pages.
- i) The order of the Proposal should follow the order established in the **Error! Reference source not found.** section.

1.3 Page Limitation

The maximum number of pages including text and graphics to be submitted for each SRE 3.2 criterion is stipulated within each criterion description.

The following are not part of the page limitation:

- a) Covering letter;
- b) Section dividers, used to solely identify the sections of the Proposal provided they are free of text and/or graphics;
- c) Table of Contents;

-
- d) Consultant Team Identification (Appendix A);
 - e) Declaration/Certifications Form (Appendix B);
 - f) Client Reference Form (Appendix E);
 - g) Integrity Provisions – Required Documentation;
 - h) Front page of the RFP; and
 - i) Front page of each solicitation amendment.

Consequence of non-compliance: any pages which extend beyond the page limitation and any other attachments will be extracted from the proposal and will not be forwarded to the PWGSC Evaluation Board members for evaluation.

1.4 Proposal via epost Connect service

This bid solicitation requests proponents to use the epost Connect service provided by Canada Post Corporation to transmit their proposal electronically.

Canada requests that the Proponent submits its proposal in accordance with section **PI13 Submission of Proposal**, of the **Proponent Instructions**. The epost Connect system has a limit of 1GB per single message posted and a limit of 20GB per conversation.

Canada requests that the proposal be gathered per separate electronic document (attachment) as follows:

Section I: Technical Bid (Proposal);
Section II: Price Proposal
Section III: Social-economic Proposal.

The electronic attachment should be labelled with the name of the section and the Solicitation Number.

If the Proponent is simultaneously providing copies of its proposal using multiple acceptable delivery methods, and if there is a discrepancy between the wording of any of these copies and the electronic copy provided through epost Connect service the wording of the electronic copy provided through epost Connect service will have priority over the wording of the other copies.

1.5 Proposal by Facsimile

Due to the nature of the bid solicitation, proposals transmitted by facsimile is not recommended but offered to proponents to provide an alternative opportunity in case of incompatibility or inability to transmit by epost Connect service.

If the Proponent submits its proposal by facsimile, Canada requests that the following sections be clearly identified and separated in the proposal:

Section I: Technical Bid (Proposal)
Section II: Financial Bid (Proposal)
Section III: Social-economic Proposal

SRE 2 PHASED BID COMPLIANCE PROCESS

2.1 General

- (a) Canada is conducting the PBCP described below for this requirement.
- (b) Notwithstanding any review by Canada at Phase I or II of the PBCP, Proponents are and will remain solely responsible for the accuracy, consistency and completeness of their Bids and Canada does not undertake, by reason of this review, any obligations or responsibility for identifying any or all errors or omissions in Bids or in responses by a Proponent to any communication from Canada.

THE PROPONENT ACKNOWLEDGES THAT THE REVIEWS IN PHASE I AND II OF THIS PBCP ARE PRELIMINARY AND DO NOT PRECLUDE A FINDING IN PHASE III THAT THE BID IS NON- RESPONSIVE, EVEN FOR MANDATORY REQUIREMENTS WHICH WERE SUBJECT TO REVIEW IN PHASE I OR II AND NOTWITHSTANDING THAT THE BID HAD BEEN FOUND RESPONSIVE IN SUCH EARLIER PHASE. CANADA MAY DEEM A BID TO BE NON-RESPONSIVE TO A MANDATORY REQUIREMENT AT ANY PHASE.

THE PROPONENT ALSO ACKNOWLEDGES THAT ITS RESPONSE TO A NOTICE OR A COMPLIANCE ASSESSMENT REPORT (CAR) (EACH DEFINED BELOW) IN PHASE I OR II MAY NOT BE SUCCESSFUL IN RENDERING ITS BID RESPONSIVE TO THE MANDATORY REQUIREMENTS THAT ARE THE SUBJECT OF THE NOTICE OR CAR, AND MAY RENDER ITS BID NON- RESPONSIVE TO OTHER MANDATORY REQUIREMENTS.

- (c) Canada may, in its discretion, request and accept at any time from a Proponent and consider as part of the Bid, any information to correct errors or deficiencies in the Bid that are clerical or administrative, such as, without limitation, failure to sign the Bid or any part or to checkmark a box in a form, or other failure of format or form or failure to acknowledge; failure to provide a procurement business number or contact information such as names, addresses and telephone numbers; inadvertent errors in numbers or calculations that do not change the amount the Proponent has specified as the price or of any component thereof that is subject to evaluation. This shall not limit Canada's right to request or accept any information after the bid solicitation closing in circumstances where the bid solicitation expressly provides for this right. The Proponent will have the time period specified in writing by Canada to provide the necessary documentation. Failure to meet this deadline will result in the Bid being declared non- responsive.
- (d) The PBCP does not limit Canada's rights under Standard Acquisition Clauses and Conditions (SACC) 2003 (2020-05-28 Standard Instructions – Goods or Services – Competitive Requirements nor Canada's right to request or accept any information during the solicitation period or after bid solicitation closing in circumstances where the bid solicitation expressly provides for this right, or in the circumstances described in subsection (c).
- (e) Canada will send any Notice or CAR by any method Canada chooses, in its absolute discretion. The Proponent must submit its response by the method stipulated in the Notice or CAR. Responses are deemed to be received by Canada at the date and time they are delivered to Canada by the method and at the address specified in the Notice or CAR. An email response permitted by the Notice or CAR is deemed received by Canada on the date and time it is received in Canada's email inbox at Canada's email

address specified in the Notice or CAR. A Notice or CAR sent by Canada to the Proponent at any address provided by the Proponent in or pursuant to the Bid is deemed received by the Proponent on the date it is sent by Canada. Canada is not responsible for late receipt by Canada of a response, however caused.

2.2 Phase I: Indigenous Participation Plan and Financial Bid

- (a) After the closing date and time of this bid solicitation, Canada will examine the Bid to determine whether it includes a Indigenous Participation Plan and Financial Bid and whether any Indigenous Participation Plan and Financial Bid includes all information required by the solicitation. Canada's review in Phase I will be limited to identifying whether any information that is required under the bid solicitation to be included in the Indigenous Participation Plan and Financial Bid is missing from the Indigenous Participation Plan and Financial Bid. This review will not assess whether the Indigenous Participation Plan and Financial Bid meets any standard or is responsive to all solicitation requirements.
- (b) Canada's review in Phase I will be performed by officials of the Department of Public Works and Government Services.
- (c) If Canada determines, in its absolute discretion that there is no Indigenous Participation Plan Bid or Financial Bid or that the Indigenous Participation Plan or Financial Bid is missing all of the information required by the bid solicitation to be included in the Indigenous Participation Plan Bid or Financial Bid, then the Bid will be considered non-responsive and will be given no further consideration.
- (d) For Bids other than those described in c), Canada will send a written notice to the Proponent ("Notice") identifying where the Indigenous Participation Plan Bid or the Financial Bid is missing information. A Proponent, whose Indigenous Participation Plan or Financial Bid has been found responsive to the requirements that are reviewed at Phase I, will not receive a Notice. Such Proponents shall not be entitled to submit any additional information in respect of their Indigenous Participation Plan or Financial Bid.
- (e) The Proponents who have been sent a Notice shall have the time period specified in the Notice (the "Remedy Period") to remedy the matters identified in the Notice by providing to Canada, in writing, additional information or clarification in response to the Notice. Responses received after the end of the Remedy Period will not be considered by Canada, except in circumstances and on terms expressly provided for in the Notice.
- (f) In its response to the Notice, the Proponent will be entitled to remedy only that part of its Indigenous Participation Plan or Financial Bid which is identified in the Notice. For instance, where the Notice states that a required line item has been left blank, only the missing information may be added to the Indigenous Participation Plan or Financial Bid, except that, in those instances where the addition of such information will necessarily result in a change to other calculations previously submitted in its Indigenous Participation Plan or Financial Bid, (for example, the calculation to determine a total price), such necessary adjustments shall be identified by the Proponent and only these adjustments shall be made. All submitted information must comply with the requirements of this solicitation.
- (g) Any other changes to the Indigenous Participation Plan or Financial Bid submitted by the Proponent will be considered to be new information and will be disregarded. There will be no change permitted to any other Section of the Proponent's Bid. Information submitted in accordance with the requirements of this solicitation in response to the

Notice will replace, in full, only that part of the original Indigenous Participation Plan or Financial Bid as is permitted above, and will be used for the remainder of the bid evaluation process.

- (h) Canada will determine whether the Indigenous Participation Plan or Financial Bid is responsive to the requirements reviewed at Phase I, considering such additional information or clarification as may have been provided by the Proponent in accordance with this Section. If the Indigenous Participation Plan or Financial Bid is not found responsive for the requirements reviewed at Phase I to the satisfaction of Canada, then the Bid shall be considered non-responsive and will receive no further consideration.
- (i) Only Bids found responsive to the requirements reviewed in Phase I to the satisfaction of Canada, will receive a Phase II review.

2.3 Phase II: Technical Bid

- (a) Canada's review at Phase II will be limited to a review of the Technical Bid to identify any instances where the Proponent has failed to meet any Eligible Mandatory Criterion. This review will not assess whether the Technical Bid meets any standard or is responsive to all solicitation requirements. Eligible Mandatory Criteria are all mandatory technical criteria that are identified in this solicitation as being subject to the PBCP. Mandatory technical criteria that are not identified in the solicitation as being subject to the PBCP, will not be evaluated until Phase III.
- (b) Canada will send a written notice to the Proponent (Compliance Assessment Report or "CAR") identifying any Eligible Mandatory Criteria that the Bid has failed to meet. A Proponent whose Bid has been found responsive to the requirements that are reviewed at Phase II will receive a CAR that states that its Bid has been found responsive to the requirements reviewed at Phase II. Such Proponent shall not be entitled to submit any response to the CAR.
- (c) A Proponent shall have the period specified in the CAR (the "Remedy Period") to remedy the failure to meet any Eligible Mandatory Criterion identified in the CAR by providing to Canada in writing additional or different information or clarification in response to the CAR. Responses received after the end of the Remedy Period will not be considered by Canada, except in circumstances and on terms expressly provided for in the CAR.
- (d) The Proponent's response must address only the Eligible Mandatory Criteria listed in the CAR as not having been achieved, and must include only such information as is necessary to achieve such compliance. Any additional information provided by the Proponent which is not necessary to achieve such compliance will not be considered by Canada, except that, in those instances where such a response to the Eligible Mandatory Criteria specified in the CAR will necessarily result in a consequential change to other parts of the Bid, the Proponent shall identify such additional changes, provided that its response must not include any change to the Financial Bid.
- (e) The Proponent's response to the CAR should identify in each case the Eligible Mandatory Criterion in the CAR to which it is responding, including identifying in the corresponding section of the original Bid, the wording of the proposed change to that section, and the wording and location in the Bid of any other consequential changes that necessarily result from such change. In respect of any such consequential change, the Proponent must include a rationale explaining why such consequential change is a necessary result of the change proposed to meet the Eligible Mandatory Criterion. It is not up to Canada to revise the Proponent's Bid, and failure of the Proponent to do so in

accordance with this subparagraph is at the Proponent's own risk. All submitted information must comply with the requirements of this solicitation.

- (f) Any changes to the Bid submitted by the Proponent other than as permitted in this solicitation, will be considered to be new information and will be disregarded. Information submitted in accordance with the requirements of this solicitation in response to the CAR will replace, in full, **only** that part of the original Bid as is permitted in this Section.
- (g) Additional or different information submitted during Phase II permitted by this section will be considered as included in the Bid, but will be considered by Canada in the evaluation of the Bid at Phase II only for the purpose of determining whether the Bid meets the Eligible Mandatory Criteria. It will not be used at any Phase of the evaluation to increase or decrease any score that the original Bid would achieve without the benefit of such additional or different information. For instance, an Eligible Mandatory Criterion that requires a mandatory minimum number of points to achieve compliance will be assessed at Phase II to determine whether such mandatory minimum score would be achieved with such additional or different information submitted by the Proponent in response to the CAR. If so, the Bid will be considered responsive in respect of such Eligible Mandatory Criterion, and the additional or different information submitted by the Proponent shall bind the Proponent as part of its Bid, but the Proponent's original score, which was less than the mandatory minimum for such Eligible Mandatory Criterion, will not change, and it will be that original score that is used to calculate any score for the Bid
- (h) Canada will determine whether the Bid is responsive for the requirements reviewed at Phase II, considering such additional or different information or clarification as may have been provided by the Proponent in accordance with this Section. If the Bid is not found responsive for the requirements reviewed at Phase II to the satisfaction of Canada, then the Bid shall be considered non-responsive and will receive no further consideration.
- (i) Only Bids found responsive to the requirements reviewed in Phase II to the satisfaction of Canada, will receive a Phase III evaluation.

2.4 Phase III: Final Evaluation of the Bid

- a) In Phase III, Canada will complete the evaluation of all Bids found responsive to the requirements reviewed at Phase II. Bids will be assessed in accordance with the entire requirement of the bid solicitation including the technical and financial evaluation criteria.
- b) A Bid is non-responsive and will receive no further consideration if it does not meet all Mandatory Technical criteria

The Phased Bid Compliance Process will apply to the mandatory criteria 3.1.1 to 3.1.4 and 3.1.6, listed in SRE3, 3.1 Mandatory Requirements.

SRE 3 MANDATORY / RATED REQUIREMENTS AND EVALUATION

3.1 MANDATORY REQUIREMENTS

Failure to meet the mandatory requirements will render the proposal non-responsive and no further evaluation will be carried out, subject to the Phased Bid Evaluation process, see SRE 2

3.1.1 Licensing, Certification or Authorization

The Proponent must be authorized to provide architectural services and must include an architect, licensed, or eligible to be licensed, certified or otherwise authorized to provide the necessary professional services to the full extent that may be required by provincial law in the province of Ontario, at time of work.

3.1.2 Consultant Team Identification

Proponents must complete, sign and submit Appendix A – Proponent Team Identification and Declaration with their Proposal.

The consultant team to be identified must include the following:

- a) Proponent (Prime consultant) Architect
- b) Key Sub-consultants / Key Personnel / Specialists Firms
Key Sub-consultants must be identified.
- c) Key Individuals:
 - i. Architect Principal-in-charge
 - ii. Project Architect
 - iii. Architectural Project Manager
 - iv. Lead Interior Design
 - v. Mechanical Engineer Principal
 - vi. Project Mechanical Engineer
 - vii. Mechanical Production Manager
 - viii. Structural Engineer Principal
 - ix. Electrical Engineer Principal
 - x. Lead Laboratory Design Specialist

If the proponent proposes to provide multidisciplinary services that might normally be provided by a Sub-Consultant, this should be indicated here.

Information required: name of firm, Key Personnel to be assigned to the project. For the Proponent, indicate current license and/or how provincial or territorial licensing requirements would be met. In the case of a joint venture, identify the existing or proposed legal form of the joint venture (refer to P118 Limitation of submissions).

3.1.3 Declaration/Certifications Form

Proponents must complete, sign and submit the following:

- Appendix B, Declaration/Certifications Form as required.

3.1.4 Integrity Provisions – Required documentation

In accordance with the Ineligibility and Suspension Policy (<https://www.tpsgc->

pwgsc.gc.ca/ci-if/politique-policy-eng.html) the Proponent must provide, as applicable, to be given further consideration in the procurement process, the required documentation as per PI5, Integrity Provisions - Proposal, section 3a.

3.1.5 Security Requirement

Proponents must meet the security requirements as outlined under PI10 and SC1.

3.1.6 Minimum Score

Proponents must meet or surpass the minimum score identified in SRE 3.2, Rated Requirements in order to be considered responsive.

3.1.7 Indigenous Participation Plan

Proponents must submit an Indigenous Participation Plan as described in SRE 3.2 Rated Requirements.

3.2 RATED REQUIREMENTS

The following table is a summary of the point-rated technical criteria.

Rated Technical Criterion	Rated Topic	Evaluation Scale	Available Points
SRE 3.2.1	Experience and Achievements of the Proponent	Scale 1	225
SRE 3.2.2	Capacity of the Proponent	Scale 2	220
SRE 3.2.3	Experience and Expertise of Key Individuals	Scale 3	340
SRE 3.2.4	Internal Structure of the Proponent	Scale 4	145
SRE3.2.5	Process and Methodology of the Proponent	Scale 5	565
MINIMUM REQUIRED SCORE			897
Total Technical Rating			1495
Rated Criterion	Rated Topic	Available Points	
SRE 3.2.6	Indigenous Participation Plan	75	

3.2.1 Experience and Achievements of the Proponent

1. The Proponent should submit a **maximum of three distinct representative projects: one science- or research-based project, one complex project, and one performance-based project** as identified in paragraphs 2 a), b), and c) of section 3.2.1, three distinct representative projects in total, to substantiate their experience and achievements by providing the information as it pertains to each criterion listed below on a **maximum of 7 pages per project**, and complete and include the Appendix E – Client Reference Form in accordance with paragraph 6) of section 3.2.1. The Client Reference Form is excluded from the maximum page count per project.

2. PWGSC will evaluate the section 3.2.1 criteria, described in paragraphs 3 a) to f) and 4 below, for each of the three distinct representative projects. If more than one representative project per category (science- or research-based, complex, performance-based) are submitted, only the first project per category will be evaluated. If the same representative project is submitted in more than one category (science- or research-based, complex, performance-based), only the representative project appearing first in the Proposal will be evaluated.

The construction cost of a representative project reasonably includes the cost of furniture, fixtures and equipment and information technologies; however, maintenance contracts and facility and property management operations do not represent construction work and will not be accepted as part of the construction cost for a representative project.

To be valid, the representative projects need to have the following characteristics for each category:

- a) **Science or Research-based laboratory** building project with the following characteristics:
- i. New build or expansion of an existing facility with a degree of design and aesthetic quality; and
 - ii. Implementation via construction management, or design-build, or public-private-partnership, or engineer-procure-construct project delivery model; and
 - iii. Included individual lab workstations, versatile laboratory casework (storage, benches, seating, etc), fume hoods, and hazard containment or hazardous materials storage; and
 - iv. Had a final or has a current projected final construction cost of at least \$50M (taxes excluded, in 2020 Canadian currency); and
 - v. Has completed at least 50% of its construction, for ongoing projects, (evidenced by construction invoicing, letter or email from the owner, or signed Appendix E – Client Reference Form) or was completed after December 31, 2011, for completed projects;
- b) **Complex** project with the following characteristics:
- i. New build or expansion of an existing facility; and
 - ii. Implementation via construction management, or design-build, or public-private-partnership, or engineer-procure-construct project delivery model; and
 - iii. Had a final or has a current projected final construction cost of at least \$150M (taxes excluded) in 2020 Canadian currency); and
 - iv. Has completed at least 50% of its construction, for ongoing projects, (evidenced by construction invoicing, letter or email from the owner, or signed Appendix E – Client Reference Form) or was completed after December 31, 2011, for completed projects; and
 - v. Is in one physical location (i.e., a project with multiple, diverse sites will not be accepted) and includes a minimum of three of the following complexity characteristics:
 - 1. Control of chemical or biological process(es) (e.g., chemical distillation or reaction, disinfection, material containment, radiation, industrial processes, etc.);

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2. Heavy engineering and industrial transportation characteristics (e.g., transportation testing and research facilities, fleet maintenance facilities with large storage yards; transportation manufacturing facilities, etc.);
 3. High security requirement of an entire facility (e.g., legislative building, laboratory, courthouse, prison, industrial or military facility, etc.);
 4. Layers of circulation or technical programming (e.g., research space(s), industrial or biological process control, hazardous materials storage, local and centralized safety systems, multiple user groups, etc.); or
 5. Process – government, crown corporations or public context (e.g., numerous approval bodies, ministerial or equivalent approval, etc.).
- c) **Performance-based** building project with the following characteristics:
- i. Sustainable design performance where loads are significantly reduced through design achieving, or ready to achieve, net zero carbon emissions **and** net zero energy, and
 - ii. Implementation via construction management, or design-build, or public-private-partnership, or engineer-procure-construct project delivery model; and
 - iii. Had a final or has a current projected final construction cost of at least \$50M (taxes excluded, in 2020 Canadian currency); and
 - iv. Has completed at least 50% of its construction, for ongoing projects, (evidenced by construction invoicing, letter or email from the owner, or signed Appendix E – Client Reference Form) or was completed after December 31, 2011, for completed projects;
3. The following criteria only will be evaluated for projects that meet the characteristics of a science- or research-based laboratory building project, a complex project, and performance-based building project, in section 3.2.1 paragraph 2. Criteria evaluated for SRE 3.2.1 are as follows:
- a) A detailed description of how each representative project is similar/related to the project as described in Appendix H – Project Brief;
 - b) A detailed description of the services rendered by the Proponent for each of the following roles and responsibilities. For projects undertaken as a joint-venture, consortium or in association, clearly specify the other participants, whether or not they are part of the Proponent's team, and a high-level description of their respective involvement and responsibilities:
 1. Design Authorship
 2. Managerial Control;
 3. Architect or Engineer of Record, as applicable;
 4. Individual architectural, structural, mechanical and electrical design leads;
 5. Construction documents production;
 6. Quality management lead;
 7. Resident site services lead;
 - c) A detailed description of the degree of involvement during the following stage(s) of the project. For projects undertaken as a joint-venture, consortium or association, clearly specify the other participants and their respective involvement and responsibilities by

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- project stage;
1. Schematic or concept design;
 2. Design development;
 3. Construction documents;
 4. Tender and award;
 5. Field or site supervision; and
 6. Post-construction warranty review.
- d) Provide scale of the project (ie: present construction cost);
- e) For the following aspects of the project, present the Building Information Modelling (BIM) process(es) and methodology(ies) undertaken by the Proponent:
- i. During the design stage, determination of component /system levels of detail and accuracy, and resolution of design interferences (clashes);
 - ii. During the design stage, use of high resolution, three-dimensional imaging to obtain design approval;
 - iii. During the construction stage, incorporation of submittals and in the BIM model to complete the record (as-built) model;
 - iv. The commissioning and close out stage, incorporation of as-commissioned information in the record (as-built) model. If project is ongoing, provide approach to be taken for commissioning and close out procedures; and
 - v. Change management, ongoing update of the BIM model to reflect changes over the life of the project;
- f) Industry/peer recognition, including industry or professional publications, and awards for innovation, design quality, or energy efficiency, excluding project-related presentations or sustainability certification.
4. For the purposes of the evaluation of the Proponent's experience and achievements:
- a) If the Proponent is composed of multiple entities, the Proponent is requested to clearly identify who in the teaming arrangement was the design authority and who was responsible for delivering the services in the representative project
 - b) If the Proponent or a member of the Proponent team was not directly involved in the delivery of the services under the representative project, the representative project will not be evaluated;
 - c) Experience claimed by a parent company, a subsidiary, an affiliate or a subcontractor will be evaluated as experience by a member of the Consultant Team, not as experience of the Proponent. For a Joint Venture, experience by any member of the Joint Venture will be evaluated as experience of the Proponent;
5. In the context of this criterion, 'client' means the project owner, or its representative, of the funding department or organization who was directly involved in contracting the architectural and engineering service activities of the representative project. Proponents are requested to provide construction costs in Canadian currency for the year completed. PWGSC will escalate the construction cost to 2020 Canadian currency as identified in SC6 Escalation of Hourly Rates.

If the Proponent submits a project and states the cost cannot be released but the 'client' confirms the cost is above the threshold defined in the grid cells of Scale 1, row 3.2.1.3 d, then they will receive the corresponding percentage rating.

Construction cost must be provided in Canadian currency

6. Client References

- a) Canada may, but will not have the obligation to, contact client references representatives to validate the information provided as part of Appendix E – Client Reference Form. In the event of any discrepancy between the information provided by the Proponent and the information validated by the client reference(s), the Proponent will be given the opportunity to clarify any such discrepancy(ies).
- b) Any portion of the information requested as part of the Appendix E – Client Reference Form that is not validated by a client reference, or any proposed representative project for which no signed client reference was provided or for which the Proponent was unable to establish contact with its client reference representatives within ten days of such a request by Canada, will not be evaluated.

Section 3.2.1 criteria 3 a) to f) will be evaluated in accordance with Scale 1 below.

Scale 1	0 %	20 %	40 %	60 %	80 %	100 %	Available Points
3.2.1 3.a)	Does not meet the characteristics of a complex project or a science/research-based project or a performance-based building project	Sample project is generally not related to the project as described in Appendix H – Project Brief	Sample project is marginally related to the project as described in Appendix H – Project Brief	Sample project is generally related to the project as described in Appendix H – Project Brief	Sample project is directly related to the project as described in Appendix H – Project Brief	Sample project exceeds the complexity of the project as described in Appendix H – Project Brief (e.g., 5 complexity characteristics as per SRE 3.2.1, 2 b) v), etc.)	15 points per project; Total: 45 points
3.2.1 3.b)	Does not meet the minimum characteristics of a complex project or a science/research-based project or a performance-based building project	Relevant services provided in less than three specific roles by the Proponent	Relevant services provided in three specific roles by the Proponent	Relevant services provided in four specific roles by the Proponent	Relevant services provided in five specific roles by the Proponent	Relevant services provided in six specific roles by the Proponent	15 points per project; Total: 45 points

Scale 1	0 %	20 %	40 %	60 %	80 %	100 %	Available Points
3.2.1 3.c)	Does not meet the minimum characteristics of a complex project or a science/research-based project or a performance-based building project	Relevant services provided in less than three project stages by the Proponent	Relevant services provided in three project stages by the Proponent	Relevant services provided in four project stages by the Proponent	Relevant services provided in five project stages by the Proponent	Relevant services provided in six project stages by the Proponent	15 points per project; Total: 45 points
3.2.1 3.d)	Does not meet the minimum characteristics of a complex project or a science/research-based project or a performance-based building project	Construction cost is ≥ \$150M but < \$175M for a complex project or ≥ \$50M but < \$60M for science/research-based project or a performance-based building project	Construction cost is ≥ \$175M but < \$200M for a complex project or ≥ \$60 but < \$70M for science/research-based project or a performance-based building project	Construction cost is ≥ \$200M but < \$225M for a complex project or ≥ \$70M but < \$80M for science/research-based project or a performance-based building project	Construction cost is ≥ \$225M but < \$250M for a complex project or ≥ \$80M but < \$90M for science/research-based project or a performance-based building project	Construction cost is ≥ \$250M for a complex project or ≥ \$90M for a science/research-based project or a performance-based building project	10 points per project; Total: 30 points
3.2.1 3.e)	Does not meet the minimum characteristics of a complex project or a science/research-based project or a performance-based building project	BIM process and methodology provided for only one of the five aspects with some process details	BIM process and methodology provided for two of the five aspects with process details per aspect	BIM process and methodology provided for three of the five aspects with process details per aspect	BIM process and methodology provided for four of the five aspects with process details per aspect	BIM process and methodology provided for all five aspects with process details per aspect	15 points per project; Total: 45 points
3.2.1 3.f)	Does not meet the minimum characteristics of a complex project or a science/research-based project or a performance-based building project	One recognition,	Two recognitions,	Three recognitions,	Four recognitions,	Five or more recognitions,	5 points per project; Total: 15 points

3.2.2 Capacity of the Proponent

1. The Proponent is required to explain, in a **maximum of five (5) pages**, how they intend to provide and maintain the necessary capacity, over the course of the resulting contract and all potential contract options, while managing other business ventures by providing the information as it pertains to each criterion listed below.
2. Criteria evaluated in relation to SRE 3.2.2 are:
 - a) Capability to provide a project management team to support a project, as described in the RFP Appendix H – Project Brief;
 - b) Capability to effectively use Building Information Modelling (BIM) to produce a complex and intricate series of construction documents, as it pertains to the provision of A&E services for the TSTS project both on and off site, in an accelerated and prioritized implementation framework, as described in RFP Appendix H – Project Brief;
 - c) Capability to interpret and integrate various and possibly competing requirements into a coherent, quality managed design;
 - d) Ability to present and highlight proposed solutions in a convincing manner so formal approvals are obtained to meet scheduling milestones,

Section 3.2.2 criteria will be evaluated in accordance with Scale 2 below.

Scale 2	0 %	20 %	40 %	60 %	80 %	100 %	Available Points
3.2.2 2a)	Did not submit information which could be evaluated	Extremely poor or insufficient capability to provide project management team for the full duration of the TSTS while managing other business ventures	Limited capability to provide project management team for the full duration of the TSTS while managing other business ventures	Acceptable capability to provide project management team for full duration of the TSTS while managing other business ventures	Good capability to provide project management team for the full duration of the TSTS while managing other business ventures	Very good capability to provide project management team for the full duration of the TSTS while managing other business ventures Executive lead team over the entire project	70 points
3.2.2 2b)	Did not submit information which could be evaluated	Weak BIM production capability off site for a project of this scale and complexity while managing other business ventures	Acceptable BIM production capability off site for a project of this scale and complexity while managing other business ventures	Good BIM production capability off site but limited BIM on site production capability for a project of this scale and complexity while	Good BIM production capability both off and on site for a project of this scale and complexity while managing other business ventures	Very good BIM production capability both off and on site for a project of this scale and complexity while managing other business ventures	40 points

Scale 2	0 %	20 %	40 %	60 %	80 %	100 %	Available Points
				managing other business ventures			
3.2.2 2c)	Did not submit information which could be evaluated	Extremely poor or insufficient internal capability to interpret and integrate various and possibly competing requirements into a coherent, quality managed design	Limited internal capability to interpret and integrate various and possibly competing requirements into a coherent, quality managed design	Acceptable internal capability to interpret and integrate various and possibly competing requirements into a coherent, quality managed design	Good internal capability to interpret and integrate various and possibly competing requirements into a coherent, quality managed design	Very good internal capability to interpret and integrate various and possibly competing requirements into a coherent, quality managed design	40 points
3.2.2 2d)	Did not submit information which could be evaluated	Poor track record of obtaining project design approvals from senior officials with limited or no documentation	Limited track record of obtaining project design approvals from senior officials with limited or no documentation	Good track record of obtaining project design approvals from senior officials but limited or no documentation	Good and documented track record of obtaining design approval for complex projects with multi- jurisdictional bodies, from senior officials	Very good and well documented track record of obtaining design approvals for complex projects with multi- jurisdictional approval bodies, from a CEO, Minister, etc.	70 points

3.2.3 Experience and Expertise of Key Individuals

- The Proponent should submit a summary resume (c.v.) for the 10 Key Individuals identified by the Proponent by name, title, and the information as it pertains to each criterion listed in SRE 3.2.3. Proponents are limited to **a maximum of 3 pages per key individual**.
- The Proponent should substantiate the experience and expertise of each Key Individual listed below and to be assigned to perform the services in the resulting contract. Include the start and completion date of all previously held positions and current position to substantiate requirements.
 - Architect Principal-in-charge:
The single individual who:
 - Has the responsibility and design leadership over all aspects of the project including meeting project requirements within the approved project parameters; and
 - Will lead and present all design approval presentations as well as all preparatory presentations thereto; and
 - Individual that will professionally certify all consultant deliverables;
 - Has overall control and accountability for the overall delivery of the consultant

services; and

- v. As the partner-in-charge for the duration of the project, will act as a dedicated project director through active, hands-on management of the integrated Consultant Team.
- b) Project Architect:
The dedicated (day to day) single individual accountable to ensure the design vision is realized and coordinated with the technical aspects of the architectural design for the project;
- c) Architectural Project Manager:
The single individual accountable to implement the design vision as part of the technical performance of the work, including the full coordination of the overall project design with all other design disciplines;
- d) Lead Interior Design:
The single individual accountable to ensure the interior design is realized and coordinated with the design vision and the technical aspects of the interior design services and with all other relevant design disciplines;
- e) Mechanical Engineer Principal:
The single individual having responsibility and design control over all aspects of the project's mechanical design within the approved project parameters. This individual will support all design approval presentations, as well as all preparatory presentations thereto; This individual will professionally certify all mechanical engineering deliverables;
- f) Project Mechanical Engineer:
The single individual accountable to ensure the mechanical design is realized, appropriately integrated with the architectural design vision, and coordinated with the technical aspects of the mechanical design services for the project;
- g) Mechanical Production Manager
The single individual accountable to implement the mechanical design in the technical performance of the work, including the full coordination of the overall mechanical design and with all other relevant design disciplines;
- h) Structural Engineer Principal:
The single individual having responsibility and design control over all aspects of the project's structural design with the approved project parameters. This individual will support all design approval presentations, as well as all preparatory presentations thereto; This individual will professionally certify all structural engineering deliverables;
- i) Electrical Engineer Principal:
The single individual having responsibility and design control over all aspects of the project's electrical design with the approved project parameters. This individual will support all design approval presentations, as well as all preparatory presentations thereto; This individual will professionally certify all electrical engineering deliverables
- j) Lead Laboratory Design Specialist:
The single individual having overall accountability to ensure the design of science-related spaces are realized, appropriately integrated with the architectural design vision, and coordinated with the technical aspects of the science-related and laboratory design services and with all other relevant design disciplines;

3. Criteria evaluated in relation to SRE 3.2.3 are:

- a) The Proponent must demonstrate five or more years' experience in the proposed role, for the Architect Principal-in-charge, Project Architect, Mechanical Engineer Principal, Project Mechanical Engineer, Electrical Engineer Principal, Structural Engineer Principal, and Lead Laboratory Design Specialist. The demonstration of experience must contain projects spanning all years of claimed experience and must include at least one project, completed within the last 10 years, that includes a minimum of three of the complexity characteristics below. The three complexity characteristics must be demonstrated within one single project, while as many projects as necessary should be presented to demonstrate the years of claimed experience. The Proponent should indicate which project it is presenting as demonstration of the complexity characteristics.
 - i. Sustainable design performance where loads are significantly reduced through design achieving, or ready to achieve, net zero carbon emissions and net zero
 - ii. Control of chemical or biological process(es) (e.g., chemical distillation or reaction, disinfection, material containment, radiation, industrial processes, etc.);
 - iii. Heavy engineering and industrial transportation characteristics (e.g., transportation testing and research facilities, fleet maintenance facilities with large storage yards; transportation manufacturing facilities, etc.);
 - iv. High security requirement of an entire facility (e.g., legislative building, laboratory, courthouse, prison, industrial or military facility, etc.);
 - v. Layers of circulation or technical programming (e.g., research space(s), industrial or biological process control, hazardous materials storage, local and centralized safety systems, multiple user groups, etc.); or
 - vi. Process – government, crown corporations or public context (e.g., numerous approval bodies, ministerial or equivalent approval, etc.).
- b) The Proponent must demonstrate two or more years' experience in the proposed role, for the Architectural Project Manager, Mechanical Production Manager and Lead Interior Design. The demonstration of experience must contain projects spanning all years of claimed experience and must include at least one project, completed within the last 10 years, that includes a minimum of three of the complexity characteristics below. The three complexity characteristics must be demonstrated within one single project, while as many projects as necessary should be presented to demonstrate the years of claimed experience. The Proponent should indicate which project it is presenting as demonstration of the complexity characteristics.
 - i. Sustainable design performance where loads are significantly reduced through design achieving, or ready to achieve, net zero carbon emissions and net zero
 - ii. Public infrastructure (e.g., museum, airport, hospital, bridge, etc.);
 - iii. Constrained spatial environment (e.g., metropolitan area, limited land mass area, etc.);
 - iv. High security requirement of an entire facility (e.g., hospital, court house, laboratory, prison, industrial facility, etc.);
 - v. Layers of circulation or technical programming (e.g., pedestrian impact, public transportation, local and centralized systems, multiple user groups, etc.); or
 - vi. Process – government, crown corporations or public context (e.g., numerous approval bodies, ministerial or equivalent approval, etc.);

NOTE: For project experience claimed in criterion 3a) and 3b), provide the start date of assignment for each project and the end date of assignment for

each project.

Each Key Individual will be evaluated separately. No person may be proposed for more than one Key Individual role.

Section 3.2.3 criteria will be evaluated in accordance with Scale 3 below.

Scale 3	0 %	20 %	40 %	60 %	80 %	100 %	Available Points
3.2.3. 3 a)	Key Individual has demonstrated less than 5 years of experience	Key Individual has demonstrated 5 or more years of experience	Key Individual has demonstrated 8 or more years of experience	Key Individual has demonstrated 10 or more years of experience	Key Individual has demonstrated 12 or more years of experience	Key Individual has demonstrated 15 or more years of experience	Architect Principal-in-charge, Mechanical Engineer Principal (45 points each);
	OR Key Individual's project sampling does not include a minimum of three complexity characteristics relevant to a complex project	AND Key Individual's project sampling includes a minimum of three complexity characteristics for at least one complex project	AND Key Individual's project sampling includes a minimum of three complexity characteristics for at least one complex project	AND Key Individual's project sampling includes a minimum of three complexity characteristics for at least one complex project	AND Key Individual's project sampling includes four or more complexity characteristics for at least one complex project	AND Key Individual's project sampling includes four or more complexity characteristics for at least one complex project	Project Architect, Project Mechanical Engineer, Electrical Engineer Principal, Structural Engineer Principal, and Lead Laboratory Design Specialist; (35 points each); Total: 265 points
3.2.3. 3 b)	Key Individual has demonstrated less than 2 years of experience OR Key	Key Individual has demonstrated 2 or more years of experience AND	Key Individual has demonstrated more than 4 years of experience AND	Key Individual has demonstrated more than 6 years of experience AND	Key Individual has demonstrated more than 8 years of experience AND	Key Individual has demonstrated more than 10 years of experience AND	Architectural Project Manager, Mechanical Production Manager, Lead Interior Design, Lead

Scale 3	0 %	20 %	40 %	60 %	80 %	100 %	Available Points
	Individual's project sampling does not include a minimum of three complexity characteristics of one complex project	Key Individual's project sampling includes a minimum of three complexity characteristics for at least one complex project	Key Individual's project sampling includes a minimum of three complexity characteristics for at least one complex project	Key Individual's project sampling includes a minimum of three complexity characteristics for at least one complex project	Key Individual's project sampling includes four or more complexity characteristics for at least one complex project	Key Individual's project sampling includes four or more complexity characteristics for at least one complex project	(25 points each) Total: 75 points

3.2.4 Internal Structure of the Proponent

1. The Proponent should present, in a **maximum of 5 pages**, their business strategy for the ongoing management, quality control and delivery of a contract resulting from this solicitation process by providing the information as it pertains to each criterion listed below.
2. Criteria evaluated in relation to SRE 3.2.4 are:
 - a) An internal team structure, program-specific organization chart including personnel titles, their responsibilities, reporting relationships and percentage of time / availability to this project, back-up resources, in the context of the requirements of a contract resulting from this solicitation process;
 - b) Internal decision-making process, including but not limited to:
 - i. Description of process;
 - ii. Efficiencies associated with the described process;
 - iii. Group/Individual responsible for taking a final decision on behalf of the Proponent.
 - iv. Quality assurance and internal coordination; and
 - v. Leadership in sustainable processes implementation within all design decisions
 - c) A resolution process associated with decision-making or issues that may arise within the Proponent Team.

Section 3.2.4 criteria will be evaluated in accordance with Scale 4 below.

Scale 4	0%	20%	40%	60%	80%	100%	Available Points
3.2.4.2 a)	Did not submit information which could be evaluated	Extremely poor internal team structure; lack complete or almost complete understanding of the requirements	Poor internal team structure; has some understanding of the requirements but lacks adequate understandings in some areas of the requirements	Adequate internal team structure; demonstrate an adequate understanding of the requirements	Good internal team structure; demonstrate a good understanding of the requirements	Very good internal team structure; demonstrate a very good understanding of the requirements	60 points
3.2.4.2b) and c)	Did not submit information which could be evaluated	Extremely poor, insufficient decision and resolution processes; lacks complete or almost complete understanding of the requirements	Poor decision and resolution processes; has some understanding of the requirements but lacks adequate understanding in some areas of the requirements	Adequate decision and resolution processes; demonstrate an adequate understanding of the requirements	Good decision and resolution processes; demonstrate a good understanding of the requirements	Very good decision and resolution processes; demonstrate a very good understanding of the requirements	3.2.4.2 b) 45 points, 3.2.4.2 c) 40 points, Total 85 points

3.2.5 Process and Methodology of the Proponent

- The Proponent should provide information as it pertains to each criterion listed below, in a **maximum of 12 pages**. Describe process(es) and methodology(ies) the Proponent would apply to foster an integrated and seamless implementation strategy for the TSTS hub project, delivered in a construction management (CM) delivery model where the design is prioritized and construction occur simultaneously.
- Criteria evaluated in relation to paragraph 1 of SRE 3.2.5 are:
 - Integration of team and with other stakeholders, including the CM team, etc.;
 - Integration of interior design (TSTS occupant requirements), furniture, fixtures and equipment (FF&E) and Connectivity (information technologies, audio-visual systems, and integrated security systems), with the main design and construction to meet project objectives;
 - Off-site and on-site BIM management and design prioritization and production to meet defined project milestones and key intermediate dates;
 - Schedule, and cost management, to reflect approved scope/budget and control fees, including mitigation strategies to control cost and schedule;
 - Time management, including means to respond to and control peaks in design production and on-site services, including a resource allocation matrix by project stage;
 - Quality management and verification of design coordination and completeness throughout design production and during construction;
 - Tracking and incorporation of functional program (FP) and owners project requirement (OPR) changes after schematic design into the construction and commissioning and confirming compliance of requirements in as-built documentation and BIM model;
 - Triage, tracking, and closeout of issues, submittals and requests for information (RFIs); and
 - Information management and transfer over to new personnel during course of the project.

Section 3.2.5 criteria will be evaluated in accordance with Scale 5 below.

Scale 5	0 %	20%	40%	60%	80%	100%	Available Points
3.2.5. 2 a)	Did not submit information which could be evaluated	Extremely poor process and methodology (assigning roles/ responsibilities, service delivery, integration stakeholders); lack complete understanding of the requirements	Poor process and methodology (assigning roles/ responsibilities, service delivery, integration stakeholders); has some understanding of the requirements but lacks adequate understandings in some areas of the requirements	Adequate process and methodology (assigning roles/ responsibilities, service delivery, integration stakeholders); demonstrate adequate understanding of the requirements	Good process and methodology (assigning roles/ responsibilities, service delivery, integration stakeholders); demonstrate a good understanding of the requirements	Very good process and methodology (assigning roles/ responsibilities, service delivery, integration stakeholders); demonstrate a very good understanding of the requirements	40 points
3.2.5. 2 b)	Did not submit information which could be evaluated	Extremely poor process and methodology to integration and coordination of interior design, FF&E, and Connectivity. Limited or no substantiation with significant gaps how the project objectives and operational requirements can be achieved	Poor process and methodology to integration and coordination of interior design, FF&E, and Connectivity. Poor substantiation with many gaps how the project objectives and operational requirements can be achieved	Adequate process and methodology to integration and coordination of interior design, FF&E, and Connectivity. Adequate substantiation with some gaps how the project objectives and operational requirements can be achieved	Good process and methodology to integration and coordination of interior design, FF&E, and Connectivity. Good substantiation with minor gaps of how the project objectives and operational requirements can be achieved	Very good process and methodology to integration and coordination of interior design, FF&E, and Connectivity. Very good substantiation of how the project objectives and operational requirements can be achieved	75 points
3.2.5. 2 c)	Did not submit information which could be evaluated	Extremely poor process and methodology for BIM management and design prioritization or reprioritization, and production to meet defined project milestones and key intermediate dates. Lacks complete or almost complete understanding of the requirements	Poor process and methodology for BIM management and design prioritization or reprioritization, and production to meet defined project milestones and key intermediate dates. Has some understanding of the requirements but lacks adequate understandings in some areas of the requirements	Adequate process and methodology for on- or off-site BIM management and design prioritization or reprioritization, and production to meet defined project milestones and key intermediate dates; Demonstrates an adequate understanding of the requirements	Good process and methodology for on- and off-site BIM management and design prioritization or reprioritization, and production to meet defined project milestones and key intermediate dates; Demonstrates a good understanding of the requirements	Very good process and methodology for on- and off-site BIM management and design prioritization or reprioritization, and production to meet defined project milestones and key intermediate dates; Demonstrate a very good understanding of the requirements	50 points
3.2.5. 2 d)	Did not submit information which could be evaluated	Extremely poor process and methodology for schedule and cost management, including mitigation strategies to deal with variances in cost and schedule.	Poor process and methodology for schedule and cost management, including mitigation strategies to deal with variances in cost and schedule.	Adequate process and methodology for schedule and cost management, including mitigation strategies to deal with variances in cost and schedule.	Good process and methodology for schedule and cost management, including mitigation strategies to deal with variances in cost and schedule.	Very good process and methodology for schedule and cost management, including mitigation strategies to deal with variances in cost and schedule.	50 points each for Schedule and Cost. Total: 100 points

Scale 5	0 %	20%	40%	60%	80%	100%	Available Points
3.2.5. 2 e)	Did not submit information which could be evaluated	Extremely poor process and methodology for time management, to respond and control to peaks in design production and on-site services, or extremely poor resource matrix by project stage	Poor process and methodology time management, to respond and control to peaks in design production and on-site services, or poor resource matrix by project stage	Adequate process and methodology for time management, to respond and control to peaks in design production and on-site services, and adequate resource matrix by project stage	Good process and methodology for time management, to respond and control to peaks in design production and on-site services, and adequate or good resource matrix by project stage	Very good process and methodology for time management, to respond and control peaks in design production and on-site services, and well detailed, logical resource matrix by project stage	50 points
3.2.5. 2 f)	Did not submit information which could be evaluated	Extremely poor process and methodology for quality management and verification of design coordination and completeness, per discipline, throughout design production and during construction	Poor process and methodology for quality management and verification of design coordination and completeness, per discipline, throughout design production and during construction	Adequate process and methodology for quality management and verification of design coordination and completeness, per discipline, throughout design production and during construction	Good process and methodology for quality management and verification of design coordination and completeness, per discipline, throughout design production and during construction	Very good process and methodology for quality management and verification of design coordination and completeness, per discipline, throughout design production and during construction	75 points
3.2.5. 2 g)	Did not submit information which could be evaluated	Extremely poor process and methodology for tracking of FP and OPR changes after schematic design into construction and commissioning. Limited or no information on confirming compliance of requirements in as-built documentation and BIM model.	Poor process and methodology for tracking of FP and OPR changes after schematic design into construction and commissioning. Many information gaps on confirming compliance of requirements in as-built documentation and BIM model	Adequate process and methodology for tracking of FP and OPR changes after schematic design into construction and commissioning. Some information gaps on confirming compliance of requirements in as-built documentation and BIM model	Good process and methodology for tracking of FP and OPR changes after schematic design into construction and commissioning. Good information on confirming compliance of requirements in as-built documentation and BIM model.	Very good process and methodology for tracking of FP and OPR changes after schematic design into construction and commissioning. Thorough process for confirming compliance of requirements in as-built documentation and BIM model.	75 points
3.2.5. 2 h)	Did not submit information which could be evaluated	Extremely poor process and methodology for triage, tracking, and closeout of issues, submittals and RFIs.	Poor process and methodology for triage, tracking, and closeout of issues, submittals and RFIs.	Adequate process and methodology for triage, tracking, and closeout of issues, submittals and RFIs.	Good process and methodology for triage, tracking, and closeout of issues, submittals and RFIs.	Very good, preemptive process and methodology for triage, tracking, and closeout of issues, submittals and RFIs.	50 points
3.2.5. 2 i)	Did not submit information which could be evaluated	Extremely poor process and methodology for BIM management and design prioritization or reprioritization, and production to meet defined project milestones and key intermediate dates. Lacks complete or almost complete understanding of the requirements	Poor process and methodology for BIM management and design prioritization or reprioritization, and production to meet defined project milestones and key intermediate dates. Has some understanding of the requirements but lacks adequate understandings in some areas of the requirements	Adequate process and methodology for on- or off-site BIM management and design prioritization or reprioritization, and production to meet defined project milestones and key intermediate dates; Demonstrates an adequate understanding of the requirements	Good process and methodology for on- and off-site BIM management and design prioritization or reprioritization, and production to meet defined project milestones and key intermediate dates; Demonstrates a good understanding of the requirements	Very good process and methodology for on- and off-site BIM management and design prioritization or reprioritization, and production to meet defined project milestones and key intermediate dates; Demonstrate a very good understanding of	50 points

Scale 5	0 %	20%	40%	60%	80%	100%	Available Points
						the requirements	

3.2.6 Indigenous Participation Plan

To meet the Government of Canada's objectives of encouraging Indigenous socio-economic development through federally funded opportunities, bidders must submit an Indigenous Participation Plan (IPP), as described below, as part of their RFP response. Over the term of the contract, the IPP is intended to develop long-term, lasting, meaningful and sustainable socio-economic benefits for Indigenous persons and Indigenous businesses across Canada.

Meaningful engagement with Indigenous peoples across Canada is a priority of the Federal government and our Departments. Public Service and Procurement Canada has worked successfully in the past to leverage training opportunities, employment, sub-contracting and capacity building for Indigenous Businesses and Peoples and is pleased to continue working collaboratively with Indigenous communities and stakeholders on Federal projects. In particular, the Consultant is expected to:

- Provide opportunity for Indigenous businesses through sub-contracting and/or joint ventures with the general business community when bidding on tenders.
- Build Indigenous capacity by providing on the job training, skills development/apprenticeship and mentorship. Benefits are to be provided in an equitable manner. Wherever possible, the Consultant will endeavor to obtain equal percentage among available regional Indigenous capacity.

Bidders are expected to participate in Canada's reconciliation efforts. As such, engagement with the Indigenous communities, Tribal councils and organizations must be respectful and must not be postponed. Bidders are expected to start the engagement process as soon as possible.

The following directories and contacts are provided to assist in the identification of Indigenous business and employment capacity:

- Algonquin Anishinabeg Nation Tribal Council (AANTC)
 - Norm Odjick
 - Telephone: (819) 449-1225
 - Email: dg@aantc-ctnaa.ca
- Algonquins of Ontario Consultation Office
 - Telephone: (613) 735-3759
 - Toll Free: 1-855-735-3759
 - Email: algonquins@tanakiwin.com
- Aboriginal Apprenticeship Board of Ontario (AABO)
 - Sara Monture, Executive Director
 - Telephone: (905) 516-0682
 - Email: saramonture@aabo.ca
- Government of Canada's Indigenous Business Directory (IBD)
 - Link: <https://services.aadnc-aandc.gc.ca/IndigenousBusinessDirectory>

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- Contact: IndigenousProcurement@canada.ca
 - Canadian Council for Indigenous Business (CCAB)
 - Link: <https://www.ccab.com/>
 - Union Gas Indigenous Business List
 - Link: <https://www.uniongas.com/about-us/community/indigenous/business-list>
 - Indigenous Business and Investment Council:
 - Link: <https://www.bcibic.ca/>
 - Canadian Indigenous and Minority Supplier Council (CAMSC)'s Supplier Certification
 - Link: www.camsc.ca
 - Province of Ontario's Indigenous Business Directory
 - Link: <https://www.ontario.ca/page/indigenous-businesses-bidding-government-contracts>
 - Native Women's Association of Canada's Indigenous Business Directory:
 - Link: <https://www.nwac.ca/womens-business-directory/>
 - Council for the Advancement of Native Development Officers (Cando)
 - Cando has a network of Indigenous economic development officers within Indigenous communities
 - Link: <https://www.edo.ca/>
 - Email: cando@edo.ca
 - Employment and Social Development Canada (ESDC) Indigenous Skills and Employment Training Program
 - Link: <https://www.canada.ca/en/employment-social-development/programs/indigenous-skills-employment-training.html>
 - **Procurement Strategy for Aboriginal Business (PSAB)**
 - Indigenous Business Directory
<https://www.sac-isc.gc.ca/rea-ibd>
 - **Indigenous Skills and Employment Training (ISET) Program**
 - <https://www.canada.ca/en/employment-social-development/programs/indigenous-skills-employment-training/service-delivery-organizations.html>
(See Ontario and Quebec)

Scoring of IPPs

The IPP will be point-rated and covers direct and indirect benefits for this tender. Direct benefits refers to Indigenous employment, including opportunities as the Subcontractor, its Sub-Sub-Contractors, or employees and/or personnel within the Bidder's team members. Indirect benefits refer to measures where there is a lack of Indigenous business capacity which can be developed by specialized training, internships and/or apprenticeships and any other proposed opportunities.

For a bid to be responsive and be assigned points, the Bidder must provide completed tables in Appendix G – Indigenous Participation Plan and Certification..

The Bidder's proposal is to include a minimum amount of Indigenous Participation committed to (Human Resources, Skills Development, and Businesses, including Goods, Services, and Sub-Contracting). Every effort should be made to ensure the Indigenous Participation Plan provides maximum benefits related to capacity of the Indigenous Nations.

****15 Bonus points will be awarded to any bidder that proposes Indigenous Benefits greater than 5% of the Total Contract Value**

Total contract value for the purpose of this criteria is as follows:

Total contract value = Total Fixed Fee + Disbursements (\$100,000.00)

The successful Bidder is required to submit the Final Indigenous Participation Plan for Canada's approval after Contract Award. (See Project Brief section 10.1.9 Final Indigenous Participation Plan for further detail)

IPP Criteria and Evaluation

ITEM		Available Points																
3.2.6.1	<p>Skills Development:</p> <p>Bidders will be evaluated on their commitment to on-the-job training programs for Indigenous Peoples across Canada, at no additional cost under this Contract.</p> <p>To establish the Skills Development score, each responsive bid will be prorated against the bidder proposing the highest market value for training, with the proposal committing to the highest market value for training receiving full points.</p> <p>EXAMPLE:</p> <table><tr><td></td><td>Bidder 1</td><td>Bidder 2</td><td>Bidder 3</td></tr><tr><td>Total number of Indigenous training hours proposed</td><td>\$70,000</td><td>\$35,000</td><td>\$60,000</td></tr><tr><td>Calculation of points</td><td>7/7 = 100% of total points available = 10</td><td>3.5/7 = 50% of total points available = 5</td><td>6/7 = 86% of total points available = 8.6</td></tr></table>		Bidder 1	Bidder 2	Bidder 3	Total number of Indigenous training hours proposed	\$70,000	\$35,000	\$60,000	Calculation of points	7/7 = 100% of total points available = 10	3.5/7 = 50% of total points available = 5	6/7 = 86% of total points available = 8.6	/10				
	Bidder 1	Bidder 2	Bidder 3															
Total number of Indigenous training hours proposed	\$70,000	\$35,000	\$60,000															
Calculation of points	7/7 = 100% of total points available = 10	3.5/7 = 50% of total points available = 5	6/7 = 86% of total points available = 8.6															
3.2.6.2	<p>Human Resources:</p> <p>Bidders will be evaluated on their commitment to the direct employment (directly employed by the Prime Contractor) of Indigenous Peoples across Canada.</p> <p>Indigenous employment will be confirmed during the Contract based on supporting documentation provided by the Consultant.</p> <p>To establish the Human Resources score, each responsive bid will be prorated against the bidder proposing the highest value committed to direct employment, with the proposal committing to the highest value to direct employment receiving full points.</p> <table><tr><td></td><td>Bidder 1</td><td>Bidder 2</td><td>Bidder 3</td></tr><tr><td>Total number of Indigenous labour hours proposed</td><td>140,000</td><td>24,000</td><td>150,000</td></tr><tr><td>Calculation of points</td><td>140/150 = 93% of total points available = 18.67</td><td>24/150 = 15% of total points available = 3.2</td><td>150/150 = 100% of total points available = 20</td></tr><tr><td></td><td></td><td></td><td></td></tr></table>		Bidder 1	Bidder 2	Bidder 3	Total number of Indigenous labour hours proposed	140,000	24,000	150,000	Calculation of points	140/150 = 93% of total points available = 18.67	24/150 = 15% of total points available = 3.2	150/150 = 100% of total points available = 20					/20
	Bidder 1	Bidder 2	Bidder 3															
Total number of Indigenous labour hours proposed	140,000	24,000	150,000															
Calculation of points	140/150 = 93% of total points available = 18.67	24/150 = 15% of total points available = 3.2	150/150 = 100% of total points available = 20															
3.2.6.3	<p>Business Plan (Includes Goods and Services Provided by Indigenous Firms, including subcontracting):</p>	/20																

	<p>Bidders will be evaluated on their commitment to offer goods and/or services from Indigenous Firms across Canada</p> <p>For the purposes of this requirement, an Indigenous firm is defined as a sole proprietorship, limited company, co-operative, partnership, or not-for-profit organization. To be considered an Indigenous firm the following criteria must be met:</p> <ul style="list-style-type: none">at least 51 per cent of the firm is Indigenous owned and controlled by Indigenous individuals or communities, and;at least one third of the firm's employees, if it has six or more full-time staff, must be Indigenous. <p>If a firm is forming a joint venture, at least 51 per cent of the joint venture must be controlled and owned by an Indigenous Firm, as defined above.</p> <p>To establish the Business Plan score, each responsive bid will be prorated against the bidder proposing the highest value committed to Indigenous Firms, with the proposal committing to the highest value receiving full points.</p> <p>EXAMPLE:</p> <table><tr><td></td><td>Bidder 1</td><td>Bidder 2</td><td>Bidder 3</td></tr><tr><td>Amount committed to Indigenous Firms</td><td>\$114,000</td><td>\$76,000</td><td>\$200,000</td></tr><tr><td>Calculation of points</td><td>114/200 = 57% of total points available = 11.4</td><td>76/200 = 38% of total points available = 7.6</td><td>200/200 = 100% of total points available = 20</td></tr></table>		Bidder 1	Bidder 2	Bidder 3	Amount committed to Indigenous Firms	\$114,000	\$76,000	\$200,000	Calculation of points	114/200 = 57% of total points available = 11.4	76/200 = 38% of total points available = 7.6	200/200 = 100% of total points available = 20	
	Bidder 1	Bidder 2	Bidder 3											
Amount committed to Indigenous Firms	\$114,000	\$76,000	\$200,000											
Calculation of points	114/200 = 57% of total points available = 11.4	76/200 = 38% of total points available = 7.6	200/200 = 100% of total points available = 20											
3.2.6.4	<p>Innovative Approaches and Other Measures</p> <p>Bidders will be evaluated on their commitment to offer other benefits such as internships, bursaries, scholarships, etc. to Indigenous Peoples across Canada, at no additional cost under this Contract.</p> <p>The Contractor or its subcontractor(s) shall include, where relevant but not be limited to, the following:</p> <ol style="list-style-type: none">Specialized training or programs required for employment at the SiteOther activities related to but not specifically detailed in the Statement of Work,Participation in careers events, such as high school visits, career presentations and scholarships. <p>To establish the Innovative Approaches and Other Measures score, each responsive bid will be prorated against the Bidder proposing the highest value, with the proposal committing to the highest value receiving full points.</p> <p>EXAMPLES</p> <table><tr><td></td><td>Bidder 1</td><td>Bidder 2</td><td>Bidder 3</td></tr><tr><td>Amount committed to Indigenous Firms in the form of other benefits.</td><td>\$57,000</td><td>\$38,000</td><td>\$100,000</td></tr><tr><td>Calculation of points</td><td>57/100 = 57% of total points available = 5.7</td><td>38/100 = 38% of total points available = 3.8</td><td>100/100 = 100% of total points available = 10</td></tr></table>		Bidder 1	Bidder 2	Bidder 3	Amount committed to Indigenous Firms in the form of other benefits.	\$57,000	\$38,000	\$100,000	Calculation of points	57/100 = 57% of total points available = 5.7	38/100 = 38% of total points available = 3.8	100/100 = 100% of total points available = 10	/10
	Bidder 1	Bidder 2	Bidder 3											
Amount committed to Indigenous Firms in the form of other benefits.	\$57,000	\$38,000	\$100,000											
Calculation of points	57/100 = 57% of total points available = 5.7	38/100 = 38% of total points available = 3.8	100/100 = 100% of total points available = 10											

	Bonus points for total commitments greater than 5% of Total Contract Value Total contract value for the purpose of this criteria is as follows: Total contract value = Total Fixed Fee + Disbursements (\$100,000.00)	/15
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Total IPP Score Calculation Example

Total IPP Score (maximum 60) = Section 3.2.6.1 Score + Section 3.2.6.2 Score + Section 3.2.6.3 Score + Section 3.2.6.4 Score
IPP Rating (maximum 10) = Total IPP Score/60 *10

	Bidder 1	Bidder 2	Bidder 3
Skills Development	10	5.0	8.6
Human Resources	18.67	3.2	20
Business Plan	11.4	7.6	20
Innovative approaches and other measures	5.7	3.8	10
Bonus Points	15	0	15
<i>Total IPP Score (/75)</i>	<i>60.77</i>	<i>19.6</i>	<i>73.6</i>
IPP Rating (%)	8.10	2.61	9.81

3.2.7 Evaluation

1. To be declared responsive, a bid must:

- a. Comply with all the requirements of the bid solicitation;
- b. Meet all mandatory criteria; and
- c. Obtain the required minimum points for the technical evaluation criteria described in 3.1.7 Minimum Score.

2. Bids not meeting (a), (b) and (c) will be declared non-responsive, subject to the Phased Bid Compliance Process.

3. The selection will be based on the highest responsive combined rating of Technical merit, Indigenous Participation Plan merit and price. The ratio will be 80% for the Technical Rating, 10% for the Indigenous Participation Plan Rating and 10% for the Price Rating.

4. To establish the Technical Rating, the overall technical score for each responsive bid will be determined as follows: total number of points obtained / maximum number of points available multiplied by 80%.

5. To establish the Indigenous Participation Plan Rating, the overall Indigenous Participation score for each responsive bid will be determined as follows: total number of points obtained / maximum number of points available multiplied by 10%.

6. To establish the Pricing Rating, each responsive bid will be prorated against the lowest evaluated price and then multiplied by 10%.

7. For each responsive bid, the Technical Rating, Indigenous Participation Plan Rating, and the Pricing Rating will be added to determine its Total Score.

8. Neither the responsive bid obtaining the highest Indigenous Participation Plan /Technical Rating nor the one with the lowest Price Rating will necessarily be accepted. The responsive bid with the highest Total Score will be recommended for award of a contract.

SRE 4 CHECKLIST

The following list of documents and forms is provided with the intention of assisting the Proponent in ensuring a complete submission. The Proponent is responsible for meeting all submission requirements.

Please follow detailed instructions in PI13 Submission of proposal and SRE 1.4. Proponents may choose to introduce their submissions with a cover letter.

For epost Connect Proposal:

- ☐ Proposal - one (1) electronic document attached to the message
- ☐ Price Proposal Form – one (1) Price proposal Form completed and submitted in a separate electronic document attached to the message
- ☐ Indigenous Participation Plan and Certification (Appendix G) - completed and submitted in a separate electronic document attached to the message
- ☐ Team Identification - Appendix A;
- ☐ Declaration/Certifications Form - Appendix B;
- ☐ Client Reference Forms for each reference project – Appendix E;
- ☐ Integrity Provisions – Required documentation – as applicable in accordance with the Ineligibility and Suspension Policy (<http://www.tpsgc-pwgsc.gc.ca/ci-if/politique-policy-eng.html>) and as per PI5 Integrity Provisions – Proposal, section 3a;
- ☐ Integrity Provisions- Declaration of Convicted Offences – with its bid, as applicable in accordance with the Ineligibility and Suspension Policy (<http://www.tpsgc-pwgsc.gc.ca/ci-if/politique-policy-eng.html>) and as per PI5 Integrity Provisions – Proposal, section 3b;
- ☐ Front page of RFP;
- ☐ Front page of all solicitation amendments.

TERMS, CONDITIONS AND CLAUSES

AGREEMENT

1. The Consultant understands and agrees that upon acceptance of the offer by Canada, a binding Agreement shall be formed between Canada and the Consultant and the documents forming the Agreement shall be the following:
 - (a) Front Page and this Agreement clause;
 - (b) General Terms, Conditions and Clauses, as amended, identified as:
 - R1210D (2018-06-21), General Condition (GC) 1 - General Provisions – Architectural and/or Engineering Services
 - R1215D (2016-01-28), General Condition (GC) 2 - Administration of the Contract – Architectural and/or Engineering Services
 - R1220D (2015-02-25), General Condition (GC) 3 - Consultant Services
 - R1225D (2015-04-01), General Condition (GC) 4 - Intellectual Property
 - R1230D (2018-06-21), General Condition (GC) 5 - Terms of Payment – Architectural and/or Engineering Services
 - R1235D (2011-05-16), General Condition (GC) 6 – Changes
 - R1240D (2018-06-21), General Condition (GC) 7 - Taking the Services Out of the Consultant's Hands, Suspension or Termination
 - R1245D (2016-01-28), General Condition (GC) 8 - Dispute Resolution – Architectural and/or Engineering Services
 - R1250D (2017-11-28), General Condition (GC) 9 - Indemnification and Insurance
 - (c) Supplementary Conditions
 - (d) Agreement Particulars
 - (e) Project Brief;
 - (f) the Security Requirements Check List (SRCL);
 - (g) any amendment to the solicitation document incorporated in the Agreement before the date of the Agreement;
 - (h) the proposal, the Declaration/Certifications Form and the Price Proposal Form.
2. The documents identified above by title, number and date are hereby incorporated by reference into and form part of this Agreement, as though expressly set out herein, subject to any other express terms and conditions herein contained.

The documents identified above by title, number and date are set out in the Standard Acquisition Clauses and Conditions (SACC) Manual, issued by Public Works and Government Services Canada (PWGSC). The SACC Manual is

available on the PWGSC Web site: <https://buyandsell.gc.ca/policy-and-guidelines/standard-acquisition-clauses-and-conditions-manual>.

3. If there is a discrepancy between the wording of any documents that appear on the following list, the wording of the document that first appears on the list has priority over the wording of any document that subsequently appears on the list.
 - (a) any amendment or variation in the Agreement that is made in accordance with the terms and conditions of the Agreement;
 - (b) any amendment to the solicitation document incorporated in the Agreement before the date of the Agreement;
 - (c) this Agreement clause;
 - (d) Supplementary Conditions;
 - (e) General Terms, Conditions and Clauses;
 - (f) Agreement Particulars;
 - (g) Project Brief;
 - (h) the document entitled "Security Requirement Check List"; and
 - (i) the proposal.

SUPPLEMENTARY CONDITIONS (SC)

SC1 SECURITY REQUIREMENT

1. The following security requirement (SRCL and related clauses) applies and forms part of the Agreement.
2. Public Works and Government Services Canada is also known as Public Services and Procurement Canada.
3. For the purposes of SC1 Security Requirement, Contractor means Consultant and Subcontractor means Sub-consultant.

A. SECURITY REQUIREMENT FOR CANADIAN SUPPLIER:

1. The Contractor/Offeror must, at all times during the performance of the Contract/Standing Offer, hold a valid Facility Security Clearance at the level of SECRET, with approved Document safeguarding at the level of PROTECTED B, issued by the Contract Security Program (CSP), Public Works and Government Services Canada (PWGSC).
2. The Contractor/Offeror personnel requiring access to CLASSIFIED/PROTECTED information, assets or sensitive site(s) must EACH hold a valid personnel security screening at the level of SECRET or RELIABILITY STATUS, as required, granted or approved by the CSP, PWGSC.
3. Processing of CLASSIFIED/PROTECTED information electronically at the Contractor/Offeror's site is NOT permitted under this Contract/Standing Offer.

4. Subcontracts which contain security requirements are NOT to be awarded without the prior written permission of the CSP, PWGSC.
5. The Contractor/Offeror must comply with the provisions of the:
 - a) Security Requirements Check List and security guide (if applicable), attached at Annex **D**
 - b) Contract Security Manual (Latest Edition).

B. SECURITY REQUIREMENT FOR FOREIGN CONTRACTOR

FSC SECRET, RELIABILITY, PB IT

1. The Foreign recipient Contractor must identify an authorized Contract Security Officer (CSO) to be responsible for the overseeing of the security requirements, as defined in this contract. This individual will be appointed by the proponent Foreign recipient Contractor's Chief Executive Officer or Designated Key Senior Official, defined as an Owner, Officer, Director, Executive, and/or partner who occupies a position which would enable them to adversely affect the organization's policies or practices in the performance of the contract.
2. Subcontracts which contain security requirements are NOT to be awarded without the prior written permission of their respective National Security Authority (NSA) or Designated Security Authority (DSA), in accordance with the National legislation, regulations and policies of the country / the Canadian DSA.
3. The Foreign recipient Contractor MUST NOT utilize its Information Technology systems to electronically process, produce, or store on a computer system any CANADA PROTECTED / CLASSIFIED information/assets until the National Security Authority (NSA) or Designated Security Authority (DSA) of their country has granted approval to do so. After approval has been granted in writing to the Foreign recipient Contractor, these tasks may be performed up to the level of SECRET.
4. The Foreign recipient Contractor shall not use the CANADA PROTECTED / CLASSIFIED information/assets for any purpose other than for the performance of the Contract without the prior written approval of the Government of Canada. This approval must be obtained from the Canadian DSA.
5. The Foreign recipient Contractor visiting Canadian Government or industrial facilities, under this contract, will submit for approval a Request for Visit form to Canada's Designated Security Authority (DSA) through their respective National Security Authority (NSA) or Designated Security Authority (DSA).
6. The Foreign recipient Contractor shall immediately report to the Canadian DSA all cases in which it is known or there is reason to suspect that CANADA PROTECTED / CLASSIFIED information/assets pursuant to this Contract has been compromised.
7. The Foreign recipient Contractor shall not disclose CANADA PROTECTED / CLASSIFIED information/assets to a third party government, person, firm or representative thereof, without the prior written consent of the Government of Canada. Such consent shall be sought through the recipient's National Security Authority/ Designated Security Authority (NSA/DSA) / Canadian DSA.
8. The Foreign recipient Contractor must comply with the provisions of the Security Requirements Check List attached at Annex **D**.

SC2 LANGUAGE REQUIREMENTS

1. Communication between Canada and the Consultant shall be in the language of choice of the Consultant Team, which shall be deemed to be the language of the Consultant's proposal.
2. The Consultant's services during construction shall be provided in the language of choice of the Contractor. The successful Contractor will be asked to commit to one of Canada's official languages upon award of the Construction Contract and, thereafter construction and contract administration services will be conducted in the language chosen by the Contractor.
3. Other required services in both of Canada's official languages (such as construction documentation) are described in detail in the Project Brief.
4. The Consultant Team, including the Prime Consultant, Sub-Consultants and Specialists Consultants shall ensure that the services being provided in either language shall be to a professional standard.

SC3 FEDERAL CONTRACTORS PROGRAM FOR EMPLOYMENT EQUITY - DEFAULT BY THE CONSULTANT

The Consultant understands and agrees that, when an Agreement to Implement Employment Equity (AIEE) exists between the Consultant and Employment and Social Development Canada (ESDC)-Labour, the AIEE must remain valid during the entire period of the contract. If the AIEE becomes invalid, the name of the Consultant will be added to the "FCP Limited Eligibility to Bid" list. The imposition of such a sanction by ESDC will constitute the Consultant in default as per the terms of the contract.

SC4 INVOICING INSTRUCTIONS

1. The Consultant must submit monthly invoices in accordance with R1230D (2018-06-21), GC 5.3.2 - Payments to the Consultant.
2. An invoice cannot be submitted until all Work identified on the invoice is completed.
3. Each invoice must be supported by:
 - a. a work breakdown by project phase demonstrating progress to date for each architectural, engineering and specialty disciplines noted in the Project Brief.
 - b. a copy of time sheets to support the time claimed for all time-based resources, on request; and
 - c. a copy of the invoices, receipts, vouchers for all direct expenses, travel and living expenses.

SC5 FEE ARRANGEMENT(S) FOR SERVICES

The Fee Arrangement(s) for Services has been modified from the General Conditions. Delete R1230D GC 5.2 (2015-02-25) Fee Arrangement(s) for Services in its entirety and replace with the following:

The fee to be paid to the Consultant for the Services described herein, shall be determined by one or more of the following arrangements as specified in the Agreement Particulars:

a. **Fixed Fee**

The fixed fee may be in the form of a fixed lump sum or an amount made up of fixed unit prices multiplied by a number of units of deliverables in the amount(s) specified in the Agreement Particulars.

b. **Time Based Fee**

- i. Principals and executives, and other personnel approved in that capacity by the Departmental Representative shall be paid at the hourly rate specified in the Agreement Particulars.
- ii. Staff approved by the Departmental Representative shall be paid at the Hourly Rate specified in the Agreement Particulars.
- iii. **Normal Working Hours**
The normal working hours per day for principals, executives and Consultant's employees, shall be deemed to be seven and a half (7.5) hours of any day during which they are actually engaged in the performance of the Services.
- iv. **Travel Time**
Travel time during normal working hours, that is related to the Project and authorized by the Departmental Representative, shall be chargeable as time worked.
Travel time outside normal working hours, that is related to the Project and authorized by the Departmental Representative, shall be chargeable up to a maximum of three (3) hours per day, unless otherwise authorized.

Travel time and accommodations necessary to complete the Services as part of this Project, other than those requested and approved by the Departmental Representative, shall not be reimbursed to the Consultant.
- v. **Maximum Amount(s) Payable**
The maximum amount(s) that applies (apply) to the Services to be carried out at time rates shall be as specified in the Agreement Particulars, which amount(s) shall not be exceeded without the prior authorization of the Departmental Representative, with the approval of Canada.

SC6 DISCRETIONARY AUDIT

1. The following are subject to government audit as described in R1215D (2016-01-28), GC 2 – Administration of the Contract:
 - a. The amount claimed under the Contract, as computed in accordance with the Basis of Payment, including time charged.
 - b. The accuracy of the Consultant's time recording system.
 - c. The estimated amount of profit in any firm-priced element, firm time rate, firm overhead rate, or firm salary multiplier, for which the Consultant has provided the appropriate certification. The purpose of the audit is to determine whether the actual profit earned on a single contract if only one exists, or the aggregate of actual profit earned by the Consultant on a series of negotiated

contracts containing one or more of the prices, time rates or multipliers mentioned above, during a particular period selected, is reasonable and justifiable based on the estimated amount of profit included in earlier price or rate certification(s).

- d. Any firm-priced element, firm time rate, firm overhead rate, or firm salary multiplier for which the Consultant has provided a "most favoured customer" certification. The purpose of such audit is to determine whether the Consultant has charged anyone else, including the Consultant's most favoured customer, lower prices, rates or multipliers, for like quality and quantity of goods or services.
2. Any payments made pending completion of the audit must be regarded as interim payments only and must be adjusted to the extent necessary to reflect the results of the said audit. If there has been any overpayment, the Consultant must repay Canada the amount found to be in excess.

SC7 ESCALATION OF HOURLY RATES

The firm hourly rates detailed in the Price Proposal, will be adjusted annually on the Contract anniversary date by the amount established based on the percentage change in the sum of the monthly indices of the Consumer Price Index, All-items, published in Statistics Canada Table No. 326-0020, <http://www.statcan.gc.ca/tables-tableaux/sum-som/l01/cst01/cpis01a-eng.htm> for the 12-month period ending three months prior to the end of the Contract anniversary date from the same 12-month period of the preceding year. This will be calculated using the following formula:

A = Sum of indices for the 12 months ending 3 months prior to the anniversary date

B = Sum of indices for the 12 months ending same month as A of the preceding year

Escalation% = $[(A/B) - 1] * 100$

Example:

Assuming that the contract was signed on July 1, 2013, the anniversary date of the contract would be July 1, 2014 and firm hourly rates would be increased by 1.72% to come up to hourly rates applicable to year 2, based on the following assumptions:

Preceding Year 12-month period = May 2013 - April 2014 Sum of Indices = 1,481.4

Current Year 12-month period = May 2014 - April 2015 Sum of Indices = 1,506.9

Escalation = $((1,506.9 / 1,481.4) - 1) * 100$

Escalation = 1.72%

To determine the Contract year 3 rates in the example, the Contract year 2 rates determined above would be adjusted using the same Statistics Canada Table and same formula with data for the two 12-month periods May 2014 - April 2015 and May 2015 - April 2016, respectively.

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EP938-212564/A

Amd. No. - N° de la modif.

Buyer ID - Id de l'acheteur
fe178

Client Ref. No. - N° de ref. du client
20212564

File No. - N° du dossier
FE178.EP938-212564

CCC No./N° CCC - FMS No./N° VME

SC8 CONTRACTING AUTHORITY

The Contracting Authority for the Contract is:

Name: Robinah Matende

Public Works and Government Services Canada Acquisitions Branch

Real Property Contracting Directorate

E-mail: robinah.matende@pwgsc-tpsgc.gc.ca

The Contracting Authority is responsible for the management of the Contract, and any changes to the Contract must be authorized in writing by the Contracting Authority.

The Consultant must not perform work in excess of or outside the scope of the Contract based on verbal or written requests or instructions from anybody other than the Contracting Authority.

RESULTANT CONTRACT

The Resultant Contract, issued at Contract Award, will be in accordance with the Terms and Conditions specified herein and will identify the fee to be paid to the Consultant for the services in accordance with the Price Proposal.

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EP93820212564

Amd. No. - N° de la modif.
File No. - N° du dossier
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Buyer ID - Id de l'acheteur
fe178
CCC No./N° CCC - FMS No./N° VME

APPENDIX A - TEAM IDENTIFICATION FORMAT

Please see SRE in the Request for Proposal.

The Proponent must submit the name of firms (Proponent and Sub Consultants) and Key Personnel / Key Individuals listed below with its bid.

The required licensing and/or accreditation information and the required security information should be submitted with the proposal.

The Key Personnel, to be included under section I - Prime Consultant (Proponent – Architect) or section II - Key Sub Consultants / Specialists are as follows:

Key Individuals for evaluation purposes:

- i. Architect Principal-in-charge
- ii. Project Architect
- iii. Architectural Project Manager
- iv. Lead Interior Design
- v. Mechanical Engineer Principal
- vi. Project Mechanical Engineer
- vii. Mechanical Production Manager
- viii. Structural Engineer Principal
- ix. Electrical Engineer Principal
- x. Lead Laboratory Design Specialist

Section II (Key Sub Consultants / Specialists) is to be completed for each Key individual listed above who are not included in Section I, if any.

I. Prime Consultant (Proponent – Architect):

Firm name (Full legal name of the Proponent, for Joint Venture, the full legal name of each member of the Joint Venture).

Indicate current license and/or how provincial or territorial licensing requirements would be met. Include the complete address, telephone number, CISC File Number and Organization Security Clearance:

.....
.....
.....
.....
.....
.....

Prime Consultant Key Personnel:

For each Key Personnel, include provincial professional licensing status and/or professional accreditation, the level of Security Clearance, the validity period of Security Clearance and the Security Screening Certificate

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File No. - N° du dossier

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Buyer ID - Id de l'acheteur

fe178

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

EP93820212564

CCC No./N° CCC - FMS No./N° VME

and Briefing Form File Number or CISD File Number:

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If the proponent proposes to provide multidisciplinary services that might normally be provided by a Sub-Consultant, this should be indicated here. If the Proponent is providing the services of any or all of the Key Sub-Consultants, the Proponent shall provide all the information for such Key Sub-Consultant in this section based on the Proponent being deemed to be such Key Sub-Consultant as the case may be

II. Key Sub Consultants / Specialists:

Firm name (Full legal name):

Include the complete address, telephone number, CISD File Number and Organization Security Clearance

.....
.....
.....

Sub Consultant Key Personnel

For each Key Personnel include provincial professional licensing status and/or professional accreditation, the level of Security Clearance, the validity period of Security Clearance and the Security Screening Certificate and Briefing Form File Number or CISD File Number:

.....
.....
.....
.....
.....

As required, copy above section II format.

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APPENDIX B - DECLARATION/CERTIFICATIONS FORM

Project Title:

Name of Proponent:

Street Address:

Mailing Address:

Telephone Number:

Fax Number:

E-Mail:

Procurement Business Number:

Type of Organization: ____ Sole Proprietorship ____ Partnership ____ Corporation ____ Joint Venture	Size of Organization: Number of Employees _____ Graduate Architects / Professional Engineers _____ Other Professionals _____ Technical Support _____ Other _____
--	--

Federal Contractors Program for Employment Equity - Certification

I, the Proponent, by submitting the present information to the Contracting Authority, certify that the information provided is true as of the date indicated below. The certifications provided to Canada are subject to verification at all times. I understand that Canada will declare a proposal non-responsive, or will declare a consultant in default, if a certification is found to be untrue, whether during the proposal evaluation period or during the contract period. Canada will have the right to ask for additional information to verify the Proponent's certifications. Failure to comply with any request or requirement imposed by Canada may render the proposal non-responsive or constitute a default under the contract.

For further information on the Federal Contractors Program for Employment Equity visit Employment and Social Development Canada (ESDC)-Labour's website.

Date: _____ (YY/MM/DD) (If left blank, the date will be deemed to be the bid closing date.)

Complete both A and B.

A. Check only one of the following:

- ☐ A1. The Proponent certifies having no work force in Canada.
- ☐ A2. The Proponent certifies being a public sector employer.
- ☐ A3. The Proponent certifies being a federally regulated employer being subject to the Employment Equity Act.
- ☐ A4. The Proponent certifies having a combined work force in Canada of less than 100 permanent full-time and/or permanent part-time employees.
- A5. The Proponent has a combined work force in Canada of 100 or more employees; and
- ☐ A5.1. The Proponent certifies already having a valid and current Agreement to Implement Employment Equity (AIEE) in place with ESDC-Labour.

OR

- ☐ A5.2. The Proponent certifies having submitted the Agreement to Implement Employment Equity (LAB1168) to ESDC-Labour. As this is a condition to contract award, proceed to completing the form Agreement to Implement Employment Equity (LAB1168), duly signing it, and transmit it to ESDC-Labour.

B. Check only one of the following:

- ☐ B1. The Proponent is not a Joint Venture.

OR

- ☐ B2. The Proponent is a Joint Venture and each member of the Joint Venture must provide the Contracting Authority with a completed Federal Contractors Program for Employment Equity - Certification. (Refer to the Joint Venture section of the Proposal Instructions)

Former Public Servant (FPS) - Certification

Contracts awarded to former public servants (FPS) in receipt of a pension or of a lump sum payment must bear the closest public scrutiny, and reflect fairness in the spending of public funds. In order to comply with Treasury Board policies and directives on contracts awarded to FPS, proponents must provide the information required below before contract award. If the answer to the questions and, as applicable the information required have not been received by the time the evaluation of proposals is completed, Canada will inform the Proponent of a time frame within which to provide the information. Failure to comply with Canada's request and meet the requirement within the prescribed time frame will render the proposal non-responsive.

Definitions

For the purposes of this clause,

"former public servant" is any former member of a department as defined in the *Financial Administration Act*, R.S., 1985, c. F-11, a former member of the Canadian Armed Forces or a former member of the Royal Canadian Mounted Police. A former public servant may be:

- (a) an individual;
- (b) an individual who has incorporated;
- (c) a partnership made of former public servants; or
- (d) a sole proprietorship or entity where the affected individual has a controlling or major interest in the entity.

"lump sum payment period" means the period measured in weeks of salary, for which payment has been made to facilitate the transition to retirement or to other employment as a result of the implementation of various programs to reduce the size of the Public Service. The lump sum payment period does not include the period of severance pay, which is measured in a like manner.

"pension" means a pension or annual allowance paid under the *Public Service Superannuation Act* (PSSA), R.S., 1985, c.P-36, and any increases paid pursuant to the *Supplementary Retirement Benefits Act*, R.S., 1985, c.S-24 as it affects the PSSA. It does not include pensions payable pursuant to the *Canadian Forces Superannuation Act*, R.S., 1985, c.C-17, the *Defence Services Pension Continuation Act*, 1970, c.D-3, the *Royal Canadian Mounted Police Pension Continuation Act*, 1970, c.R-10, and the *Royal Canadian Mounted Police Superannuation Act*, R.S., 1985, c.R-11, the *Members of Parliament Retiring Allowances Act*, R.S., 1985, c.M-5, and that portion of pension payable to the *Canada Pension Plan Act*, R.S., 1985, c.C-8.

Former Public Servant in Receipt of a Pension

As per the above definitions, is the Proponent a FPS in receipt of a pension? YES () NO ()

If so, the Proponent must provide the following information, for all FPS in receipt of a pension, as applicable:

- (a) name of former public servant;
- (b) date of termination of employment or retirement from the Public Service.

By providing this information, proponents agree that the successful Proponent's status, with respect to being a former public servant in receipt of a pension, will be reported on departmental websites as part of the published proactive disclosure reports in accordance with Contracting Policy Notice: 2012-2 and the Guidelines on the Proactive Disclosure of Contracts.

Work Force Adjustment Directive

Is the Proponent a FPS who received a lump sum payment pursuant to the terms of a work force reduction program? YES () NO ()

If so, the Proponent must provide the following information:

- (a) name of former public servant;
- (b) conditions of the lump sum payment incentive;
- (c) date of termination of employment;
- (d) amount of lump sum payment;
- (e) rate of pay on which lump sum payment is based;
- (f) period of lump sum payment including start date, end date and number of weeks; and

(g) number and amount (professional fees) of other contracts subject to the restrictions of a work force adjustment program.

For all contracts awarded during the lump sum payment period, the total amount of fees that may be paid to a FPS who received a lump sum payment is \$5,000, including Applicable Taxes.

Name of Proponent:

DECLARATION:

I, the undersigned, being a principal of the proponent, hereby certify that the information given on this form and in the attached proposal is accurate to the best of my knowledge. If any proposal is submitted by a partnership or joint venture, then the following is required from each component entity.

.....
Name

.....
Signature

.....
Title

I have authority to bind the Corporation / Partnership / Sole Proprietorship / Joint Venture

.....
Name

.....
Signature

.....
Title

I have authority to bind the Corporation / Partnership / Sole Proprietorship / Joint Venture

.....
Name

.....
Signature

.....
Title

I have authority to bind the Corporation / Partnership / Sole Proprietorship / Joint Venture

During proposal evaluation period, PWGSC contact will be with the following person:

Name: _____

Telephone Number: () _____

Fax Number: () _____

E-mail: _____

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APPENDIX C - PRICE PROPOSAL FORM

PROPOSERS SHALL NOT ALTER THIS FORM

Project Title:**Name of Proponent:**

The following will form part of the evaluation process

AGREEMENT PARTICULARS**TERMS OF PAYMENT – CALCULATION OF FEES****REQUIRED SERVICES**

Fixed Fee (R1230D (2018-06-21), GC 5 - Terms of Payment – Architectural and/or Engineering Services) to be paid to the Consultant for the services shall be in accordance with the following fee arrangement. The Fixed Fee covers all Services (and associated costs) required and defined under Annex G – Project Brief unless otherwise noted under Disbursements below

TOTAL FIXED FEE FOR REQUIRED SERVICES		\$.....
Required Services	% value of Fixed Fee	Corresponding Portion of Fixed Fee (for information purposes only)
Analysis of Project Requirements and Design Concept (includes Pre-Design and Schematic Design)	12%	\$..... (a)
Design Development (includes Contract Award up to 100% Design Development submission approval and all related Services for this phase as described in the Project Brief)	15%	\$..... (b)
Design Packages (includes the preparation, tendering services, and all other related Services for this phase of the project as described in the Project Brief)	45%	\$..... (c)
Site Services (includes all Site Services and contract administration related services to Substantial Performance of the Work as described in the Project Brief).	25%	\$.....(d)
Post-Construction Services (includes all Post-Construction Services described for this phase of the project in the Project Brief; including,	3%	\$.....(e)

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but not limited to, site/deficiency inspections, commissioning, close-out and sustainability/wellness certifications)		
<i>Compiled Total of (a) – (e) shall add up to the Total Fixed Fee for Required Services.</i>		

ADDITIONAL SERVICES**Time Based Fees** (R1230D (2018-06-21), GC 5 - Terms of Payment– Architectural and/or Engineering Services)

The rates in Table B below may be used for future amendments

Table B

Discipline	Category of Resources / Level	Firm All-inclusive Hourly Rate
General Architecture	Senior Architect(s)	\$
	Intermediate Architect(s)	\$
	Junior Architect(s)	\$
	Senior Architectural Technologist	\$
	Intermediate Architectural Technologist	\$
	Junior Architectural Technologist	\$
	Senior Architectural Technician/Draftsman	\$
	Intermediate Architectural	\$
	Junior Architectural Technician/Draftsman	\$
Landscape Architecture	Senior Architect	\$
	Intermediate Architect	\$
	Junior Architect	\$
	Senior Architectural Technologist	\$
	Intermediate Architectural Technologist	\$
	Junior Architectural Technologist	\$
	Senior Architectural Technician/Draftsman	\$
	Intermediate Architectural	\$
	Junior Architectural Technician/Draftsman	\$
Interior Designer	Senior Interior Designer	\$
	Intermediate Interior Designer	\$
	Junior Interior Designer	\$
	Senior CAD Technician	\$
	Intermediate CAD Technician	\$
	Junior CAD Technician	\$

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Functional Programming	Senior Architect	\$
	Intermediate Architect	\$
	Junior Architect	\$
Civil Engineer	Senior Engineer	\$
	Intermediate Engineer	\$
	Junior Engineer	\$
	Senior Technologist	\$
	Intermediate Technologist	\$
	Junior Technologist	\$
	Senior Technician/ Draftsman	\$
	Intermediate Technician/ Draftsman	\$
	Junior Technician/ Draftsman	\$
Structural Engineer	Senior Engineer	\$
	Intermediate Engineer	\$
	Junior Engineer	\$
	Senior Technologist	\$
	Intermediate Technologist	\$
	Junior Technologist	\$
	Senior Technician/ Draftsman	\$
	Intermediate Technician/ Draftsman	\$
	Junior Technician/ Draftsman	\$
Mechanical Engineer	Senior Engineer	\$
	Intermediate Engineer	\$
	Junior Engineer	\$
	Senior Technologist	\$
	Intermediate Technologist	\$
	Junior Technologist	\$
	Senior Technician/ Draftsman	\$
	Intermediate Technician/ Draftsman	\$
	Junior Technician/ Draftsman	\$
Electrical Engineer	Senior Engineer	\$
	Intermediate Engineer	\$
	Junior Engineer	\$
	Senior Technologist	\$
	Intermediate Technologist	\$
	Junior Technologist	\$
	Senior Technician/ Draftsman	\$
	Intermediate Technician/ Draftsman	\$
	Junior Technician/ Draftsman	\$
Laboratory Design and Programming Specialist	Senior Specialist	\$
	Intermediate Specialist	\$
	Junior Specialist	\$
	Intermediate Technologist/ Technician/ Draftsman	\$
Laboratory Equipment Specialist	Senior Specialist	\$
	Intermediate Specialist	\$

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	Junior Specialist	\$
	Intermediate Technologist/ Technician/ Draftsman	\$
Vertical Transportation Specialist	Senior Specialist	\$
	Intermediate Specialist	\$
	Junior Specialist	\$
	Intermediate Technologist/ Technician/ Draftsman	\$
Acoustic Design Specialist	Senior Specialist	\$
	Intermediate Specialist	\$
	Junior Specialist	\$
	Intermediate Technologist/ Technician/ Draftsman	\$
Sustainable Design Specialist	Senior Specialist	\$
	Intermediate Specialist	\$
	Junior Specialist	\$
Lighting Specialist	Senior Specialist	\$
	Intermediate Specialist	\$
	Junior Specialist	\$
Industrial Engineer	Senior Engineer	\$
	Intermediate Engineer	\$
	Junior Engineer	\$
Material Handling Specialist	Senior Specialist	\$
	Intermediate Specialist	\$
	Junior Specialist	\$
Environmental Engineer	Senior Engineer	\$
	Intermediate Engineer	\$
	Junior Engineer	\$
Industrial Hygiene Specialist	Senior Specialist	\$
	Intermediate Specialist	\$
Property Management	Senior Specialist	\$
	Intermediate Specialist	\$
Building Code, life safety and fire protection Specialist	Senior Specialist	\$
	Intermediate Specialist	\$
Accessibility Specialist	Senior Specialist	\$
	Intermediate Specialist	\$
Building Science Specialist	Senior Specialist	\$
	Intermediate Specialist	\$
	Junior Specialist	\$
	Intermediate Technician/ Draftsman	\$
Door Hardware Specialist	Senior Architect/Technologist	\$
	Intermediate Architect/Technologist	\$
	Junior Architect/Technologist	\$
	Intermediate Technician/Draftsman	\$
Signage and Wayfinding Specialist	Senior Designer/ Specialist	\$
	Intermediate Designer/ Specialist	\$
	Junior Designer/ Specialist	\$
	Intermediate Technician/Draftsman	\$

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Transportation and Traffic Engineer	Senior Engineer	\$
	Intermediate Engineer	\$
	Junior Engineer	\$
	Senior Technologist	\$
	Intermediate Technologist	\$
	Junior Technologist	\$
	Senior Technician/Draftsman	\$
	Intermediate Technician/Draftsman	\$
	Junior Technician/Draftsman	\$
BIM Specialists	BIM Manager	\$
	Senior BIM Specialist	\$
	Intermediate BIM Specialist	\$
	Junior BIM Specialist	\$
Air flow, Zonal, and energy simulation	Senior Modeling Specialist	\$
	Intermediate Modeling Specialist	\$
Fume hood	Senior Modeling Specialist	\$
	Intermediate Modeling Specialist	\$
Building Automation Specialist	Senior Specialist	\$
	Intermediate Specialist	\$
	Intermediate Technician/Draftsman	\$
Security Specialist	Senior Specialist	\$
	Intermediate Specialist	\$
	Junior Specialist	\$
	Intermediate Technician/Draftsman	\$
Information Technology & Multi-media Specialist	Senior Specialist	\$
	Intermediate Specialist	\$
	Junior Specialist	\$
	Intermediate Technician/Draftsman	\$
Cost Specialist	Senior Cost Specialist (PQS)	\$
	Intermediate Cost Specialist	\$
Time Specialists	Senior Time Specialist	\$
	Intermediate Time Specialist	\$
Project Manager	Senior Project Manager	\$
	Intermediate Project Manager	\$
Commercial Kitchen Design Specialist	Senior Commercial Kitchen Design Specialist	\$
	Intermediate Commercial Kitchen Design Specialist	\$
Sub-total, excluding HST:		\$
Weighting Factor (for bid evaluation purposes only):		x 1,000 hours
Total (Sub-total x Weighting Factor), excluding HST:		\$

Notes:

1. Payment will be based on actual hours spent.
2. All-inclusive hourly rate is applicable to both normal working hours and any other shift work as required.
3. The Total Time Based Fee is for evaluation purposes only and has no bearing on Canada's liability to the Consultant.

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4. Should the need arise during the period of the Contract to add additional services, the firm all-inclusive hourly rates in the table above shall apply.
5. The rate for junior personnel must not exceed the rate of an intermediate personnel; both rates must not exceed the rate of senior personnel; and all four rates must not exceed the rates of a Key Individual or Key Personnel. This will apply to each sub-category contained within each category for each discipline (e.g. the rates for architectural technologists will not be used to compare the rates for architects).
6. The all-inclusive hourly rate shall be the same regardless of the location where the services are being rendered.
7. Estimated number of hours is given for evaluation purposes only.
8. Lead, Chief, Senior and Leader and associated synonyms are considered equivalent under Table 2 of the Time Based Fee.
9. The BIM Manager identified under Table A is considered a senior role.
10. Resources are to be billed against their performed function. To clarify with an example, a senior individual acting in a junior role would be considered billable under the junior role.
11. Canada may accept or reject any of the above hourly rates. Canada reserves the right to negotiate these hourly rates.

TOTAL COST OF SERVICES FOR PROPOSAL EVALUATION PURPOSES

Total Table A Fixed Fee	\$.....
Total Table B – Time Based Fee for Evaluation Purposes	\$.....
Total Evaluated Fee (for Evaluation Purposes only)	\$.....

The following will NOT form part of the evaluation process

DISBURSEMENTS

At cost without allowance for mark-up or profit, supported by invoices/receipts - see clause R1230D (2018-06-21), GC 5 - Terms of Payment– Architectural and/or Engineering Services, section GC5.12 Disbursements. This includes but not limited to:

- i. The cost of all required project registrations and certifications (e.g. sustainability, wellness and laboratory) or similar as requested by the DR;
- ii. Additional Travel, if requested in writing by Canada in advance, will be reimbursed in accordance with the National Joint Council Travel Directives.
- iii. The cost for providing any additional hard copies of submittals.

Maximum Amount for Disbursements	<u>\$100,000.00</u>
----------------------------------	---------------------

END OF PRICE PROPOSAL FORM

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APPENDIX D – SRCL



SECURITY REQUIREMENTS CHECK LIST (SRCL)

LISTE DE VÉRIFICATION DES EXIGENCES RELATIVES À LA SÉCURITÉ (LVERS)

PART A - CONTRACT INFORMATION / PARTIE A - INFORMATION CONTRACTUELLE

1. Originating Government Department or Organization / Ministère ou organisme gouvernemental d'origine		2. Branch or Directorate / Direction générale ou Direction	
3. a) Subcontract Number / Numéro du contrat de sous-traitance		3. b) Name and Address of Subcontractor / Nom et adresse du sous-traitant	
4. Brief Description of Work / Brève description du travail			
5. a) Will the supplier require access to Controlled Goods? Le fournisseur aura-t-il accès à des marchandises contrôlées?		<input type="checkbox"/> No / Non <input type="checkbox"/> Yes / Oui	
5. b) Will the supplier require access to unclassified military technical data subject to the provisions of the Technical Data Control Regulations? Le fournisseur aura-t-il accès à des données techniques militaires non classifiées qui sont assujetties aux dispositions du Règlement sur le contrôle des données techniques?		<input type="checkbox"/> No / Non <input type="checkbox"/> Yes / Oui	
6. Indicate the type of access required / Indiquer le type d'accès requis			
6. a) Will the supplier and its employees require access to PROTECTED and/or CLASSIFIED information or assets? Le fournisseur ainsi que les employés auront-ils accès à des renseignements ou à des biens PROTÉGÉS et/ou CLASSIFIÉS? (Specify the level of access using the chart in Question 7. c) (Préciser le niveau d'accès en utilisant le tableau qui se trouve à la question 7. c)		<input type="checkbox"/> No / Non <input type="checkbox"/> Yes / Oui	
6. b) Will the supplier and its employees (e.g. cleaners, maintenance personnel) require access to restricted access areas? No access to PROTECTED and/or CLASSIFIED information or assets is permitted. Le fournisseur et ses employés (p. ex. nettoyeurs, personnel d'entretien) auront-ils accès à des zones d'accès restreintes? L'accès à des renseignements ou à des biens PROTÉGÉS et/ou CLASSIFIÉS n'est pas autorisé.		<input type="checkbox"/> No / Non <input type="checkbox"/> Yes / Oui	
6. c) Is this a commercial courier or delivery requirement with no overnight storage? S'agit-il d'un contrat de messagerie ou de livraison commerciale sans entreposage de nuit?		<input type="checkbox"/> No / Non <input type="checkbox"/> Yes / Oui	
7. a) Indicate the type of information that the supplier will be required to access / Indiquer le type d'information auquel le fournisseur devra avoir accès			
Canada <input type="checkbox"/>		NATO / OTAN <input type="checkbox"/>	
Foreign / Étranger <input type="checkbox"/>			
7. b) Release restrictions / Restrictions relatives à la diffusion			
No release restrictions Aucune restriction relative à la diffusion <input type="checkbox"/>		All NATO countries Tous les pays de l'OTAN <input type="checkbox"/>	
Not releasable À ne pas diffuser <input type="checkbox"/>			
Restricted to: / Limité à : <input type="checkbox"/> Specify country(ies): / Préciser le(s) pays :		Restricted to: / Limité à : <input type="checkbox"/> Specify country(ies): / Préciser le(s) pays :	
7. c) Level of information / Niveau d'information			
PROTECTED A PROTÉGÉ A <input type="checkbox"/>		NATO UNCLASSIFIED NATO NON CLASSIFIÉ <input type="checkbox"/>	
PROTECTED B PROTÉGÉ B <input type="checkbox"/>		NATO RESTRICTED NATO DIFFUSION RESTREINTE <input type="checkbox"/>	
PROTECTED C PROTÉGÉ C <input type="checkbox"/>		NATO CONFIDENTIAL NATO CONFIDENTIEL <input type="checkbox"/>	
CONFIDENTIAL CONFIDENTIEL <input type="checkbox"/>		NATO SECRET NATO SECRET <input type="checkbox"/>	
SECRET SECRET <input type="checkbox"/>		COSMIC TOP SECRET COSMIC TRÈS SECRET <input type="checkbox"/>	
TOP SECRET TRÈS SECRET <input type="checkbox"/>			
TOP SECRET (SIGINT) TRÈS SECRET (SIGINT) <input type="checkbox"/>			
		PROTECTED A PROTÉGÉ A <input type="checkbox"/>	
		PROTECTED B PROTÉGÉ B <input type="checkbox"/>	
		PROTECTED C PROTÉGÉ C <input type="checkbox"/>	
		CONFIDENTIAL CONFIDENTIEL <input type="checkbox"/>	
		SECRET SECRET <input type="checkbox"/>	
		TOP SECRET TRÈS SECRET <input type="checkbox"/>	
		TOP SECRET (SIGINT) TRÈS SECRET (SIGINT) <input type="checkbox"/>	



PART A (continued) / PARTIE A (suite)

8. Will the supplier require access to PROTECTED and/or CLASSIFIED COMSEC information or assets?
Le fournisseur aura-t-il accès à des renseignements ou à des biens COMSEC désignés PROTÉGÉS et/ou CLASSIFIÉS? ☐ No ☐ Yes
Non Oui
If Yes, indicate the level of sensitivity:
Dans l'affirmative, indiquer le niveau de sensibilité :
9. Will the supplier require access to extremely sensitive INFOSEC information or assets?
Le fournisseur aura-t-il accès à des renseignements ou à des biens INFOSEC de nature extrêmement délicate? ☐ No ☐ Yes
Non Oui
- Short Title(s) of material / Titre(s) abrégé(s) du matériel :
Document Number / Numéro du document :

PART B - PERSONNEL (SUPPLIER) / PARTIE B - PERSONNEL (FOURNISSEUR)

10. a) Personnel security screening level required / Niveau de contrôle de la sécurité du personnel requis
- | | | | |
|---|---|---|--|
| <input type="checkbox"/> RELIABILITY STATUS
COTE DE FIABILITÉ | <input type="checkbox"/> CONFIDENTIAL
CONFIDENTIEL | <input type="checkbox"/> SECRET
SECRET | <input type="checkbox"/> TOP SECRET
TRÈS SECRET |
| <input type="checkbox"/> TOP SECRET- SIGINT
TRÈS SECRET – SIGINT | <input type="checkbox"/> NATO CONFIDENTIAL
NATO CONFIDENTIEL | <input type="checkbox"/> NATO SECRET
NATO SECRET | <input type="checkbox"/> COSMIC TOP SECRET
COSMIC TRÈS SECRET |
| <input type="checkbox"/> SITE ACCESS
ACCÈS AUX EMPLACEMENTS | | | |
- Special comments:
Commentaires spéciaux : _____
- NOTE: If multiple levels of screening are identified, a Security Classification Guide must be provided.
REMARQUE : Si plusieurs niveaux de contrôle de sécurité sont requis, un guide de classification de la sécurité doit être fourni.

10. b) May unscreened personnel be used for portions of the work?
Du personnel sans autorisation sécuritaire peut-il se voir confier des parties du travail? ☐ No ☐ Yes
Non Oui
If Yes, will unscreened personnel be escorted?
Dans l'affirmative, le personnel en question sera-t-il escorté? ☐ No ☐ Yes
Non Oui

PART C - SAFEGUARDS (SUPPLIER) / PARTIE C - MESURES DE PROTECTION (FOURNISSEUR)

INFORMATION / ASSETS / RENSEIGNEMENTS / BIENS

11. a) Will the supplier be required to receive and store PROTECTED and/or CLASSIFIED information or assets on its site or premises?
Le fournisseur sera-t-il tenu de recevoir et d'entreposer sur place des renseignements ou des biens PROTÉGÉS et/ou CLASSIFIÉS? ☐ No ☐ Yes
Non Oui
11. b) Will the supplier be required to safeguard COMSEC information or assets?
Le fournisseur sera-t-il tenu de protéger des renseignements ou des biens COMSEC? ☐ No ☐ Yes
Non Oui

PRODUCTION

11. c) Will the production (manufacture, and/or repair and/or modification) of PROTECTED and/or CLASSIFIED material or equipment occur at the supplier's site or premises?
Les installations du fournisseur serviront-elles à la production (fabrication et/ou réparation et/ou modification) de matériel PROTÉGÉ et/ou CLASSIFIÉ? ☐ No ☐ Yes
Non Oui

INFORMATION TECHNOLOGY (IT) MEDIA / SUPPORT RELATIF À LA TECHNOLOGIE DE L'INFORMATION (TI)

11. d) Will the supplier be required to use its IT systems to electronically process, produce or store PROTECTED and/or CLASSIFIED information or data?
Le fournisseur sera-t-il tenu d'utiliser ses propres systèmes informatiques pour traiter, produire ou stocker électroniquement des renseignements ou des données PROTÉGÉS et/ou CLASSIFIÉS? ☐ No ☐ Yes
Non Oui
11. e) Will there be an electronic link between the supplier's IT systems and the government department or agency?
Disposera-t-on d'un lien électronique entre le système informatique du fournisseur et celui du ministère ou de l'agence gouvernementale? ☐ No ☐ Yes
Non Oui



PART C - (continued) / PARTIE C - (suite)

For users completing the form **manually** use the summary chart below to indicate the category(ies) and level(s) of safeguarding required at the supplier's site(s) or premises.

Les utilisateurs qui remplissent le formulaire **manuellement** doivent utiliser le tableau récapitulatif ci-dessous pour indiquer, pour chaque catégorie, les niveaux de sauvegarde requis aux installations du fournisseur.

For users completing the form **online** (via the Internet), the summary chart is automatically populated by your responses to previous questions.

Dans le cas des utilisateurs qui remplissent le formulaire **en ligne** (par Internet), les réponses aux questions précédentes sont automatiquement saisies dans le tableau récapitulatif.

SUMMARY CHART / TABLEAU RÉCAPITULATIF

Category Catégorie	PROTECTED PROTÉGÉ			CLASSIFIED CLASSIFIÉ			NATO				COMSEC					
	A	B	C	CONFIDENTIAL CONFIDENTIEL	SECRET	TOP SECRET TRÈS SECRET	NATO RESTRICTED	NATO CONFIDENTIAL	NATO SECRET	COSMIC TOP SECRET COSMIC TRÈS SECRET	PROTECTED PROTÉGÉ			CONFIDENTIAL	SECRET	TOP SECRET
												A	B			
Information / Assets Renseignements / Biens																
Production																
IT Media / Support TI																
IT Link / Lien électronique																

12. a) Is the description of the work contained within this SRCL PROTECTED and/or CLASSIFIED?

La description du travail visé par la présente LVERS est-elle de nature PROTÉGÉE et/ou CLASSIFIÉE?

☐ No ☐ Yes
☐ Non ☐ Oui

If Yes, classify this form by annotating the top and bottom in the area entitled "Security Classification".

Dans l'affirmative, classifiez le présent formulaire en indiquant le niveau de sécurité dans la case intitulée « Classification de sécurité » au haut et au bas du formulaire.

12. b) Will the documentation attached to this SRCL be PROTECTED and/or CLASSIFIED?

La documentation associée à la présente LVERS sera-t-elle PROTÉGÉE et/ou CLASSIFIÉE?

☐ No ☐ Yes
☐ Non ☐ Oui

If Yes, classify this form by annotating the top and bottom in the area entitled "Security Classification" and indicate with attachments (e.g. SECRET with Attachments).

Dans l'affirmative, classifiez le présent formulaire en indiquant le niveau de sécurité dans la case intitulée « Classification de sécurité » au haut et au bas du formulaire et indiquer qu'il y a des pièces jointes (p. ex. SECRET avec des pièces jointes).

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File No. - N° du dossier
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Buyer ID - Id de l'acheteur

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

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CCC No./N° CCC - FMS No./N° VME

APPENDIX E – CLIENT REFERENCE FORMNote to Proponent:

The information in the table below should be provided for each of the three projects and submitted by the Proponent.

Representative Project Name <i>(Please expand space provided to accommodate extent of information requested)</i>	
Project description	
Describe the work performed by the Proponent on the project	
Describe the contracting delivery model used for the project	
Describe the overall "scope" of the project	
Project location	
Project size (m ² or ft ²)	
Initial construction cost (excluding taxes)	
Final/current construction cost (excluding taxes)	
If applicable, explain any discrepancy between initial and final construction cost	
Describe any significant "scope" changes during the project	
Original completion date	
Actual or approved completion date	
If applicable, explain any discrepancy between original and actual/approved completion date	

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Contact Information and Testimonial	
Client reference's company name	
Client reference representative's title	
Client reference representative's telephone number	Area Code (____), Number____-____
Client reference representative's email address	
Name of entity/firm claiming the experience	
Client Reference Representative's Testimonial	To the best of my knowledge, the information cited above is true and factual.
	<div><div></div><div><i>Signature</i></div></div> <div><div></div><div><i>Date</i></div></div>

Solicitation No. - N° de l'invitation

EP938-212564

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APPENDIX F- ESCALATION CALCULATION**Escalation Calculation - 2020 Value of Construction Costs**

Years from 2020	Year	Example* Construction Cost	StatsCan Escalation Values %	Annual Escalation	Cummulative Escalated Value	Cummulative Escalation
	2002		3.2			
	2003		3.1			
	2004		7.1			
	2005		3.8			
	2006		6.4			
	2007		5.6			
	2008		8.7			
	2009		-1.6			
-10	2010	\$ 36,308,142	4.7	\$ 1,706,483	\$ 38,014,624	4.7%
-9	2011		5.4	\$ 2,052,790	\$ 40,067,414	10.4%
-8	2012		1.4	\$ 560,944	\$ 40,628,358	11.9%
-7	2013		-0.5	-\$ 203,142	\$ 40,425,216	11.3%
-6	2014		1.7	\$ 687,229	\$ 41,112,445	13.2%
-5	2015		1.6	\$ 657,799	\$ 41,770,244	15.0%
-4	2016		1.1	\$ 459,473	\$ 42,229,717	16.3%
-3	2017		3.1	\$ 1,309,121	\$ 43,538,838	19.9%
-2	2018		7.0	\$ 3,047,719	\$ 46,586,557	28.3%
-1	2019		3.1	\$ 1,444,183	\$ 48,030,740	32.3%
	2020		4.1	\$ 1,969,260	\$ 50,000,000	37.7%

Years from 2020	Year	Example* Construction Cost	StatsCan Escalation Values %	Annual Escalation	Cummulative Escalated Value	Cummulative Escalation
	2002		3.2			
	2003		3.1			
	2004		7.1			
	2005		3.8			
	2006		6.4			
	2007		5.6			
	2008		8.7			
	2009		-1.6			
-10	2010	\$ 181,540,709	4.7	\$ 8,532,413	\$ 190,073,122	4.7%
-9	2011		5.4	\$ 10,263,949	\$ 200,337,070	10.4%
-8	2012		1.4	\$ 2,804,719	\$ 203,141,789	11.9%
-7	2013		-0.5	-\$ 1,015,709	\$ 202,126,080	11.3%
-6	2014		1.7	\$ 3,436,143	\$ 205,562,224	13.2%
-5	2015		1.6	\$ 3,288,996	\$ 208,851,219	15.0%
-4	2016		1.1	\$ 2,297,363	\$ 211,148,583	16.3%
-3	2017		3.1	\$ 6,545,606	\$ 217,694,189	19.9%
-2	2018		7.0	\$ 15,238,593	\$ 232,932,782	28.3%
-1	2019		3.1	\$ 7,220,916	\$ 240,153,698	32.3%
	2020		4.1	\$ 9,846,302	\$ 250,000,000	37.7%

Non-Residential Building Construction Price Index escalation for Ottawa

<http://www5.statcan.gc.ca/cansim/>

* Example: Assumes project completion after December 31, 2009

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APPENDIX G – INDIGENOUS PARTICIPATION PLAN AND CERTIFICATION

At the time of bid submission, the Proponents must provide the following information

Indigenous Obligations	Minimum Commitment
Skills Development	\$
Human Resources	\$
Business Plan	\$
Innovative Approaches and Other Measures	\$
Total Obligations	\$

Proponent Certification

The Proponent must submit the following certification

INDIGENOUS PARTICIPATION PLAN CERTIFICATION:		
<div style="border-bottom: 1px solid black; margin-bottom: 5px;"></div> PRINT NAME	<div style="border-bottom: 1px solid black; margin-bottom: 5px;"></div> SIGNATURE	<div style="border-bottom: 1px solid black; margin-bottom: 5px;"></div> DATE
<p>The Proponent authorized signatory certifies its IPP for contracting submitted with its bid is accurate and complete and acknowledges there is no conflict of interest with its subcontractors as indicated in PI18 – Limitation of Submissions and PI26 – Conflict of Interest – Unfair Advantage.</p>		

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APPENDIX H – PROJECT BRIEF

(see attachments)

APPENDIX H – Project Brief

Laboratories Canada - Transportation Safety and Technology Science Hub Project

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1 PROJECT DESCRIPTION

1.1 Intent of Contract

The Science and Parliamentary Infrastructure Branch (SPIB) of Public Works and Government Services Canada (PWGSC), commonly known as Public Services and Procurement Canada (PSPC), will retain the Services of an architectural entity with engineering disciplines, the Consultant, to develop the Transportation Safety and Technology Science (TSTS) hub, the Project.

In the Contract, the Consultant, Sub-Consultant(s), and Specialist Consultant(s) collectively are referred to as the Design Team. Altogether, the scope of the Design Team's Services includes detailed investigation and analysis of Project requirements, full Services to complete review and validation of Project implementation sequencing, Cost estimating, detailed Schematic Design (SD) options and obtaining necessary approvals, detailed Design Development (DD), numerous Design Packages (DP) for competitive tender, and Site Services—administration and oversight of the construction work.

PWGSC will retain multiple firms through standing offers to provide geotechnical and environmental engineering services and industrial hygiene services, collectively referred to in this Project Brief as the GEICs, as well as land surveying services and design and construction services related to preconstruction works. Throughout this Contract the Consultant and all members of the Design Team are required to coordinate their Services with those by PWGSC's GEICs, other design consultants and contractors, and land surveyor. As appropriate at each stage of the Project, the Design Team is required to integrate the findings and requirements of PWGSC's GEICs, other consultants, and land surveyor into the Design Team's design.

PWGSC will retain one construction management firm near or at the end of the SD stage to deliver the work of this Project, excluding pre-construction works. The Construction Manager (CM) will work collaboratively with the Design Team, PWGSC's GEICs, and PWGSC's Departmental Representative (DR). The CM is required to support the development and analysis of Project the preferred SD option, managing the construction sequencing, construction Cost planning, estimating, Monitoring and control, and construction work required by the approved design solutions. Moreover, the CM is required to provide comprehensive review of the Design Team's design and provide Design Package management services to identify and prioritize the Design Team's DP production to optimize overall Project implementation.

Establishing and maintaining a collaborative working environment is a primary PWGSC objective for this Project. Accordingly, the Design Team with the CM, PWGSC's GEICs and other consultants/contractors, and DR have a fundamental role in promoting a Project-first mindset within their own teams and in supporting each other, overcoming challenges as they arise.

The Consultant is required to respect and apply the PWGSC's high quality standards throughout all aspects of design planning and production, ensuring ongoing and timely quality control of the Design Team's work product and Site Services to confirm the Project work is built and commissioned as designed.

APPENDIX H – Project Brief

Laboratories Canada - Transportation Safety and Technology Science Hub Project

1.1.1 Project Brief Structure

This Project Brief is written in a prescriptive manner and significantly exceeds the design requirements typically found in a private-sector architectural and engineering services contract.

This PDF document was originally written using the Document Map in Microsoft Word. It is highly recommended the Design Team convert this PDF to Word then make use of the “Navigation” pane, which can be selected from within “View” tab, to scroll through and read the Project Brief. There is a significant amount of cross-referencing between Project Brief sections and the appendices. The Navigation pane will aid in better understanding the cross-referenced requirements and Services.

The Services the Design Team are to provide in the Contract are defined in Project Brief section 6 and sections 9 through 17. These sections are specifically identified with the term “SERVICES” in the section heading (e.g., Project Brief section 10–ADMINISTRATION and MANAGEMENT SERVICES, or section 17–POST CONSTRUCTION SERVICES). Project Brief section 16–SITE SERVICES is an amalgamation of various Services which primarily relate to construction contract administration, resident site support, and commissioning.

Project Brief sections 1 through 8 provide Project contextual information only, which inform and guide the Design Team’s Services through the progression of traditional Project stages. While all of the contextual information in these early Project Brief sections are important, the Design Team should pay particular attention to the following sections:

- a) Section 1.3–Project Information. Among other things, this section describes the Cost and milestone information in the Contract and provides a simple one-page graphic of the Project’s implementation;
- b) Section 1.4–Project Implementation. This section describes the basic or at times a more detailed overview of the Design Team’s Services and Project intent by Project stage or specific topic, included activities after reaching overall substantial performance;
- c) Section 4–SCOPE. This section describes the Project scope and is the basis for all Services defined in Project Brief sections 9 through 17. The scope section is broken down into four subsections: common scope elements; enabling projects; main construction; and scope exclusions; and
- d) Section 6–CONSULTANT SERVICES. This section describes the Consultant, Subconsultant, and Specialty Consultant Services required for this Project.

There are eight Project Brief appendices. These appendices describe supplemental requirements that augment and further detail the Design Team’s Services described in Project Brief section 9 through 17. Project Brief APPENDIX H–DELIVERABLES SUMMARY identifies the major Design Team deliverables by Project stage, but does not supersede the defined requirements and deliverables identified within Project Brief sections 10 through 17.

APPENDIX H – Project Brief

Laboratories Canada - Transportation Safety and Technology Science Hub Project

1.2 Terms, Acronyms and Abbreviations

Defined terms, acronyms and abbreviations used in this Project Brief are capitalised and defined in the Contract or Project Brief APPENDIX B–TERMS, and APPENDIX C–ACRONYMS. Words that are not uppercase have standard definitions as defined in the Oxford English Dictionary.

1.3 Project Information

PWGSC Project Title:	Transportation Safety and Technology Science hub Project
Project Location:	National Research Council, Montreal Road Campus, Ontario
TSTS Occupants:	The Transportation Safety Board of Canada (TSB) and the National Research Council of Canada's (NRC) Aerospace Research Centre Structures and Materials Performance Laboratory (SMPL)
Property and Asset Manager:	National Research Council
Departmental Representative:	To be confirmed before Contract award

1.3.1 Abstract

Laboratories Canada (LC) is a 25-year Government of Canada strategy to reinvigorate federal science. The Transportation Safety and Technology Science hub is one of five proposed hubs of federal science departments, approved in the 2018 federal budget.

The TSTS Hub will advance the government's vision for science and promote scientific excellence by creating a national center of excellence (COE) in transportation safety and technology science. This COE will facilitate the development of the next generation of transportation safety and science subject matter experts by enhancing collaboration through co-location of scientists, engineers and technologists from the Transportation Safety Board of Canada (TSB) and the National Research Council of Canada's (NRC) Aerospace Research Centre's (ARC) Structures and Materials Performance Laboratory (SMPL).

Both organizations in the TSTS hub conduct transportation system engineering and scientific analyses with different but complementary mandates that focus on improving transportation safety. In many cases, this work is performed by staff possessing similar scientific and technical backgrounds and using similar laboratory equipment for their day-to-day activities. There is an opportunity to strengthen collaborations and partnerships by co-locating the TSB and NRC's SMPL organizations. This will enable the TSB engineering laboratory scientists to stay abreast of the latest research and technology developments relevant to transportation systems from their NRC SMPL colleagues, and NRC SMPL scientists can build upon TSB engineering laboratory investigation findings to initiate new research projects that will enhance public safety and resolve practical problems for the transportation industry.

The cross-collaboration in complementary research areas will further reinforce the already well-recognized transportation safety benefits individually provided by these science organizations via an increase in combined talent pools, modernized and shared infrastructure resources, greater operational flexibility, minimized capital investments, and improved response times due to an increased capacity to manage resource surge. Bringing the two organizations together in modern facilities will allow scientists, researchers, and engineers, as well as visiting staff, to work in an

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environment where they can be agile and responsive to shifting science priorities and stay at the cutting edge of research.

The TSTS hub will focus on enhancing scientific excellence, establishing a new federal culture of open science and knowledge flow, and attracting and retaining a talented, diverse, and inclusive cadre of scientists, including early-career and international scientists, while addressing some pressing real property issues in the National Capital Region.

The TSTS hub will focus on the following multiple science themes:

- High temperature materials research and development;
- Structural integrity science;
- Non-destructive evaluation;
- Metallography and microscopy analysis;
- Extraction and analysis of vehicle data;
- Electrical and electronic system failure analysis;
- Mechanical system failure analysis; and
- Image analysis and simulation.

TSB and the NRC's ARC SMPL are currently accommodated in separate and dispersed facilities in the Ottawa area. This Project envisions consolidating and co-locating all operations into a single facility on the NRC's campus located in Ottawa east, as currently occupied facilities are not suitable or capable of accommodating the combined requirements of all groups.

Accordingly, and to achieve Project and LC program objectives, all groups are to relocate to a single combined hub. The Project scope is to provide sufficient and appropriate accommodations in a single combined hub in order to renew science infrastructure and to fulfill identified program requirements for 246 employees: 98 from affected federal science departments plus another 148 from TSB head office.

Space requirements include a mix of laboratory areas, support spaces and circulation areas, TSB head office space, and include provisions for collaborative spaces with external partners in domains such as academia, other levels of government, non-governmental and non-profit organizations, local schools, indigenous groups and others.

Space requirements are based on consultations with the TSB and NRC and are summarized in a pre-design functional program by LC's advocate consultant team, Stantec Architecture Ltd, Stantec Consulting, Merrick & Company, Merrick Canada ULC, Dialog Ontario Inc, and Dialog Alberta Architecture Engineering Interior Design Planning Inc JV, operating as FRAMEWORK FSTII Design Partners JV (FRAMEWORK). The pre-design functional program is one of the documents listed in Project Brief section 8–REFERENCE INFORMATION.

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1.3.2 Cost

PWGSC's Construction Cost Estimate for this Contract is summarized below. PWGSC's [Contract Cost Principles](#) will determine all Project direct and indirect Costs.

Scope Element	Construction Cost Estimate*
Main construction (less furniture, fixtures & equipment (FF&E) and Connectivity)	\$168.0 M
Building Components and Connectivity	\$17.3 M
Overall Construction Cost Estimate	\$185.3 M

* Includes design contingency, construction contingency, and escalation contingency.
Excludes fees, risk, commissionaires, utility charges, taxes, and disbursements.

The Design Team is required to optimize the design to achieve or come as close as possible to the overall Construction Cost Estimate. The final construction Cost will depend on PWGSC's priorities and requirements.

1.3.3 Milestones

Milestones for the Project and key intermediate activities are listed below. Additional information regarding activities after substantial performance of the work are summarized in Project Brief section 1.4–Project Implementation.

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Contract Milestone	Key Intermediate Activity	Date
Consultant appointment		March 2022
	50% Schematic Design submission	+7 months from Contract award
	90% Schematic Design submission	+11 months from Contract award
	100% Schematic Design submission	+14 months from Contract award
	50% Design Development submission	+20 months from Contract award
	90% Design Development submission	+25 months from Contract award
	100% Design Development submission	+28 months from Contract award
Substantial Performance		+63 months from Contract award
	Handover to Canada	+75 months from Contract award
	TSTS Occupant Move in/Occupancy	Post-handover
Final Completion		+80 months from Contract award

1.3.3.1 The First Three Years

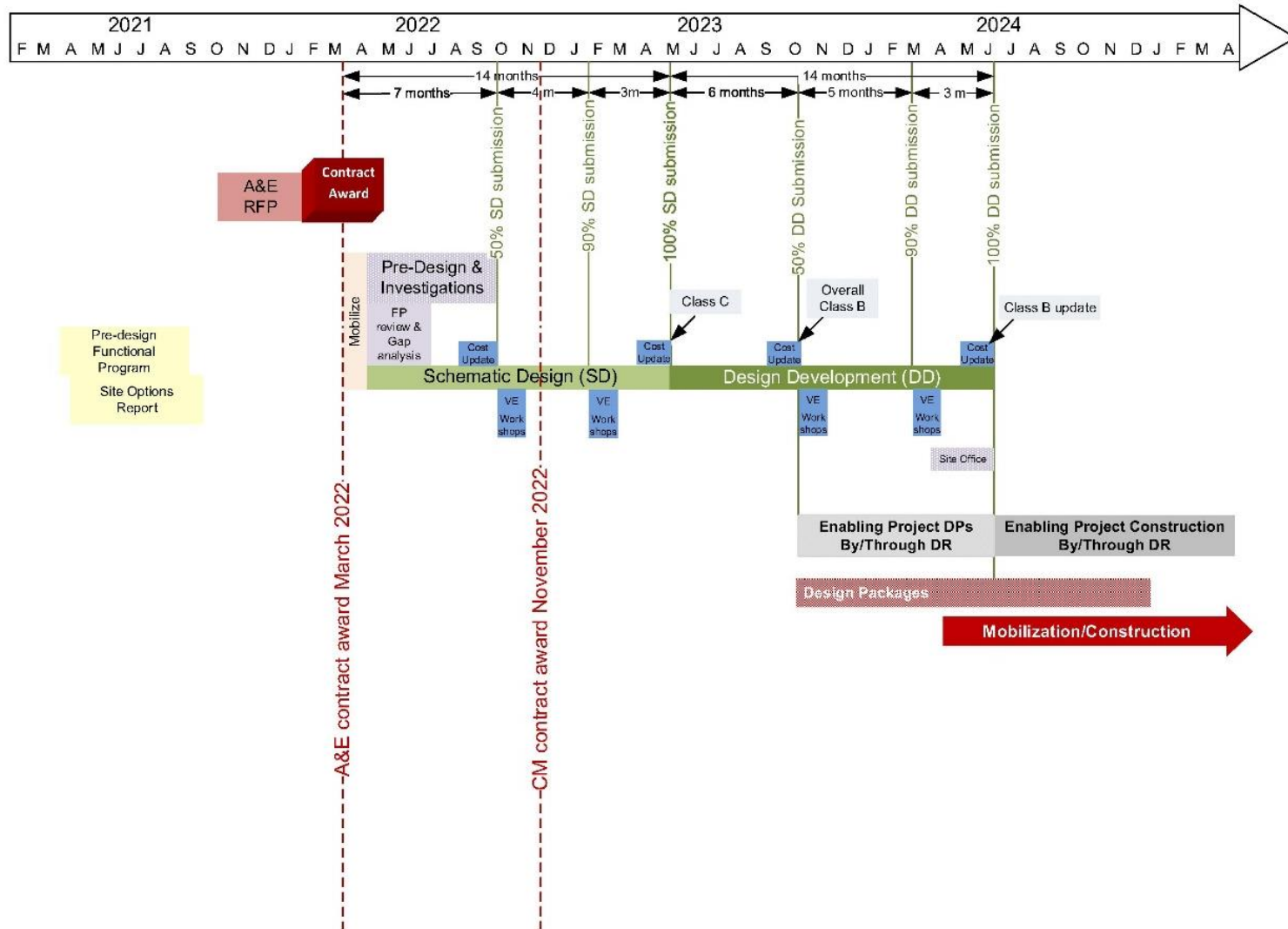
To allow for the main construction work to proceed in a streamlined and efficient sequence, the Project Team will have to make fundamental design decisions and complete enabling projects, making the first three years of the Project an intensive effort for all, as depicted in the following graphic.

The actual sequence of design and construction activities depends in part on the CM's construction sequencing and the approved Project cash flow.

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Transportation Safety and Technology Science Hub: The first three years....



1.4 Project Implementation

1.4.1 Overview

The Project implementation is to optimize critical decision making in order to prioritize the integrated design and interim Project approvals, allowing construction operations to start in a streamlined sequence near or after the completion of the DD stage.

To meet these priorities, the Design Team, the GEICs, the CM, DR, along with the TSTS occupants are expected to work continually in an interactive manner, progressively resolving issues. Building Information Modelling (BIM) is central to the design and construction process, as well as digital and physical mock-ups of key building assemblies, to confirm the optimal design and adequate materials are selected for the TSTS hub.

The Design Team's and the GEIC's mandates require targeted and specialized investigations and materials testing to inform the structural and seismic design, sustainability strategies, and scope for each design discipline. Investigations, including partial non-structural deconstruction and abatement, are to advance as far as possible while not impeding the ongoing operations of the NRC Campus.

The Consultant, as the design authority, is required to understand the TSTS occupants' functional, operational and security requirements and incorporate these into comprehensive and coordinated design solutions. Further, the Consultant and all Design Team disciplines and the GEICs are required to define component and system performance requirements then confirm and document their actual performance once built.

To make sure there is an ongoing integration of comprehensive Project commissioning, the Consultant's Services will include those of a dedicated Specialist Consultant who is specialized in commissioning laboratory facilities and who is not responsible for the design of building systems. The Consultant's commissioning Specialist Consultant is required to, on an ongoing basis, coordinate Design Team and GEIC disciplines and assemble progressively more detailed documentation related to the Project commissioning process. An overview of the Design Team's responsibilities includes, but is not limited to:

- Development of detailed operations and maintenance and energy budgets, and smart-lab sustainability strategies, including detailed life-cycle assessment (LCA);
- Development of detailed building component life-cycle Cost analysis (LCCA), which when coupled with the Design Team's LCA serves as the primary consideration in the selection of building components and systems, to the approval of the DR;
- Definition and coordination of detailed component, systems, and integrated systems performance criteria and oversight and certification of said criteria throughout commissioning;
- Development of Design Team-lead training sessions focussing on operational and design intent of all building systems; and
- Coordination and documentation of the Design Team's training of the TSTS occupants' employees or suppliers to confirm their training of the operational and design intent.

The CM, as the construction authority, will on an ongoing basis be responsible to:

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- Participate in meetings and workshops, provide bid-ability and constructability advice, define construction phasing, define the scope and sequencing DPs to the DR, Design Team, and GEICs based on the approved design, and establish and manage, to the approval of the DR, the Project construction schedule and construction budget;
- Provide detailed construction Cost planning and estimating and activity planning and scheduling based on design review and design package scope optimization;
- Define requirements for and undertake open and transparent solicitations for their subcontractors and suppliers;
- Provide an on-Site team for the duration of the Project, whose services will be co-located with those of the Design Team, the DR, and when required the TSTS occupants;
- Manage the construction and complete and document performance testing as defined by the Design Team and the GEICs; and
- Provide and document CM-led operations and maintenance training of building operation and TSTS occupants' employees or suppliers to confirm their training of the operational and maintenance requirements and procedures for building systems and components.

1.4.2 Delivery Methodology

The Project Team's integration and use of lean design and construction principles will promote Project-first thinking. The DR, the Consultant, the GEICs, and the CM are to form a joint Project management team to align and prioritize holistic Project interests and objectives, defining and managing the approved Project scope on a best-value-to-taxpayer basis.

The construction management delivery method will, as the Project design evolves, enable the complex implementation of the major construction.

Concurrent Design Packages with construction requires the Consultant to provide proactive, effective, and ongoing project management of each Design Team discipline, constant design coordination of the entire Design Team, and constant implementation Monitoring of Design Packages within the context of the overall Project design.

The Design Team, GEICs, and the CM are to make sure the DR is constantly aware of the timing for design decisions to enable DP completion and the start of construction. The consequences of design decision-making delay, both direct and cumulative impacts, are to be documented by the Consultant and the CM and candidly presented to the DR along with options for mitigation.

The CM and the Design Team's and GEICs' Site teams are to be enabled with the authority and capacity to immediately respond to evolving situations, daily, coordinating and integrating ongoing construction operations with the evolving production of the design.

1.4.2.1 Sustainability

Project Brief section 3.3–Sustainability outlines the federal government's heightened minimum sustainability performance objectives, notably; significant energy reduction, targeting net zero operational and embodied carbon, and employee health and well being.

The Design Team will face a considerable level of effort to integrate sustainability objectives and innovative approaches into the design throughout the evolution of the Project, balancing environmental, social, and economic values.

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In this Project, science process loads are defined as the energy use from science specific equipment use for experiments, which are excluded from total base building operating energy use or carbon emissions. The Design Team can extend targeting net zero operational carbon and energy towards science process and science-based emissions, offsetting the base building's annual emissions. However, a distinction will have to be made in targeting carbon neutrality and energy efficiency for the base building and targeting carbon neutrality and energy efficiency for the TSTS occupants' science processes.

This Project is to be an exemplar for sustainability evaluation, verification, and performance and integrate strategies that:

- a) Reduce life-cycle environmental impacts from design and material choices, with consideration for material content and extended user and manufacturer responsibility (e.g., considering environmental product declarations, health product declarations, exclusion of '[red-listed](#)' hazardous materials and substances, take-back programs, etc.);
- b) Design and build for durability, resiliency and adaptability, accounting for changing, future climatic conditions while future-proofing for enhanced energy efficiency performance;
- c) Maximize pollution prevention, waste reduction, and water efficiency;
- d) Design and build for healthy interior and exterior environments, and occupant comfort and wellness, through intelligent control to enhance space use and occupant engagement, in addition to operational efficiency;
- e) Integrate adaptive, restorative and regenerative design and construction solutions that will improve ecological integrity;
- f) Enhance social livability through highly productive and comfortable indoor/outdoor spaces that encourage social interaction, active living and nurture the human/nature connection;
- g) Integrate new technologies and green chemistry that enhance smart-laboratory sustainability strategies;
- h) Optimize operational and maintenance practices over the full life cycle of the building; and
- i) Provide long-term savings through improved efficiencies.

Significant and ongoing whole building LCA using industry recognized tools such as the Athena [Impact Estimator for Buildings](#), [OneClick](#) or equivalent software, energy Modelling and, as described in Project Brief section 4.1.4.3, life-cycle Cost analysis (LCCA) by the Design Team, will span every Project stage.

(Note: In this Project Brief, the Athena Impact Estimator for Buildings is referenced. The Design Team may choose an equivalent software, to the approval of the DR, so long as the approved software is consistently used for all sustainability-related Services throughout the Contract.)

BIM enhanced commissioning will affect every design discipline and construction trade. All-encompassing performance verification processes and documentation, enhanced post-construction training of TSTS occupants by each design discipline and the CM's subcontractors/suppliers, detailed 'green' standard operating procedures, and fully developed 'green' maintenance contracts will require integrated planning and development by all design disciplines and the CM from the pre-design stage onward.

1.4.2.2 Delegated Design and Design Assist

It is essential to confirm clarity of roles, responsibilities, and accountability in terms of design-related processes. For example, certain design and/or testing activities are traditionally best delivered by a manufacturer or CM supplier (e.g., sprinkler design/installation/testing, metal or piping fabrication, etc.) and,

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when appropriate, other design-related activities can be delegated to or assisted by a CM subconsultant or subcontractor.

With the participation and agreement of the CM and DR and as described in paragraph e) of Project Brief section 10.2.1–Design Management Planning, the CM is to support the Consultant in the Design Team’s development and update of a detailed delegated design Specification and design responsibility matrix. The Specification and matrix are to define the Design Team professional(s) responsible for the design, review, and acceptance of certain components of scope that could/should be assigned to the CM or the CM’s subcontractors or suppliers, where the specialist design expertise resides with the subcontractor or supplier.

The CM is required to provide design assist services if and when requested by the DR, after consultation with and agreement of the Consultant and/or the GEICs.

The CM and the Design Team are required to start delegated design and design-assist discussions once the CM is hired to thoroughly vet the processes related to the roles and responsibilities of the Design Team and the CM and the CM’s subcontractors and suppliers.

1.4.3 Building Information Modelling

BIM is an object-based digital representation of the physical and functional configuration, characteristics and attributes of a project that requires the cooperation and collaboration of all stakeholders to be fully exploited. The Design Team and CM, when hired, are required to use a Project-specific Model-centric delivery approach to enable seamless design and construction planning/management and issue identification/resolution.

The Design Team is required to capture all Project scope in the Model using a common data environment for visualization, analysis and communication of Project information for and between Project stakeholders. The Design Team is required to use the Model to assess embodied carbon in the selection of materials, to document component and systems life-cycle information, and to realize a sustainable and intelligent building complex that integrates building fabric, biometric data systems and biometric end devices, sensors for energy regulation and consumption, access control, preventative maintenance, etc.—a continuous link between the digital and physical asset.

The Design Team is required to use high-resolution scanning and photogrammetry to create a shared coordinate system and capture the information necessary to build the Model. Both the Design Team and CM are to employ drone technologies to maximize data collection in the shortest time possible during the pre-design, construction and post-construction phases of the Project.

To establish essential Model parameters and future interoperability requirements, the Design Team and CM, when hired, are required to develop comprehensive processes that integrate established, new, and emerging digital technologies. These processes are to be detailed in a Project-specific BIM Execution Plan (BXP) which will be routinely updated to reflect the refined design, construction, commissioning and future operational requirements. Early in the design process, the Design Team is to confirm with the DR and TSTS occupants the extent of interoperability and level of information required for Model Elements in the final, as-built (record) Model. To facilitate the development of the as-built Model, the Design Team is required to incorporate submittals (i.e., shop drawings, etc.) provided by the CM or the CM’s subcontractors and suppliers into the Model as they are approved. Likewise, as construction progresses, before and after concealment of each building assembly and Site element, the Design Team is required to complete laser scanning, photogrammetry, and incorporate the point-cloud data and photogrammetry to complete the as-built Model, as it is progressively built.

Given the above requirements, the BIM computing requirements necessary for the Project are significant. The Design Team and CM need to understand the information technology (IT), audio-visual equipment (AV),

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and the specialized software required for BIM in this Project. The Design Team and CM are to obtain said equipment and software, and plan and execute their collective and coordinated Services as detailed for the Design Team in this Project Brief, notably sections 10–ADMINISTRATION and DESIGN MANAGEMENT SERVICES through 17–POST-CONSTRUCTION SERVICES, inclusively. The CM’s services will be detailed in the CM’s terms of reference and contract.

The DR will provide the Design Team a rudimentary REVIT 3D Model developed for the siting analysis. The Design Team may choose to use this basic Model or develop a new Model in the development of their design. The rudimentary REVIT 3D Model will supplement other information identified in Project Brief section 8–REFERENCE INFORMATION.

1.4.3.1 Copyright

The author of a Model Element retains copyright to the Model Element unless otherwise stated.

The author of a Model Element must grant a non-exclusive license to the Project Team to use the Model Elements and their associated content within the scope established by the authorized uses and Model Element table, as defined in the Project Brief section 10.2.2–BIM Execution Plan, for the design and construction of the Project and for the TSTS occupants’ operations following handover to Canada.

1.4.3.2 Model Ownership

Notwithstanding the copyright of Model Elements, PWGSC has, without exception, the ownership of and the right to use all Models, CAD files, and TSTS hub operations and maintenance data developed for the Project. Further, PWGSC is to have access to these assets at any time throughout the Contract.

1.4.4 Design Coordination

Successful integration of design requirements, physical security, and IT infrastructure with the base building and Site landscape is one of the overarching requirements for this Project. The Consultant has the ongoing role of managing all members of the Design Team and confirming a high degree of systems and design integration throughout the delivery of the Project. Once hired, the CM has an ongoing role to support the Design Team through design review and Cost, time and risk analysis.

The Design Team is required to use the Project-specific Model to:

- a) Assess lighting, air flow, acoustics, seismic resistance, solar and wind studies, and for all other design disciplines;
- b) Integrate their LCA and component-based LCCA with the design of building components and systems, in accordance with Project Brief section 4.1.4.3, as well as other sustainable design requirements;
- c) Coordinate Modeled content across disciplines, specialties and other stakeholder input, identifying design and constructability issues proactively;
- d) Identify changes between current and previous Model versions in order that iterative reviews may be focused on the changes;
- e) Document the design of the Project and develop Model-based, coordinated DPs for the CM’s tendering;
- f) Facilitate design reviews and approvals, including validation that functional and technical program requirements have been achieved;

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- g) Capture all building and Site data that serves a direct Project or life-cycle purpose; and
- h) Allow the CM to undertake bid-ability, constructability and work sequencing analysis.

1.4.5 Enabling Projects and Pre-Construction Works

1.4.5.1 Site Office

The CM is required to establish and maintain a Site office to support construction operations and commissioning activities, with sufficient space and services for the CM's staff as well as provision for the PWGSC Project Team and the Consultant's and GEICs' Site personnel. The timing and location of the Site office will require approval from the NRC and the DR, before setting up the office.

The CM is required to build the office, which includes common IT infrastructure, equipment and Project collaboration platforms/software (e.g., Oracle Aconex, BIM 360, etc. The Design Team, GEICs, CM, and DR are to collectively determine the collaboration software required, based on the purpose, functionality, optimal delivery, and ability to broadly share and safeguard information.

The Design Team and CM are required to provide their own laptops, cell phones, and network infrastructure required for Internet and communications.

1.4.5.2 Investigations

The Design Team along with the DR and CM are required to establish a detailed strategy and program of investigations.

The Design Team is required to prepare a preliminary investigation plan in coordination with the DR to initiate preliminary Site inspections, which is to be updated routinely as detailed investigation requirements become known. The purpose of investigations is to gather all information required by the Design Team to advance the design, including:

- a) Confirming existing Site conditions, including condition of adjacent buildings, roadways, etc. and their sensitivity to seismic activity during construction;
- b) Confirming civil/municipal and utility infrastructure condition and location, and integrating the geotechnical and geological Site information from the GEICs to provide information in the development of seismic, foundation, excavation, geothermal, etc. design requirements;
- c) Integrating topographic and legal survey information provided by PWGSC's land surveyor; and
- d) Other investigations the Design Team recommends as necessary to prepare and advance a coordinated design.

The resulting analysis and reports from these investigations will provide information to the Project Team for the development and preparation of design options and DPs.

1.4.5.3 Pre-Construction Works

Pre-construction works as defined in Project Brief section 4.2.4 will be carried out by the DR through other design and construction contracts.

1.4.6 Functional Program

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LC's FRAMEWORK consultant completed a TSTS occupant pre-design functional program, which the DR will provide to the Design Team.

The Design Team is required to analyze and understand the pre-design program and prepare a gap analysis report that identifies outstanding information. During this analysis period, the Design Team is to develop a listing of user group workshops for the DR to organize.

Through approximately 15 user group workshops during the SD stage of the Project, the Design Team is required to further develop and refine their functional, operational, and security requirements and incorporate the refined functional program into the SD options.

Within the functional program development, core programmatic decisions and LC's threat and risk assessment information that affect the design.. The Design Team is required to clearly identify what these core programmatic decisions are and security information necessary to the DR early in the functional program and SD stage.

The final functional program and 100% SD are interrelated processes, each complementing and updating each other. Most importantly, the final functional program and 100% SD are to reflect the spatial and security requirements, circulation and access control requirements, and define new or modified building components and systems. The final functional program is required at the 100% SD for formal approval by the TSTS occupants.

After 100% SD approval, significant programmatic changes, if any, will require the approval by the DR's senior management, prior to proceeding with any change.

Minor adjustments to the final functional program will occur throughout the Design Development (DD) stage and during construction. The Design Team is required to:

- Track functional program changes and link said changes with the owners Project requirements, in accordance with paragraph c) ii) of Project Brief section 4.3.11–Commissioning;
- Record programmatic alterations in an updated functional program document;
- Update the commissioning plan and performance verification Specifications to reflect changes in the operational parameters; and
- Validate the proper commissioning of components, systems and integrated systems and confirm and performance requirements intended are achieved.

Accordingly, the Design Team is required to update the functional program on an on-going basis throughout the implementation of the Project.

Once hired, the CM is required, on an ongoing basis, to analyze the functional program and all iterations of the program over the life of the Project. The CM's initial and ongoing analysis of the functional program will inform their construction Cost estimate and construction schedule, confirming commissioning activities reflect the updated commissioning plan and supporting performance verification documents.

1.4.7 Pre-Design (PD)

LC's Project-specific threat and risk assessment will confirm security threats and vulnerabilities and provide an analysis of risks and a description of proposed security mitigation measures the Design Team is required to consider in developing its pre-design analysis and Project design.

The PD stage includes an initial summary of the Project sustainable development strategy. The strategy includes a climate change risk assessment and defines and demonstrates sustainability objectives, priorities

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and resulting design and construction approaches. The Design Team and the CM are to refine and update the strategy through the DD and DP stages and through construction, commissioning and post-construction.

1.4.8 Schematic Design (SD)

SD development requires a significant level of coordinated effort that involves both the entire Design Team and the GEICs. The information collected through investigations and the functional program will inform the development of two SD options.

1.4.8.1 50% Schematic Design

Geotechnical and environmental Site characterization by the GEICs, materials testing, the Design Team's multi-disciplinary investigations and analyses will inform the various structural/seismic and building envelope design options.

LC prepared a Project-specific security design brief to outline security requirements and support and inform SD option development by all Design Team disciplines. The Design Team's detail Cost analysis and estimates of security design requirements and options will support the DR's decision-making of security design requirements.

Integral to all SD options are Site exterior lighting, security and circulation systems, universal accessibility, sustainable development strategies including components, systems, and design certification targets/components/systems, operational and functional aspects and visitor screening. A strategy for Site signage and way finding is to initially focus on the transition of the Site to construction operations for the duration of the Project and eventually include the long-term final signage and way finding solution. The Design Team is to present the initial Site signage strategy for transition to construction operations with the 50% SD submission.

Immediately following the 50% SD submission, a value engineering (VE) workshop is to be undertaken by the Design Team and the DR to determine the Cost-benefit of each SD option.

Numerous workshops focused on individual subjects will provide the Design Team essential information to refine and integrate system concepts, construction estimates and sequencing options.

The Consultant is to present the 50% SD options to the NCC's staff for advice and feedback. Presentations are to include the building massing with all related architectural and Site features and impacts.

The Design Team is to integrate the NCC's comments into the next SD submission.

1.4.8.2 90% Schematic Design

The 90% SD submission represents a significant point of design coordination before seeking formal approval at 100% SD and reflects a substantially complete functional program.

Design options are to be well developed and coordinated with clear rationale for sustainable design strategies that were discounted and the well-defined benefits for those that are proposed.

The Design Team's and GEIC's successive detail Cost analysis and estimates of sustainability and security design requirements and options will support the DR's decision-making regarding all design options.

A whole-building LCA, using the Athena [Impact Estimator for Building](#), to evaluate environmental impact reduction opportunities and whole-building energy analysis and energy Model meeting the ASHRAE 140

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Standard are required to be 100% complete with the 90% SD submission, in accordance with Project Brief section 4.3.5–Sustainability.

Another set of workshops focused on individual subjects (as occurred with the 50% SD stage) will further integrate technical and functional requirements and refine all design options to be presented at 100% SD. If required, a second VE workshop with the Design Team, GEICs and the DR will critique the proposed design options and assess possible changes for savings in time and Cost.

1.4.8.3 100% Schematic Design

The 100% SD submission is to incorporate the final functional program requirements as a separate volume, the feedback from subject matter workshop, various stakeholder consultations, and all investigation findings to date.

The Design Team is required to undertake a complete and detailed Cost estimate of the 100% SD submission.

The Consultant is responsible to formally present the recommended 100% SD option to ACPDR, for NCC board approval, as well as additional presentations to LC and TSTS occupant senior executives, as identified in Project Brief sections 10.1.1.4–Submission Meetings/Presentations, 10.1.8.5–Presentations, and APPENDIX D–PROCESS MAPs.

Comments provided by ACPDR are to be integrated by the Design Team in consultation with the CM and to the satisfaction of the DR into the subsequent submissions.

Following the 100% SD presentation and approval processes, the Design Team is required to integrate approval comments or conditions by approval bodies in the design.

1.4.9 Design Development (DD)

1.4.9.1 50% Design Development

The Design Team and the GEICs are required to sufficiently advance the overall design and complete further sustainability performance analysis by the end of the 50% DD stage. The Design Team and GEICs are required to start DPs for enabling projects after the 50% DD submission, or as prioritized by the CM, incorporating the results of the third VE workshop, if required, and the outcome of the numerous workshops focused on individual subjects.

Based on the recommended SD option, the Design Team is to fully develop two enhanced sustainability options by 50% DD. The two enhanced sustainability options are to include detailed rationale, scope, and estimates for each option and be based on whole-building LCA, using the Athena [Impact Estimator for Building](#) and whole-building energy analysis and energy Model. The Design Team is to provide the DR a recommendation as to which enhanced sustainability option to further develop in the DD and in the DP stage.

The Consultant is to present the 50% DD to the NCC's staff for advice and feedback and integrate NCC comments into the next DD submission.

The Design Team, GEICs and CM are required to undertake a complete and detailed Cost estimate of the 50% DD submission. Estimates are to include sufficient contingencies for the entire Project scope. PWGSC will seek TB approval and funding of the construction after the 50% DD submission, based on the Design Team's, GEICs', and CM's class "B" estimates for the overall Project.

1.4.9.2 90% Design Development

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The 90% DD submission represents a significant point of design coordination for a well-developed design, which includes detailed FF&E and Connectivity requirements.

The Design Team's updates of the whole-building life-cycle Cost assessment and whole-building energy analysis and energy Model are required to be 100% complete with the 90% DD submission, in accordance with Project Brief section 4.3.5–Sustainability.

Another set of workshops focused on individual subjects (as occurred with the 50% DD stage) will further integrate technical and functional requirements and refine all design options to be presented at 100% DD. If necessary, a fourth VE workshop with the CM, the Design Team and the DR will critique the proposed design options and assess possible changes for savings in time and Cost.

1.4.9.3 100% Design Development

The Project design is to fully reflect all aspects of the approved functional program, adjusted as required to reflect building limitations or required minor function program changes.

The Consultant is responsible to formally present the 100% DD to ACPDR, for NCC board approval, as well as additional presentations to LC and TSTS occupant senior executives, as identified in Project Brief sections 10.1.1.4–Submission Meetings/Presentations, 10.1.8.5–Presentations, and Appendix D–PROCESS MAPs. In consultation with the CM and to the satisfaction of the DR, the Design Team is required to integrate ACPDR comments into DPs.

The Design Team, GEICs and CM are required to commence complete and detailed Cost estimate of the 100% DD submission, reflecting the refined construction sequencing and durations.

Construction is not expected to start until after the 100% DD submission, although Site mobilization and office set-up can start once construction funding and contract approval are approved.

1.4.10 Design Packages and Tendering Strategy

The CM will take the lead role to identify all DP submissions and their timing in order for the Design Team and the GEICs to prioritize their design effort. In addition, some DP are required to include operations and maintenance provisions until handover to Canada, while other DPs are required to include an ongoing maintenance contract requirement, to be novated to Canada for funding and ongoing management at handover to Canada (e.g., those systems with proprietary technologies, such as elevators, fire alarm, building automation).

PWGSC understands the impact of scope changes on the Design Team's and GEICs' ability to finalize complete and coordinated DPs. Accordingly, if the DR approves scope change after the initial 50% DP submission the Design Team and GEICs are required to inform the DR and CM of the impact of said change on DP production. The Design Team, GEICs and the CM are required to inform the DR of the impact of said change on the Construction Cost Estimate and the Project schedule. With the agreement of the DR, the Design Team and GEICs are required to incorporate the approved scope change into DP addenda where possible or address the change as a change order after DP award.

The CM is required to prequalify a pool of subcontractors and suppliers to implement trade/supplier-specific work. When requested by the CM the Design Team/GEICs, in consultation with the DR, is required to support the CM to define pre-qualification criteria for subcontractors and suppliers.

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Tendering to construction trades or suppliers should start after delivery of DPs that are 100% complete. In some cases, to advance starting Critical Path activities, the CM may tender 90% DPs and obtain competitive unit rates to complete the DP work.

At minimum, the Project could require 45 DPs, including FF&E and Connectivity DPs. The CM is required to determine the actual number of DPs, in consultation with the Design Team and DR. FF&E and Connectivity DPs are to reflect the TSTS occupants' requirements and, to the extent possible, consolidate similar goods into larger solicitations of similar content. The list below is a preliminary summary of DPs, which may be expanded or condensed by the CM:

- a) Site preparation;
- b) Interior/exterior protection and deconstruction;
- c) Excavation and backfill;
- d) Exterior Site work/infrastructure;
- e) Landscaping;
- f) Exterior walls and foundations;
- g) Structural /seismic including concrete/structural steel/rebar and wire mesh;
- h) Roofing;
- i) Windows and exterior doors;
- j) Conveying systems;
- k) Mechanical;
- l) Electrical;
- m) Pre-purchase of mechanical and electrical equipment;
- n) Drywall and ceiling systems;
- o) Interior door frames and doors;
- p) Door hardware;
- q) Interior finishes;
- r) Millwork;
- s) Furniture, fixtures and equipment, including specialized scientific and laboratory equipment;
- t) Connectivity cabling and equipment (IT/AV/ ISS); and
- u) Custom furniture.

To optimize the overall Project Schedule, the CM may subdivide DPs into individual tender packages, or tender and award DPs to multiple subcontractors of the same trade.

Once all DPs are tendered, the Design Team is required to update the energy Model to reaffirm intended energy consumption and performance verification requirements during commissioning.

1.4.11 Work Restrictions and Sequencing

The CM is required to, in collaboration with the Design Team, GEICs and the DR, develop a work restrictions plan and work sequencing plan, or combined plans, specific to the Project. The work restrictions plan and

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sequencing plan(s) are to identify the constraints and sequencing requirements, including temporary protection, etc., that will be imposed on the construction in order that stakeholder approval is received before start of construction.

The approved work restrictions and sequencing plan(s) will have a direct bearing on the development of the CM's front-end tender package and the Design Team's Division 1 specification. Once stakeholder approval is received, the CM, DR, and the Design Team are to discuss and agree on the exact delineation of the Design Team's Division 1 specification versus the CM's front-end tender package at the start of the design process.

As part of the CM's procurement plan, the CM is required to inform its subcontractors and suppliers of the constraints and requirements, including those that impose a Cost and schedule impact.

The constraints and requirements within the CM's approved work restrictions and sequencing plans are to include, but are not limited to:

- a) Environmental control;
- b) Commissioning and seasonal commissioning;
- c) Scheduling restrictions;
- d) Sequence of work;
- e) Construction safety;
- f) Hours of work;
- g) Delivery of equipment/materials;
- h) Waste disposal;
- i) Air monitoring;
- j) Scaffolding;
- k) Temporary services;
- l) Noise;
- m) Welding;
- n) Security clearances, security of information and physical security of personnel, equipment and the work;
- o) Shutdown of services;
- p) Storage;
- q) Parking;
- r) Access restrictions to site and building(s) during enabling projects, construction, and post-construction;
- s) Fire watch;
- t) Site plan showing limits of work and staging areas;
- u) Washrooms and lunchrooms; and
- v) Any other element related to the implementation of the work.

1.4.12 FF&E and Connectivity Integration

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The Design Team is required to fully coordinate and integrate into the Model all architectural and building systems and Connectivity (IT/AV/ISS) with the FF&E, including specialized scientific and laboratory equipment, throughout the Project design and construction stages. The CM will provide ongoing review and analysis of the proposed design solutions, making recommendations for alternative products, materials, construction methods, and construction sequencing.

The Design Team is to actively Monitor construction advancement. Design Team feedback concerning the FF&E, specialized scientific and laboratory equipment, and Connectivity integration into the built work is essential to identify necessary design and/or construction adjustments prior to the construction progressing too far. The Design Team, and to a lesser extent the CM, are to take a leading role to facilitate the timing of on-Site reviews and the feedback process. Timely integration of minor design changes, before advancing construction to the point where it must be rebuilt, is essential.

The backbone and horizontal telecommunications distribution are to be implemented during construction and before Substantial Performance. Connectivity equipment and components such as routers, servers, projectors and cameras will be, for the most part, installed after substantial performance.

Due to the sensitive nature of electronic, scientific, and laboratory equipment, the CM is required to maintain the Site as clean as possible during and after installation of electronic components. The Design Team is required to include in DPs the Specifications for dust control, suppression, and removal. Both the CM and the Design Team are required to routinely verify temporary protection system effectiveness, adjusting protection and procedures as required.

All deliveries of FF&E, including specialized scientific and laboratory equipment, and Connectivity goods are to be carefully planned and received in a sequence that fully integrates with ongoing construction operations. Both the Design Team and CM are required to coordinate with the DR and TSTS occupants to schedule suitable dates and times for the delivery of specific equipment provided by the TSTS occupants. The Design Team, with the input of the CM, is required to define delivery and commissioning requirements within FF&E and Connectivity DPs. The CM is required to schedule, coordinate, and supervise the delivery, installation, and commissioning of FF&E and Connectivity goods. The Design Team will validate and confirm the installation and commissioning of FF&E and Connectivity goods.

The CM is responsible to effectively manage and supervise the Site, identifying and allocating damage to the built work to the responsible party(ies). The CM is required to advise the DR of all damage.

Acoustics testing and certification will only occur in zones of no construction (silence). Detailed construction planning is required to permit these activities to progress.

As a prerequisite for TSTS occupant occupancy, final security sweeps of the TSTS hub will be completed once construction and commissioning activities are completed and FF&E, Connectivity are installed.

1.4.13 Warranty Period

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The following graphic depicts the responsibilities of CM, PWGSC, and the building custodian after substantial performance. (Custodianship has not yet been confirmed.)

Activity	Timeline			
	Substantial Performance	< 12 months after Substantial Performance >	Handover to Canada	< 12 months after Handover >
Warranty Period	... by CM ----->			-----> by Custodian ...
FF&E/IT/AV/ISS installation/commissioning	... by CM ----->			-----> by Custodian ...
Site Cleaning	... by CM ----->			-----> by Custodian ...
Site Constructor	... by CM ----->			-----> by Custodian ...
Site Security	... by CM ----->			-----> by Custodian ...
Building Operation & Maintenance	... by CM ----->			-----> by Custodian ...
Large Lab Equipment Move/Installation	... by CM ----->			-----> by Custodian ...
Trial Operations (TSTS occupants)	Custodian/TSB			-----> by Custodian ...
Office/Small Lab Equipment Move/Installation	by CM ->			-----> by Custodian ...
Occupancy (TSB/NRC move-in)	CM			-----> by Custodian ...

Up to handover to Canada, the CM is required to operate and maintain all building components, systems and integrated systems supplied and installed or modified as part of the Project in accordance with the manufacturer's instructions. The CM is to establish a call-back procedure during the maintenance period and respond to problems (e.g., device alarms, equipment failures).

The Design Team is required to measure energy consumption and update the energy Model 11-months after Substantial Performance, before handover to Canada.

At handover to Canada, for those DPs tendered with an ongoing maintenance contract requirement, the CM is required to novate said contracts to Canada, for funding and ongoing management.

After handover to Canada, additional Design Team and CM subcontractor/supplier training will continue. Building systems maintenance contracts tendered with DPs are to be novated to and funded by Canada.

2 BACKGROUND

2.1 Context

Federal science plays a vital role in delivering on the Government's responsibilities to advance the health, economic and social well-being of Canadians, and to protect the environment and build a more innovative and prosperous economy. It also provides the evidence to develop policies, regulations and standards, and to respond to threats and emerging opportunities. However, most federal science facilities are near or at the end of the functional life-cycle. Current operating conditions are impeding the delivery of innovative science and Canada's mandated science programs.

2.2 Laboratories Canada Program

The LC program is a pivotal part of Canada's ambitious 25-year plan to revitalize federal science through a whole-of-government, transformative initiative driven by science outcomes and aligned to six guiding principles:

1. **Science excellence** will be supported by top talent delivering high-impact science that informs decision-making for emergent challenges;
2. **Collaboration** will be strengthened through laboratories that bring together the required people, fostering a culture of engagement with partners and stakeholders;
3. **Modern and collaborative spaces** will help attract and retain a pool of diverse and inclusive talent. This will further help build Canada's capacity for scientific innovations;
4. **Agility and responsiveness** will be enabled by flexible and adaptable spaces, ensuring scientists can respond quickly to shifting priorities, emerging challenges and stay at the cutting edge of their fields;
5. **Environmental responsibility** will reflect a commitment on green operations in climate resilient, sustainable, carbon-neutral facilities; and
6. **Responsible public stewardship** will deliver an asset portfolio of fit-for-purpose facilities that maximizes space, reduces redundancy, and optimizes investments.

The LC program will create a world-class, national network of federal laboratories to support evidence-based decision-making, collaboration with partners, and innovation in core program delivery, including regulatory responsibilities. This initiative represents a significant opportunity to create positive and lasting change, to better support and enable federal science now and into the future, by:

- Creating a framework for collaboration that will drive the federal science community and the next generation of scientists;
- Developing infrastructure and greater access to common tools to enable leading-edge

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science; and

- Leveraging partnerships with academia, industry, other governments, and key players in research and innovation.

In addition to fostering collaborative science, LC is leading the shift to a whole of government approach as it relates to the science and technology fixed asset class. The approach includes four interdependent components that will enhance federal science and technology capacity, address infrastructure deficiencies, and enable collaboration and cutting-edge science by:

- Building new multi-department, multi-purpose, “green” federal laboratories;
- Upgrading science and technology information management and information technology systems to facilitate data-sharing and high-capacity computing while ensuring security of government systems;
- Optimizing the impact of investments by sharing the cost of acquiring major scientific equipment; and
- Reducing policy barriers that inhibit scientific collaboration.

Phase one of the LC program will address critical laboratory infrastructure by focusing on five science hubs including the TSTS hub, aligned with Government of Canada priorities and based on program and mandate synergies within and between the hub partner departments and agencies.

The TSTS hub is being undertaken to address the urgent requirement for upgraded facilities and infrastructure to enable and accomplish world class science and to address poor conditions and functional limitations associated with existing assets.

2.3 Advocate Consultant Team

LC’s advocate consultant, FRAMEWORK, not only developed the TSTS hub pre-design function program and sitting options but is also in the process of developing a repeatable laboratory design framework (RLDF) for all LC program projects. The RLDF identifies laboratory design principles as well as the minimum performance requirements for federal laboratories, specific to laboratory functions, and their science office accommodation (SOA) standards, similar in nature to PWGSC’s publication [Technical Reference for Office Buildings](#) and PWGSC’s [GCworkplace standard](#).

Version 1 of the RLDF document is expected early in fall 2021, around the expected Contract award date. The CM and Design Team are required to review and understand the RLDF requirements and the Design Team is required to incorporate those requirements not already covered in FRAMEWORK’s pre-design functional program into the TSTS hub design.

The DR will retain FRAMEWORK review and validate conformity of Design Team’s pre-design, schematic design and design development deliverables, in accordance with the Contract requirements.

2.3.1 Approved Design Principles

With the support of FRAMEWORK, LC developed RLDF design principles which to guide the development of LC projects, including this Project.

The design principles of the RLDF are to create Canadian laboratories with a common set of goals for design and key performance indicators. An assessment model considers and reviews current projects to apply lessons learned and refine the RLDF principles for future projects. While many design principles and indicators have a certain subjectivity to their application, LC will have discretion to consider various regional considerations, local codes and best practice laboratory designs that enhances Canada's science communities, all within a collaborative and sustainable setting. The RLDF design principles are:

1. Design excellence, which:
 - a) Means how the visibility of science can be delivered to the general public, academia and support partners. Participation and public embrace of science are key to improving and advancing our understanding of our surroundings.
 - b) Requires achievement of recognizable and memorable architecture that attracts and retains top talent.
 - c) Includes defining characteristics such as:
 - i. The visibility of science;
 - ii. Creating a safe, comfortable, and supportive work environment;
 - iii. Connecting to the greater community context;
 - iv. Providing a sense of place within the built public realm; and
 - v. Expressing and advancing a sustainable vision;
2. Collaboration, which:
 - a) Highlights the goals and principles of creating spaces that foster a sense of community amongst individuals and institutions.
 - b) Encourages interaction, both formal and informal, between scientific program staff by means of design elements and operational opportunities.
 - c) Includes defining characteristics such as:
 - i. Visual connectivity across the science programs;
 - ii. Design solutions that promote the sharing of space, equipment, amenities to reduce infrastructure requirements;
 - iii. Encouraging creative collisions between science staff through design;
 - iv. Incubation space for public and private sector horizontal and vertical use; and
 - v. Space for technology transfer and teaching;
3. Flexibility, which:

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- a) Describes the metrics and indicators associated with delivering science facilities that can adapt to changing technologies, evolving workflow requirements and the ability to accommodate diverse programs.
 - b) Provides the ability to quickly and economically transition program and technology.
 - c) Includes defining characteristics such as:
 - i. Base-building infrastructure which creates an adaptable facility;
 - ii. Responding to emergent and unanticipated scientific need;
 - iii. Flexible-use furniture;
 - iv. Ability to re-program with minimal operational impact; and
 - v. Provides a modular design of laboratories;
4. Functional suitability and expandability, which:
- a) Is a most critical criteria or indicator for the success of the LC purpose. Each laboratory that is created has to meet its intended goals for science both now and in the future. A laboratory has to be able to adapt in order to accommodate a range of science goals, changes to various types of scientific equipment, people and workflow integrations, all within a built environment that has technical systems with adjustability and good planning for future growth and change management.
 - b) Include spaces well-programmed for intended purpose and ability to expand key areas of a facility.
 - c) Include defining characteristics such as:
 - i. Achievement of clearly defined program for each facility;
 - ii. Development of concepts defining functional requirements;
 - iii. Alignment of site selection to meet functional suitability;
 - iv. Master planning with future expansion in mind; and
 - v. Built-in ability to expand with minimal operational disruption;
5. Sustainability, which:
- a) Efficiently uses energy, water and materials to reduce impacts on the environment through better siting, design, construction, operation, and maintenance throughout the building's life cycle.
 - b) Includes defining characteristics such as:
 - i. Design for carbon neutral and net-zero ready facilities
 - ii. Climate-resiliency in facility lifecycle design;
 - iii. Achieving specific health and wellness goals; and
 - iv. Design for high performance operations;
6. Universal accessibility, which:

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- a) Identifies the key performance indicators associated with accessibility objectives related to science-based facilities.
 - b) Allows all qualified staff access to and functionality in their assigned workspaces.
 - c) Includes defining characteristics such as:
 - i. Compliance with LC accessibility requirements;
 - ii. Inclusive design processes;
 - iii. Equitable and universal accessibility;
 - iv. Workplace access for all qualified staff;
7. Intelligent building infrastructure, which:
- a) Outlines the key performance indicators of information management and technology infrastructure necessary for effective collaboration and communication by modern computing standards.
 - b) Implements a holistic, building automation strategy based on data, predictive building maintenance, and a sustainable approach to improve to building performance and occupant comfort.
 - c) Includes defining characteristics such as:
 - i. Planning and designs for intelligent and integrated building management systems;
 - ii. Planning for future trends in controls and network infrastructure;
 - iii. Delivers advanced systems including advanced analytics; and
 - iv. Integrates autonomous actions for safe, healthy, and comfortable environments with optimized performance.

2.3.2 Office Accommodation Standards

With the support of FRAMEWORK, LC developed RLDF science office accommodation (SOA) standards for the programming of science office areas. The SOA standards consider the fact that PWGSC's GCworkplace requirements for designing office spaces do not account for the differences between general offices and science offices. Some of the characteristics identified as unique to science offices are:

- Specialized IT and equipment;
- Different work modes (i.e., visual/physical, audible, and security); and
- Levels of privacy necessary in a specific work-point and office areas.

The RLDF SOA allows for:

- a) Flexibility - SOA spaces areas are designed to fit within a lab planning module (i.e., 3.6m X 3.6m) making future space transformations feasible and efficient;
- b) A variety of work-points to accommodate specific requirements for different users that include a variety of open and enclosed collaborative work-points;

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- c) Options for co-creation and collaboration by providing formal and informal gathering spaces. For example, dedicated science “project rooms”, huddles and teaming areas;
- d) A healthy work environment by providing support spaces for relaxation, breaks and socialization;
- e) Design solutions to accommodate various users within an interactive and adaptive working environment that include assigned and unassigned work-points;
- f) Individual space solutions with:
 - i. Enclosed work-points such as shared science focus rooms and enclosed workstation areas provide support for individual focused work; and
 - ii. Open work-points such as workstations are spaces for mid- to long-term focused science work where flexible furniture could provide sit and stand options and panels between work-points could provide visual and acoustical separation.
- g) Collaborative space solutions with:
 - i. Open spaces such as chat points, huddle spaces, teaming areas and lounges foster social interactions between staff members and provide a more relaxed environment to work or recharge from daily tasks; and
 - ii. Enclosed spaces including:
 - 1. Meeting rooms that are either medium or large spaces for more formal meetings where team members and clients can have a conversation or work session in a more private setting but still connected to the adjacent spaces;
 - 2. Lab project rooms which are special spaces designed for science collaboration, for mid- to long-term group work or meetings, ideally located adjacent to the laboratory entry points or vestibules.
- h) Support spaces solutions with:
 - i. Kitchenettes as shared areas to accommodate employees for food service support and casual conversation, which could be open or semi-enclosed with visual separation from workspaces and be located near lounges and meeting rooms to be able to function as serveries, should this be necessary;
 - ii. Equipment and storage space to accommodate science office supplies; and
 - iii. Lockers of various types for individuals and coat closets in a centralized area(s).

For all spaces above, aspects such as demountable partitions, appropriate selection of furniture, and access to technology play a key role in achieving ultimate flexibility and a progressive work environment. A space solution that facilitates the daily tasks and fosters a true collaboration is the goal.

It should be noted that GC Workplace standards are to be applied to the TSB Head Office component of the TSTS facility while the above-described SOA standards are to be applied to the TSTS Hub offices.

2.3.3 Security Requirements

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For this Project, LC has completed: TSTS-specific Threat and Risk Assessment (TRA), preliminary security requirements (PSR), and preliminary security space requirements (SSR).

The PSR and SSR are incorporated into the pre-design functional program room data sheets. The pre-design functional program and a sanitized version of the TRA recommendations are included as part of the Project Brief section 8 – Reference Information.

2.4 Transportation Safety and Technology Science Hub

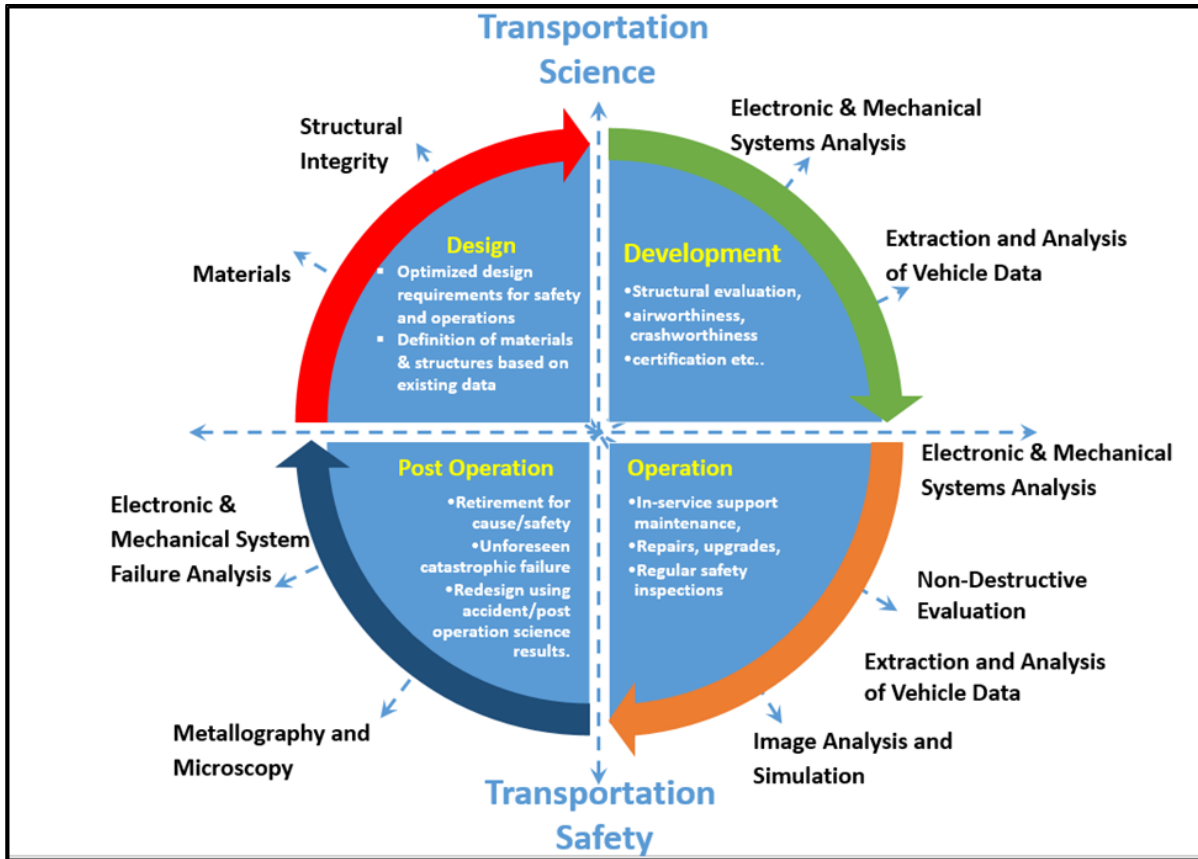
The TSTS hub will position Canada at the forefront of international research and regulatory science. Research will support evidence-based decision making associated with structural integrity of transportation systems (i.e., air, land and sea), safety certification, and accident investigations. The hub will enable the improved integration of research and modeling in support of accident investigation outcomes as described below and lessons learned from accident investigations will inform new airworthiness and certification criteria for cost effective asset utilization and safe life extension:

- Advance safety science and certification rules;
- Investigate transportation occurrences to determine failure modes and identify component design failures and material deficiencies
- Simulate and model operational environments to test structural integrity, identify innovative solutions for life cycle extension and cost reductions for various modes of transportation, including rail, ship and aircraft; and
- Undertake research and development of new technologies in support of non-destructive inspections, recovery and extraction of electronic data (i.e., black boxes) and the performance testing of new composite materials.

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The disciplines involved in the TSTS hub are represented in the accompanying graphic:



Combining the TSB and NRC science programs will create opportunities to strengthen their independent but complementary outcomes through greater access to specialized expertise. TSB engineers possess unique skills and knowledge that typically can only be gained through years of experience in failure analysis. This skill set is difficult to generate given the unique nature of the work performed by the TSB and the small size of the organization. Sharing of this knowledge with NRC scientists through collaboration on projects will not only open the door for new research opportunities for the NRC, but it will also create a greater large knowledge base within Canada to help assure the continued maintenance and generation of such expertise for the next generation.

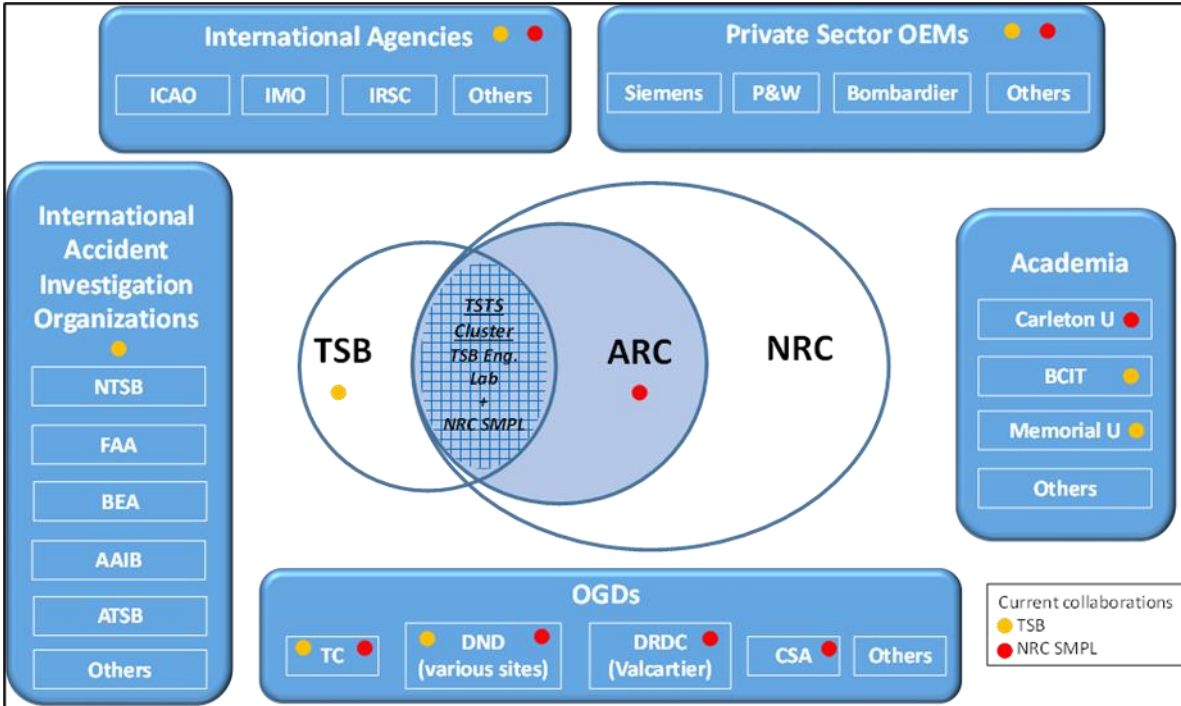
Similarly, NRC scientists are internationally renowned leaders in their respective fields of research. Sharing of NRC advanced expertise through the TSTS hub will enhance the future capabilities of the TSB in the field of accident investigation science.

The TSTS hub will also provide greater opportunities for strengthening and expanding the collaboration with other government and transportation industry partners by building on already established relationships to create a specialized science ecosystem.

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An illustration of the current and potential transportation science collaboration environment is shown in the figure below:



The Project space requirement includes a mix of laboratory areas, support spaces and circulation areas, which include non-science head office space for use by TSB. Three basic science space types are planned for the TSTS hub facility are high bays, typical wet and dry laboratory spaces, and workshops, each fitted up with specialized laboratory equipment, technology, and infrastructure.

A consolidation strategy considered opportunities and constraints for sharing common spaces such as laboratories, workshops, and equipment and the way the TSB's and SMPL's conduct their work. However, some resources cannot be shared because of operational constraints (i.e., maintaining confidentiality with International Traffic in Arms Regulations, controlled goods, and ensuring the integrity of evidence until an accident investigation is complete) may result in duplication of space and/or equipment.

Current high bay spaces do not have mechanical cooling and rely on natural ventilation and temperatures often reach the high-twenties Celsius during the summer season. Exploring expanded temperature ranges for other spaces can be discussed at schematic design; however, the TSTS hub agreed that this would represent a departure from current conditions and would therefore require a change management approach.

2.5 TSTS Occupants

As mentioned, the TSTS hub involves two federal science departments:

- The Transportation Safety Board of Canada; and

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- The National Research Council Aerospace Research Centre's Structures and Materials Performance Laboratory.

2.5.1 Transportation Safety Board of Canada

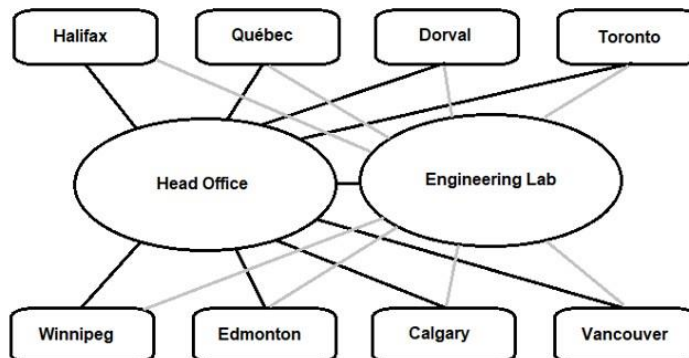
The TSB is an independent agency, with the mandate to advance safety in air, marine, pipeline, and rail transportation in Canada. They do this by:

- *“conducting independent investigations, including public enquiries when necessary, into selected transportation occurrences, in order to make findings regarding their causes and contributing factors;*
- *identifying safety deficiencies, as evidenced by transportation occurrences;*
- *making recommendations designed to eliminate or reduce such safety deficiencies; and*
- *reporting publicly on our investigations and findings in relation thereto.”*

(Source: <https://www.tsb.gc.ca/eng/qui-about/index.html>)

The board of the TSB HO includes five members: a chairperson, a chief operating officer, an executive committee, and support staff with various responsibilities and expertise.

The TSB's head office relationship with the engineering team and each of the regional offices is depicted below.



TSB engineers and technologists investigate transportation occurrences in the air, marine, rail and pipeline sectors to determine failure modes and identify safety deficiencies with the products and practices already in use by these industries. In many cases, the work done in the TSB laboratories, currently located near the Ottawa International Airport, uncovers transportation system and vehicle component design deficiencies that could be addressed through product improvements, new technology and/or new certification standards.

Due to the sensitive and quasi-judicial nature of the TSB's investigation work, the TSB needs to safeguard its IT systems from external access. As such, the TSB is not a client of Shared Services Canada, the Government of Canada's common service provide for shared IT systems. The TSB is the technical authority over their IT systems and requires physical and electronic separation of their IT system from other IT systems.

The TSB head office is currently located at Place Du Centre, Gatineau, a Crown-owned asset. The current TSB space is not modernized and TSB is over-accommodated. Relocation and colocation yield space saving/efficiency of almost 30% compared to current occupied space and simplify the day-to-day integration between head office personnel and the engineering laboratory investigators. The co-location of these teams will allow the TSB to better serve and protect Canadians by advancing safety in air, marine, pipeline, and rail transportation. The TSB will be a tenant in the TSTS hub, which will be managed by the NRC.

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2.5.2 National Research Council Aerospace Research Centre

The NRC Aerospace Research Centre includes more than 325 scientists, engineers and technical experts located in three provinces (i.e., Ontario, Québec, Manitoba). In Ottawa, the ARC is located in several buildings at the NRC's Montreal Road campus, as well as at the NRC Uplands campus. The NRC ARC's SMPL is located in three buildings at the Montreal Road campus: M3, M13 and M14. SMPL scientists develop methodologies, procedures and technologies to reduce the total life cost of aircraft structures, while decreasing the risk of structural failure and ensuring flight safety.

2.5.3 Operational Hazards

Due to the nature of the TSB's and the NRC SMPL's work there are operational hazards which require containment and ongoing monitoring. FRAMEWORK identified a preliminary list of hazards in their pre-design functional program. While the majority of these hazards are in small quantities, they do require specialized building systems, handling, and management to ensure the safety of those working with or near these hazards, which include:

- a) Chemicals, including acids, solvents, petrol (e.g., jet fuel, oils, etc.), flammable liquids and gases, noxious, compressed and inert gases, etc.;
- b) Radiation, including x-ray diffraction, aircraft instrumentation, etc.; and
- c) Biological, including blood and traces of human remains.

Framework will update the preliminary hazard assessment and develop a detailed list of existing operational hazards, which the Design Team is required to consider in their design solutions.

2.6 NRC Campus

2.6.1 Description

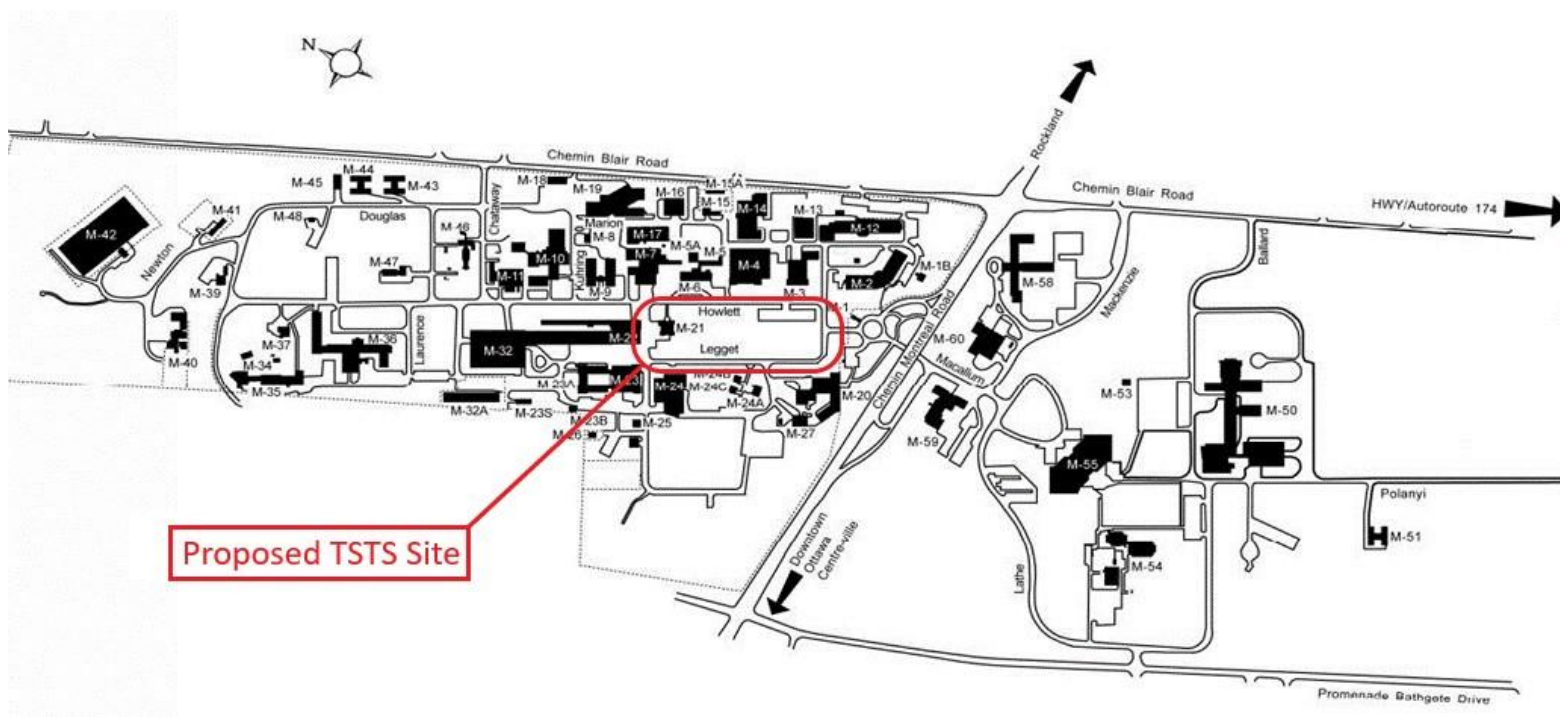
Located at 1200 Montreal Road, the NCR campus is a large complex of multi-use and specific-use buildings located on the east side of Ottawa, Ontario.

The proposed TSTS hub location, just north of the Montreal Road entrance, is bound by Howlett Street and Legget Avenue. The Site is zoned for light industrial use. The Site and surrounding streets serve as a major corridor for NRC Campus utilities. Campus buildings along these roads are in use and need to remain in use throughout Project delivery.

The following graphics indicate the proposed location of the TSTS hub and preferred site option.

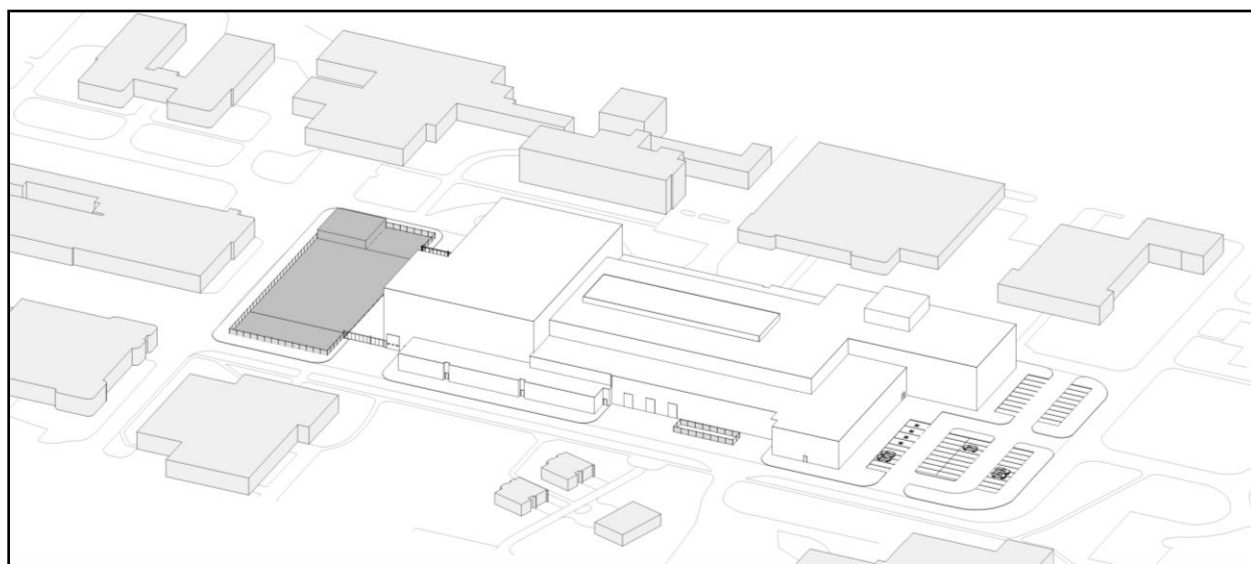
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NRC Campus, Ottawa, Ontario

Source: FRAMEWORK



TSTS Hub massing: Proposed Site Option 3

Source: FRAMEWORK

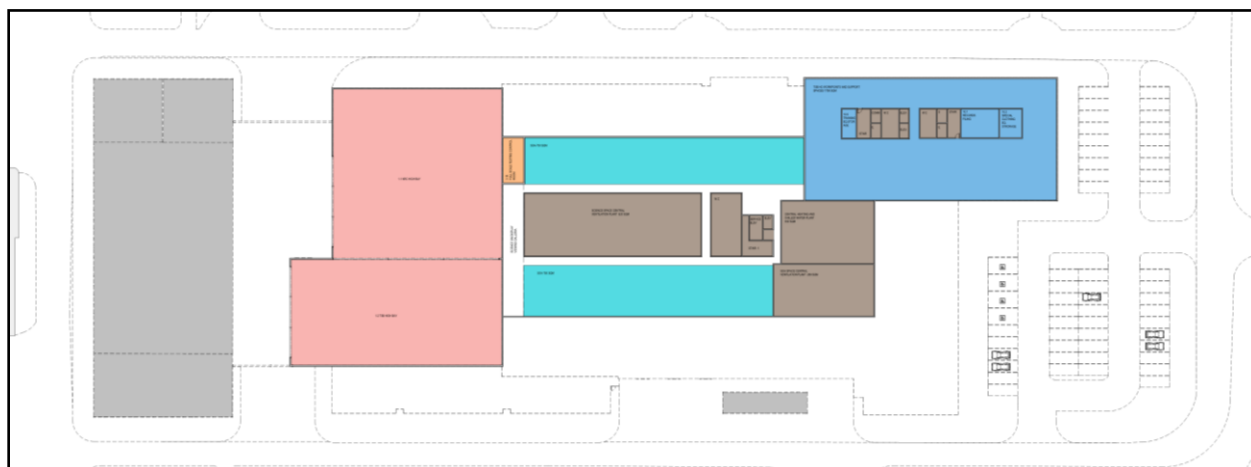
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TSTS Hub Ground Floor Plan: Site Option 3

Source: FRAMEWORK



TSTS Hub Second Floor Plan: Site Option 3

Source: FRAMEWORK

2.6.2 Environmental Condition

Various reports were commissioned as part of the NRC's due diligence process to identify environmental issues and establish remedial measures. On the NRC Campus, there is soil and groundwater contamination in the vicinity of buildings M-7, M-17, M-19, M-9, all M-10s and M-46. The contamination in these areas include an area of free-phase light non-aqueous phase liquid (i.e., jet fuel) and visible hydrocarbon or fuel sheens on groundwater.

Building M21, located on the proposed location, has asbestos containing materials within its structure or building systems.

3 OBJECTIVES

3.1 Collaborative Project Delivery

Collaborative Project delivery objectives are to:

- a) Develop a common vision for the Project through a collaborative team-centric approach;
- b) Deliver the Project with integrated design and construction solutions in accordance with the following objectives; and
- c) Meet Project scope and overcome design challenges with balanced, cost-effective solutions.

3.2 Design Excellence

Design objectives are to:

- a) Deliver flexible and adaptable, technology-enabled laboratory design solutions to accommodate evolution of research and functional needs and technologies involved in scientific procedures over the life of the TSTS hub, with minimal disruption to ongoing programs;
- b) Design solutions are to promote modularity of space use, flexibility of laboratory furnishings, easily reconfigurable utility systems, and ensure future expandability as part of the Site's master plan; and
- c) Incorporate sufficient capacity and adaptability for future operational growth and evolution of functional needs and technologies over the life of the TSTS hub;
- d) Provide intelligent building systems that enhance a safe and secure work environment, make available meaning information for effective operations, maintenance and related property management budgeting; and
- e) Provide a robust, durable base building rehabilitation that meet or exceed life-cycle requirements and CSA S478-2019 guidelines for durability in buildings and withstand future environmental conditions and extreme weather events due to a changing climate.

3.3 Sustainability

Sustainability objectives are to:

- a) Deliver the TSTS hub with a minimum 30% reduction in operating energy as compared to the 2017 National Energy Code of Canada for Buildings, targeting net-zero carbon;
- b) Obtain industry-recognized green building certification of LEED Gold or better and Fitwel 2 Star or better, or equivalent certifications;
- c) Meet or exceed requirements outlined in the [2019 to 2022 Federal Sustainable Development Strategy](#), [2020-2023 Departmental Sustainable Development Strategy](#), [TBS Greening Government Strategy](#) and its [Real Property Guidance](#), PWGSC Real Property Sustainability Framework Handbook, PWGSC Real Property Sustainable Development and Environment Strategy, and the [PWGSC Technical Reference For Office Building Design](#);
- d) Support BOMA BEST Gold, LEED EB: O&M Gold, or equivalent operational performance; and

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- e) Anticipate and integrate sustainability requirements that are reasonably foreseen to be common place by the time the Project is completed, such as charging capacity for more electric cars.

3.4 Quality

Quality objectives are to:

- a) Design and deliver a world-class, innovative Project with exemplary laboratory design and operations; and
- b) Confirm the technical performance of all components, systems, and integrated systems be tested against the design intent and operational criteria.

3.5 Project Control

Project control objectives are to:

- a) Deliver the Project within the limits of its authorized funding;
- b) Organize, prioritize and deliver the Project within the established time limits, permitting the full use and function as intended, proactively prioritizing and completing the construction and their supporting and integrated designs, and assigning and managing resources to achieve the prescribed milestones; and
- c) Maximize opportunities and minimize risk while substantiating the viability and Cost and time benefits of design phasing and construction sequencing choices.

4 SCOPE

Working in collaboration with the DR, the Design Team is required to validate the Project scope using value for money principles, to the approval of the DR, balancing the need for capital investment while maintaining asset life cycle, always considering the perspective of Canadians at large.

The design and work of the Project is required to conform to the 2020 National Building Code of Canada (NBCC) and the National Fire Code of Canada (NFCC). Although the federal government is not subject to jurisdictions at other levels of government, voluntary compliance with the requirements of provincial and municipal authorities is a requirement of the Contract, unless otherwise directed by the DR. In areas of conflict between authorities the federal authority prevails. In areas of conflict between codes, standards and regulations apply the most stringent requirements.

The Project scope includes a yet to be determined Indigenous initiative. The DR will confirm the scope of this initiative with the input of Indigenous stakeholders.

This Project Brief scope section is divided into main sections, each with several subsections. The primary scope sections are:

- a) Common Scope Elements;
- b) Enabling Projects and Preconstruction Work; and
- c) Main Construction.

4.1 Common Scope Elements

In planning and designing the work of the Project, the Consultant is to take into account the common scope elements that will affect almost all aspects of the design and construction, which include: investigations; surveying; protection, deconstruction and abatement; temporary work; and operating requirements.

4.1.1 Investigations

Investigations are required to confirm all Site and building conditions which are either unclear or unknown, informing Project scope, Cost estimates and schedules, and reduce Project risk related to unknown conditions. Investigations will be ongoing and concurrent with the Design Team's required Services.

The Design Team is to gain a deep knowledge of the TSTS Site and NCR Campus conditions with the documentation listed in Project Brief section 8—REFERENCE INFORMATION. Based on this information and information gaps, either identified or omitted, the Design Team, is required to establish a Project-specific program of investigations. This program is to be updated routinely throughout the Project Pre-Design and Schematic Design stages. The Design Team is required to prepare tender documents for each investigation scope that requires a construction component, in coordination with the DR. Until the CM is hired, the DR will tender and carry out investigations under the oversight of the Design Team discipline requiring the investigation.

Investigation may, as appropriate, continue in to the Design Development stage. Investigations include, but are not limited to:

- a) A detailed geological and geotechnical investigation and Site-wide characterization by the GEICs in support of the structural/seismic design;

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- b) Geo-source testing by the GEICs to determine mechanical design parameters for geo-source heating and cooling, included the provision of a test-well on any proposed geo-source field;
- c) A detailed examination of civil/municipal and Site and nearby mechanical, electrical, and Connectivity systems, their interconnection and dependencies on adjacent buildings and the overall Site and municipal infrastructure, or other Sites as they apply to enabling projects;
- d) A detailed environmental investigation and Site-wide characterization by the GEICs, including Species-at-Risk studies, soil/rock remediation and groundwater treatment, and Project permitting requirements;
- e) A detailed assessment by the GEICs of designated substances and hazardous materials, building on existing documentation, including determination of quantity and types of substances in the building and in-ground on the Site;
- f) A thorough examination and determination of current and future environmental loads in support of the development of structural/seismic and geothermal heating/cooling designs options;
- g) Confirmation of Site and building access requirements and protocols, approval requirements and processes, and Site and nearby use, restrictions, and constraints; and
- h) Other investigations as necessary.

4.1.2 Protection and Deconstruction

The GEICs are required to undertake comprehensive Site investigations to validate the content, type, location and quantity of designated substances located in each building's interior, exterior and the Site.

The resulting gap analysis and report from these investigations, along with the seismic, structural, physical security and functional programming requirements will dictate the degree and scope of abatement to be defined by the GEICs and deconstruction to be designed by the Design Team.

The Design Team is required to design protection, Monitoring, and temporary systems during construction. The design of temporary systems (e.g., floor and wall protection, temporary dust protection) could be delegated to the CM, who at times may be better suited to react to the ever-changing construction requirements. Delegated designs are to be documented and agreed to by the DR as indicated in Project Brief section 10.2.1.1–Design Management Planning.

4.1.3 Temporary Work

Temporary work requirements are to be included in DP documentation. These requirements include interim measures (activities) to modify the work in the transitional periods between DPs or as necessary to make sure the ongoing safety and security of the work and the Project Site(s), plus removal of all temporary work when no longer required. Elements of temporary work include, but are not limited to:

- a) Temporary protection installation, Monitoring, adjustments and removals as they apply to each building component and system;
- b) Heat, ventilation and humidity with controls where required, as agreed by the DR;
- c) Protection measures and structural bracing in phased sequence that prioritizes activities to meet the sequence of the work as determined by the CM;
- d) Fire protection to support construction operations;
- e) Maintaining operational capacity for required civil/municipal, mechanical, electrical and

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life safety systems, and Site and NRC Campus services/utilities, including lighting, security, emergency power for heating, lighting, ventilation, fire protection, lightning protection, life safety systems;

- f) Architectural separation (physical and dust) and structural bracing, underpinning, and supports, including implementation sequence instructions; and
- g) Security requirements for the building and Site, as agreed by the DR in consultation with NRC Campus operations.

The CM will design, install, and maintain all scaffolding necessary for the Project according to building structure, envelope, and subsurface load limits established by the Consultant.

4.1.4 Operating Requirements

With the DR, the Design Team is required to develop Project operating requirements as a separate report accompanying Schematic Design and Design Development submissions, then updated over the progression of DP development and finalized during the commissioning stage of the Project.

The Design Team is required to provide the DR final operating requirement documents before handover to Canada, as indicated in Project Brief section 1.4.13–Warranty Period. The CM is required to operate and maintain all new and modified building systems in accordance with manufacturers' published instructions, including emergency call-back services and related work, until handover to Canada.

Operating requirements are to be defined and summarized by each design discipline in two broad categories: a primary building management plan (BMP); and a life-cycle Cost analysis (LCCA).

4.1.4.1 Preliminary Building Management Plan

The requirements for preliminary BMP requirements include, but are not limited to:

- a) Annualized Costs for each utility (i.e., heating, cooling, electricity, water, sewer, and gas), expressed in total dollars per year and total dollars per gross square meter;
- b) All third-party operations and maintenance contract requirements and projected annual Costs for:
 - i. All interior and exterior mechanical, electrical, and vertical transportation components and systems, all control systems; and all exterior Site services (e.g., lighting, irrigation, window cleaning);
 - ii. Landscape maintenance in accordance with Project's landscape design requirements, by season (e.g., alternative no/low salt snow removal, tree pruning, grass cutting);
 - iii. Interior and exterior building envelope maintenance (windows, roofing, doors);
 - iv. Daily housekeeping and janitorial;
 - v. Loading dock equipment;
 - vi. Waste management and removal;
 - vii. Security system monitoring, security staffing in accordance with the approved concept of operations, and as applicable remote supervision; and
 - viii. For each identified third-party operations and maintenance contract, operational standards and maintenance frequency and standards for reliable TSTS hub operations;

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- c) Long-term monitoring programs to collect information (e.g., energy consumption, water usage, GHG emissions, waste, environmental conditions, etc.) for NRC's ongoing post-construction reporting, if said monitoring programs are not already part of a maintenance contract requirement in accordance with paragraph b) above;
- d) A list of future minor recapitalization projects associated with proper cyclical maintenance (e.g., building repointing, window/door replacement, roof caulking, building system upgrade). Identify the frequency and brief scope statement for each recapitalization project. Link the frequency with assumptions taken in Project Brief section 4.1.4.3–Life-Cycle Cost Analysis. Integrate information developed from the Design Team's climate change risk assessment, Project Brief section 11.9–Sustainability Analysis;
- e) TSTS occupant staff requirements (i.e., number, type, budget Cost);
- f) With the input of the DR and municipal officials, property assessment for tax purposes.

4.1.4.2 BIM Interoperability

The NRC is transforming their day-to-day operations to reflect a highly digitized operating environment. As a result, the CM is required to support the Design Team's delivery of an as-built (record) Model(s), which includes extensive interoperability of Model elements and BIM enabled commissioning.

The Design Team's FF&E are required to interact with the Model and to migrate to NRC's enterprise software or property/asset management system, to create a permanent record of all FF&E, for NRC's post-Project use.

Monitoring and reporting of ongoing operations, utility consumption, changing interior and exterior environmental conditions, FF&E information and location, etc. are to be incorporated into the as-built Models.

4.1.4.3 Life-Cycle Cost Analysis

As defined by the Office of the Comptroller General of Canada, *"lifecycle cost estimates cover all costs associated with projects over their life cycle, spanning from initial conception to disposal or wind-down. Consideration of lifecycle costs are critical to ensuring sufficient budget is available for the operation, sustainment and disposal of assets, as well as to enable trade-off studies that identify the cost impact of changing requirements or pursuing different options."*

The Office of the Comptroller General requires *"the department's [PWGSC's] assessment of the overall quality of the lifecycle cost estimate should be provided, aligned with the ROM, Indicative and Substantive definitions. The key cost drivers for each of the Lifecycle Phases [i.e., operating, sustainment, and disposal], and whether they are controllable by the department or the Government of Canada, should be explained in a brief narrative. The anticipated useful life of the asset(s) and the total number of years covered by the lifecycle phases should be provided as part of this narrative"*.

With information from the Chief Appraiser of Canada, PWGSC has determined a component-based life-cycle Cost analysis (LCCA) is appropriate for this Project, a durable building asset which is required to remain operational with as little disruption as possible.

Moreover, in accordance with the PWGSC's sustainable development commitment, life-cycle assessment (LCA) and LCCA are methods for assessing the total cost of facility ownership, accounting for all Costs of acquiring, owning, and disposing of a building or building system to maximize net savings and best value to the Crown.

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The Design Team is required to undertake a life-cycle assessment (LCA) and life-cycle Cost analysis (LCCA) of each Schematic Design option, each sustainability performance strategy, during DD, at the end of building fit-up DPs, and during post-construction. Incorporate into the LCA and LCCA, for each defined building system, their components, and selection of durable, low-carbon, low-energy materials:

- a) All annualized operating Costs, in accordance with ToR section 4.1.4.1 – Preliminary Building Management Plan;
- b) Results of whole-building energy analysis in the LCA, including:
 - i. Building envelope performance; and
 - ii. Energy Costs over a 40-year period using a carbon shadow price of \$300/metric tonne of GHG of embodied carbon dioxide (CO₂e);
- c) The Design Team is required to develop LCCA repair and replacement Costs and cash flows, including both hard construction and soft Costs, for the major building systems/components over their expected useful life, as defined in the table below, based on the Design Team's scope and timing of said repairs/replacements:

Component Name	TSTS
	<i>Non-heritage asset useful life</i>
Substructure	100
Superstructure	100
Exterior Enclosure	60
Roofing (average)	25
Interiors	30
Conveying	25
Plumbing	30
HVAC	30
Fire Protection	25
Electrical	30
Building Sitework	30
Fixed Furnishing (millwork)	30
Standard office fit-up	20
Building Equipment	10
Infrastructure	40

- d) Residual value of the land, assuming total building demolition, recycling, disposal, expressed in total dollars per square meter;
- e) Simple payback period (return on investment); and
- f) All inclusions, exclusions and assumptions, including inflation and discount rates, fuel cost escalation, etc.

Refer to the sustainability subsections within the Project Brief sections 11–Pre-Design Services, 12–Schematic Design Services, 13 – Design Development Services, and 14 – Design Package Services.

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The DR will use the LCCA information to inform and obtain feedback from the TSTS occupants, PWGSC's Professional and Technical Services and National Investment Management sectors and, if necessary, third-party subject matter experts. The DR's decision regarding building system/component selection at Schematic Design and subsequent Project stages will be final.

4.1.4.4 Operations and Maintenance Contracts

As defined by the DR, the Project scope includes operations and maintenance of all building and Site systems until handover to Canada as defined by manufacturers' published instructions or, in the case where published instructions do not exist, as agreed to by the DR.

In addition, for those building/Site systems with proprietary technologies, such as elevators, fire alarm, building automation, etc., as agreed by the DR, the Design Team's DPs are to include system-specific scope and requirements for ongoing maintenance contracts. The DR will provide the system-specific maintenance contract requirements to incorporate within DPs.

The CM is required to tender said contracts as part of their tender process and novate said contracts to Canada 11-months after Substantial Performance, at handover to Canada, for Canada's funding and ongoing maintenance contract management.

4.1.5 Benefits Realization

For the TSTS Project, a benefit realization plan and benefit register which support the investment of public funds are specific requirements of the Treasury Board's [*Directive on the Management of Projects and Programmes*](#). PWGSC understands that benefits may change throughout the lifecycle of the Project; therefore, the Monitoring of benefits is critical which triggers the need to update the Project benefits map and benefits register the latter Project stages. A final, Baseline version of the Project benefits plan and benefits register are to be completed with the 100% SD and the content of the plan and register are to be validated at 100% DD, substantial performance, and handover to Canada.

It is common for benefits to be realized after a project has been formally closed and the new capabilities integrated into business operations for the service line federal department or agency. Accordingly, the benefits plan and register are to include a summary of what needs to be in place operationally for benefits to be realized beyond the closure of a project, including the TSTS Project. For example, describing what needs to be in place operationally at handover to Canada or transition activities at the end of the Project to the benefit owner(s) or other stakeholders (i.e., the NRC, TBS, PWGSC) will support realizing the benefits by the benefit owner(s) monitoring progress towards the planned outcomes during and after the project is completed. Clearly, the scope defined in Project Brief sections 4.1.4—Operating Requirements and 4.3.5—Sustainability play an important aspect in defining and quantifying Project benefits, but other broader benefits resulting from this investment of public funds do exist.

The Design Team's role is essential in the development, Monitoring, and updating of a Project-specific benefits plan and benefits register. For the 100% SD submission, with the DR, the Design Team is required to develop:

- a) A benefit register, similar to the following table, which includes:
 - i. The name of each benefit;
 - ii. A brief statement describing each of the benefits;
 - iii. The metric or metrics that will be used to track the realization of each benefit;

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- iv. As defined by the DR, the name of the associated government program or horizontal initiative / plan; and
- v. The anticipated timing for the realization of the benefit (i.e., during the Project or after closure).

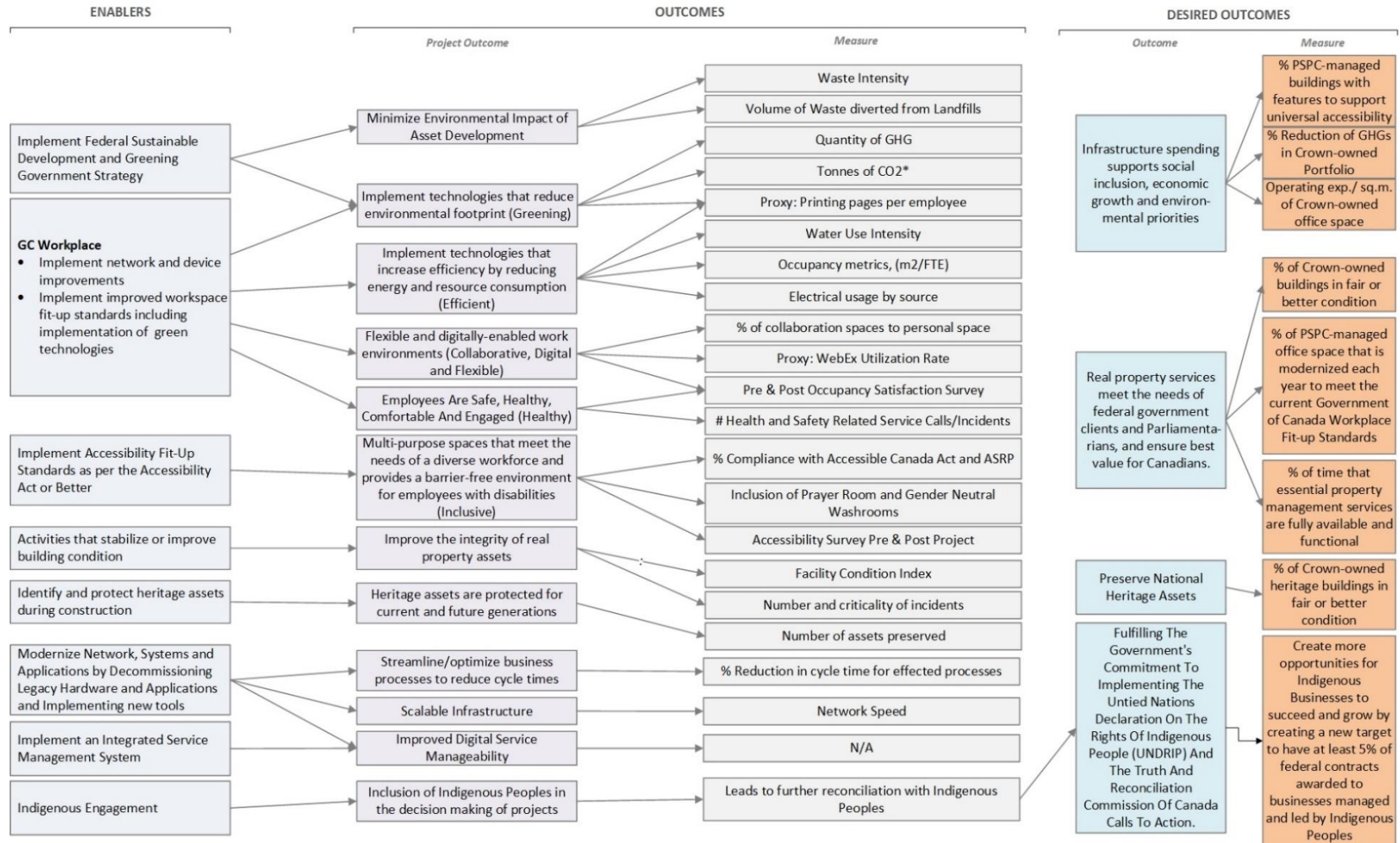
Benefit Benefit name or identifier	Benefit statement This is a brief statement that describes the benefit.	Benefit metric(s) Measures to be used to assess results	Strategic alignment What is the associated program or horizontal plan for this benefit?	Anticipated Timing Is the benefit expected to be realized during the Project lifecycle, or after Project closeout?	Benefit Owner To support transition activities

- b) A benefits map, similar to the following graphic but adapted to the TSTS Project;

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Outcomes Map and Associated Metrics



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- c) An updated benefit register with 100% DD submission, at substantial performance, and at handover to Canada, which includes and compares current benefit status/projection(s) with 100% SD Baseline information / targets and metrics on preferred SD design option; and
- d) At handover to Canada, an updated benefits register highlighting a full listing of benefits which are to be tracked and reported on by the business owner(s) during their ongoing operations, including necessary activities (i.e., contracts, staffing, operational practices) the business owner(s) need to put in place.

4.2 Enabling Projects and Pre-Construction Works

For the purposes of this project, Enabling Works are not part of this contract and will be carried out under separate contracts to facilitate the preparation of site for this contract. Pre-Construction Works will be site activity in advance of the main construction and will be part of this contract

4.2.1 Pre-Construction Work - Site Office

The CM is required to establish and maintain a Site office to support construction operations and commissioning activities, with sufficient space and services for the CM's staff as well as provision for the Project Team and the Consultants site personnel. The timing and location of the Site office will require approval from the NRC and the DR, before setting up the office.

The exact Site office operational requirements of the Design Team and CM are to be developed in collaboration with the DR.

The office is to include necessary technologies to view, update and maintain the Model and proactively manage the Project design and construction to advance the Project, while ensuring that security of information and personnel are maintained. The BIM Execution Plan (BXP), Project Brief section 10.2.3, is to determine the Site office technology requirements. The Site office technology requirements are supplemental and are to be of equal standards to various technologies, software, and communication and computing devices (i.e., cell phones, laptops, printers, copiers, data plans) that the Design Team, GEICs, and CM are to provide their staff and within their home, regional or local offices.

Secondary offices may be set up within the Site to support key sub-trade contractors and facilitate the effective management of the construction. The DR, in consultation with the Design Team and CM, will determine the location, size and requirements of the Site office considering the requirements defined in Project Brief section 16–Site Services and the CM's services. Planning and design of the Site office is to consider expansion over time to support effective Site management at the peak of construction.

4.2.2 Pre-Construction Work - Wayfinding, Traffic Management and Site Fencing

The Project will affect the operations of the NCR campus with restrictions and reconfiguration of circulation and pedestrian routes.

The scope includes:

- a) All temporary and final traffic and way finding planning, approvals and signage, including transitional changes as the Project Site expands and contracts over time;
- b) When warranted, full-time traffic control personnel to manage and direct pedestrian and vehicular traffic around and within the Project Site;

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- c) Secure, dignified, well designed and approved Site fencing that permits public viewing of construction operations within the Project Site but, at all times, prevents unauthorized access, including all modifications and ongoing maintenance as the Site expands and contracts over time; and
- d) Security Monitoring of the building exterior, construction Site, Site fencing and access gate(s), and adjacent areas.

4.2.3 Pre-Construction Work Temporary Heating, Electrical, Lighting, and Water

The scope includes:

- a) Providing, maintaining, and modifying heating systems with ancillary controls and metering to the TSTS hub until new building systems are installed and commissioned, potentially 3 years or more;
- b) Providing, maintaining, and modifying scaffolding heating to suit the construction;
- c) Providing, maintaining and modifying temporary electrical service and lighting for the building and Site; and
- d) Providing, maintaining and modifying temporary water supply and fire-fighting capability for the building and Site.

4.2.4 Enabling Works

The information in this Project Brief section is for the Design Team's information only and will be carried out in whole or part by the DR.

4.2.4.1 Enabling Works - Utilities Reconfiguration

The scope to be carried out by the DR potentially includes:

- a) Isolation and reconfiguration of NRC Campus two 300mm primary watermain and multiple branch lines to permit deconstruction work while maintaining sufficient water supply for Site and NRC Campus use and fire fighting. These two watermain supply the entire NRC Campus heating plant network and can only be relocated one-at-a-time, with shutdowns limited to approved weekends only;
- b) Isolation and reconfiguration of an NRC Campus 1050mm storm water and 450mm sanitary sewer systems that pass diagonally across the Site, as well as multiple branch systems;
- c) Isolation and reconfiguration of multiple underground tunnels, 1.8m below grade, which interconnect multiple NRC Campus buildings and contain:
 - i. High-pressure steam and condensate heating piping and cooling piping;
 - ii. 13.2kV and 600V electrical supply systems; and
 - iii. Telecommunication systems;
- d) Isolation and reconfiguration of two 200mm high pressure natural gas mains, which supply the campus central heating plant and multiple buildings;
- e) Road reconstruction resulting from utility reconfiguration, including temporary roads to allow NRC Campus operations to continue during construction operations; and

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- f) Obtaining NRC, Ottawa Fire Department, Hydro One, Enbridge Gas, and all other applicable utility and telecom provider approval before implementation.

4.2.4.2 Enabling Works – Existing Building Decommissioning

The scope to be carried out by the DR potentially includes the isolation, abatement, and removal of NRC building M21 and related Site infrastructure.

4.3 Main Construction

The main construction of the TSTS is summarized by Design Team discipline as follows:

4.3.1 Geotechnical

The scope may include some or all of the following, as determined by the GEICs :

- a) The Design Team's review, coordination, and as applicable integration of geotechnical design requirements by PWGSC's geotechnical consultant, whose services may include some or all of the following scope:
 - i. Whole site characterization and determining seismic classification of the Project Site;
 - ii. Development of a geotechnical data report (GDR), a geotechnical design memorandum (GDM) and a geotechnical baseline report (GBR), including mechanical design parameters for geo-source heating and cooling;
 - iii. Rock and soils engineering and Modelling for geotechnical design solutions to respond to, support, and that are coordinated with civil, municipal, structural and architectural designs;
 - iv. Rock and soil excavation, rock stabilization as necessary, dewatering and related work;
 - v. A Monitoring and instrumentation program related to excavation; and
 - vi. All applicable investigations, enabling projects, and possibly pre-construction work.

4.3.2 Environmental

This section is closely linked with Project Brief section 4.3.5–Sustainability.

The scope may include some or all of the following, as determined by the GEICs:

- a) The Design Team's review, coordination, and as applicable integration of environmental design requirements by PWGSC's environmental and industrial hygiene consultants, whose services may include some or all of the following scope:
 - i. Full ecological characterization and detailed assessment of the entire Project area and ongoing Monitoring of all environmental and construction worker protection;
 - ii. Identification, application, follow-up and obtaining Project-specific environmental authorizations and permits;
 - iii. Identification, planning, Monitoring, reporting and removal of contaminated and non-hazardous soil/rock and designated building substances;
 - iv. If necessary, identification, development, Monitoring, and reporting of on-Site water treatment requirements, before discharge into municipal sewer systems;

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- v. If necessary, development and refinement of a detailed Site remediation report, before handover to Canada, for all activities undertaken;
- vi. If necessary, development and refinement of a Project-specific risk management measures plan reflective of the results of all Site remediation and Monitoring activities, before handover to Canada, for the NCR's ongoing post-construction management;
- vii. Development, Monitoring, and reporting of non-hazardous construction, renovation, and demolition (CDR) waste management program, which includes a complete waste audit, a waste reduction work plan, a material source separation program, training of Site personnel, and a waste diversion report;
- viii. Development, Monitoring, and reporting of a construction activity pollution plan that outlines the measures and methods to prevent environmental impact from construction activities and environmental measures such as control dust, decontamination procedures; and
- ix. All applicable investigations, enabling projects, and possibly pre-construction work.

4.3.3 Site

4.3.3.1 Landscape Architecture

The scope includes:

- a) Undertaking research and review of past reports related to prepare an illustrated landscape background analysis of the landscape immediately around the TSTS hub;
- b) Enhancement of health and safety for the TSTS occupants and visitors;
- c) A secure, gated compound (i.e., perimeter) with:
 - i. A privacy fence surrounding the wreckage yard, storage area, jet fuel farm, and secure parking for fleet vehicles, large equipment, and other assets; and
 - ii. Vehicular anti-ramming measures such as bollards or landscaping elements such as planters, walls or berms at the front and sides of the facility;
- d) A dedicated jet fuel farm consisting of storage tanks, distribution equipment and piping readily accessible by a fuel transport vehicle, including fuel transfer equipment in a weather-proof enclosure within the secure exterior compound readily accessible by a fuel transport vehicle, in close proximity to the burner rig test cells;
- e) Development of a tree protection plan and enhancement of vegetation on the Site;
- f) Universal accessibility for all persons to the TSTS access and egress points and the surrounding Site, including transitions to areas adjacent to the Project landscaping scope;
- g) Design of Site furniture and lighting of an appropriate character and sense of place of the TSTS landscape;
- h) Sustainable and long-lasting materials that are compatible with the existing systems and are easily maintained and are durable to Canada's four-season climate and severe winters;
- i) Vehicle parking for 27 facility staff, excluding fleet parking: 7 accessible and 20 standard vehicle spaces with emergency assistance stations integrated with the security system;
- j) Bicycle parking for staff is 43 bicycles, not including visitor bicycle parking;

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- k) A storage yard with:
 - i. Sufficient space to store and handle multiple industrial storage containers and/or large wreckage pieces, equivalent to the high bay investigations area to address unexpected critical investigations and surge requirements;
 - ii. Covered storage area or warehouse to store materials until a high bay area is available;
 - iii. Grade level access for loading/unloading and maneuvering of full-sized highway tractor and semi-trailer vehicles is required outside of the high bay areas;
- l) Sustainable and maintainable systems that will reduce operating Costs;
- m) Manageable and maintainable civil/municipal and utility infrastructure;
- n) Accommodation of vehicular traffic including the TSTS occupants, building operations, security, service delivery, material handling, accessible parking, drop-off and pick-up; and
- o) All applicable investigations and enabling projects.

4.3.3.2 Civil/Municipal

Most of the work as described in this section will have been carried out as part of the Enabling Works. The scope of work to be carried out by the DR generally includes the following:

- a) All municipal infrastructure elements serving the TSTS hub or passing through the Project Site, including:
 - i. Watermains and their appurtenances;
 - ii. Storm water collection systems and their components; and
 - iii. Sanitary sewer collection systems and their components;
- b) Reconfiguring water mains, storm water and sanitary sewer collection systems, electrical and telecommunication duct banks, gas mains, tunnels and their services, roadways, including infrastructure relocation and reconfiguration beyond the Site limits, to take into account on-Site and off-Site condition and capacity concerns that would impact the new facility, in addition to requirements for landscaping, geotechnical, electrical, mechanical, IT connectivity requirements and other design disciplines;
- c) Maximizing watermain Site feeds (in size and in number) and providing fire flow rated water meters and Site fire hydrants. Fire flow calculations are to confirm that the existing water distribution system can accommodate the new fire flow requirements;
- d) Providing watermain redundancy for Site supply and building service. Identify all improvements that may be required on-Site as well as off-Site (i.e., the NRC Campus at large and potential City of Ottawa municipal water distribution);
- e) Using existing, fixed sanitary and storm outlets provided that the condition and capacity of the existing outlets and lateral connections are capable of meeting future TSTS hub and Site flow requirements;
- f) Locating iron works in clear and accessible areas;
- g) Relying on gravity for storm and sanitary collection systems;

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- h) Cutting into existing sewers and water infrastructure purely for expedience of the temporary, without regard to the long-term degradation of performance to the infrastructure as a whole, will require written authorization from the DR, before cutting;
- i) New Connectivity and electrical infrastructure design (i.e., duct banks, manholes, positive drainage) and infrastructure space management with growth capacity for all underground utilities;
- j) On-Site integration of new storm water management systems and related sustainability performance strategies as deemed necessary by the Consultant;
- k) Complete geometrical analysis to confirm optimal alignment of new or modified roads to accommodate the traffic path of emergency and operational vehicles accessing the Site;
- l) Coordinated with the landscape and architectural disciplines, all grading, paving, hardscape, and accessibility requirements for the Site; and
- m) All applicable investigations and enabling projects.

4.3.4 Architecture

The scope includes:

- a) Design and construction of pre-design function program option 1, adjusted to FRAMEWORK's site option 3, a gross building area of approximately 17,500 square meters and building footprint just under 13,000 square meters, with further assessment for efficiencies and space reduction;
- b) Design of the building and its envelope including integration of seismic requirements, in accordance with approved security design requirements, and energy efficiency measures;
- c) Integration of mechanical, electrical, vertical transportation, IT, audio-visual (AV) and integrated security systems (ISS) into the building fabric;
- d) Integration of IT and/or AV in custom design and laboratory furniture and millwork;
- e) Logical and contextually appropriate exterior and interior wayfinding and signage;
- f) Comprehensive interior design of the TSTS hub, that includes at a minimum:
 - i. Laboratories, workshops, high-bay areas with industrial gantry and gib crane systems, meeting rooms and offices, etc.;
 - ii. Storage spaces for hazardous materials awaiting disposal, such as oil, petroleum, lubricants, corrosive materials, and low radioactive materials (e.g., aircraft instrumentation), complete with controlled access, drainage, and spill containment;
 - iii. Shared spaces, including the building lobby, reception, waiting and security areas, exhibition space and interpretative centre, informal gathering/event space, library, auditorium, etc.;
 - iv. Use of antimicrobial coatings (i.e., films and layers), such as [organosilane](#) nanocoatings on surfaces such as doorknobs, countertops, wall surfaces, etc.;
 - v. Base building, support services and security, IT and AV spaces;
 - vi. Design and integration of FF&E and Connectivity;
- g) Integration with the landscape to design connections and linkages that strengthen the relationship between building, landscape and visitor's and employee's experience where:

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- i. Architecture elements, architectural features and supporting materials will enhance the relationship of the TSTS hub with the landscape design and materials palette;
 - ii. A circulation system for vehicular traffic (e.g., TSTS occupants, NRC Campus traffic, service delivery and material handling, emergency, security) and pedestrian traffic to building entrances and service delivery docks, drop-off and pick-up points will enhance and improve the TSTS's function and operation;
 - iii. Loading facilities accommodate a loading roller door that is at least 15 meters wide by 7 meters high with clear access for a crane to extend and lift wreckage from a flatbed truck.
 - iv. Swing space allows for pick-up and drop-off of at least two industrial storage containers;
 - v. There is sufficient space equivalent to the high bay investigation area to address unexpected critical investigations and surge requirements, complete with covered storage area or warehouse to store materials until a high bay area is available, as opposed to redundant space to allow for multiple investigations to be undertaken simultaneously;
 - vi. Other outdoor spaces appropriately integrate a decontamination area, a fuel farm and fuel storage, a garbage and recycling area, hard and soft landscaping, and bicycle and fleet, visitor and employee vehicle parking;
 - vii. Universal accessibility at entrance/exit thresholds, entrances/exits and foyers improves the functionality and recognizes the need to accommodate all persons;
 - viii. Sustainable designs improve the environment of the building and its Site by addressing how to manage and filter Site storm water, providing sufficient clean air for building ventilation, using the landscape and vegetation to augment building heating, cooling and mitigate physical security threats;
 - ix. Exterior lighting significantly enhances the building facade, entrance ways, service dock areas, connecting pathways, and drop-off pick-up points and improve the public's experience of the building and its environs, along with careful integration of security requirements enhancing overall safety and security operations;
 - x. Emergency and evacuation gathering areas are clearly identified when required but do not impact the sense of place; and
 - xi. Materials selected are respectful of the building and landscape's architectural design and support sustainability, and that they are durable, long lasting and easy to maintain;
- h) Bird-friendly building design and construction in accordance with CSA A460:19;
 - i) Daylight harvesting to off-set lighting use and improve employee well-being; and
 - j) All applicable investigations and enabling projects.

4.3.4.1 Building and Site Program

The scope includes:

- a) Reviewing, validating, and updating the pre-design functional and technical program until a final program is defined for formal approval by the TSTS occupants at 100% schematic design;
- b) Optimization of the functional program to address science space areas, workflows, laboratory and workshop adjacencies, space sharing, as well as the approach to the science operations conducted in those spaces and science support spaces (i.e., spaces that support program functions such as

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resource centres, auditoriums, shared meeting rooms, shared offices, and outdoor spaces that support the science facility operations);

- c) Space types generally summarized as follows:

Space / Functional Areas	Space Type
Science and High Bay Laboratories	Science Space
Science Workshops	Science Space
Science Laboratories	Science Space
Science Laboratory Support	Science Space
Science Logistics	Science Space
SOA – Individual Workspaces	Science Office Space
SOA – Collaboration Workpoints	Science Office Space
SOA – Support Spaces	Science Office Space
GCWorkplace – Individual Workspaces	Office Space
GCWorkplace – Collaboration Workspaces	Office Space
GCWorkplace – Support Spaces	Office Space
Executive Suite – Chair, Board Member + COO	Office Space
Special Purpose Spaces	Office Space
Lobby, Reception, Waiting Area, and Security Area	Public Space
Display – Interpretative Centre	Public Space
Informal Gathering / Event Space	Public Space
Wellness Room / Nursing Room / First Aid	Shared Space
Centralized Resource Centre	Shared Space
Decentralized Resource Centre	Shared Space
Auditorium	Shared Space
Lunchroom	Shared Space
Resource Center	Shared Space

- d) Employee accommodation, expressed as full-time equivalent (FTE) individuals, generally summarized as follows:

Science Programs	FTE	FTE Total
TSB engineering laboratory	24	28
TSB engineering laboratory visitors/industry	4	
NRC SMPL	51	66
NRC SMPL visitors/students	15	
Shared flex/surge staff level	4	4
Total Science Programs		98

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Non-Science (TSB head office) Program	
Office of the Chair	13
Communications Branch	16
General Counsel	5
Air	13
Marine	4
Rail and pipeline	11
Operational services	20
Corporate services	43
Shared/flex staff	23
Total Non-Science (TSB head office) Program	148
TOTAL Science and Non-Science Program	246

- e) Iterative building and Site program development which will continue through to end of Design Package development are to integrate, amongst other items:
- i. Elements identified in the initial pre-design functional program gap analysis;
 - ii. Elements (i.e., goods, office equipment, laboratory/industrial equipment) identified for relocation from existing locations for design and construction integration in the new TSTS hub, as planned for and moved in accordance with Project Brief section 4.3.4.8–Move Management;
 - iii. Universal design for accessibility, including uniquely defined RLDF requirements for laboratory spaces;
 - iv. Physical security building and Site design options, security zoning and control;
 - v. Optimized circulation for people and equipment within the building and on the Site;
 - vi. Conventional structural/seismic design options which take into account large clear spans over high bay areas and 16 different cranes types, as follows:
 1. An NRC high bay equipped with one new 10-tonne overhead crane with a minimum of 15-meter clear spaces to the underside of the crane hook;
 2. A TSB high bay equipped with two new 20-tonne overhead cranes with shared crane rails and a minimum of 15-meter clear spaces to the underside of the crane hook;
 3. Additional new overhead cranes as follows:
 1. Machine shop: 2-tonne;
 2. Full-scale testing prep room: 1-tonne;
 3. Material and component testing laboratory: 10-tonne;
 4. Spin and burner rig equipment area: 1-tonne;
 5. Pump room area: 1-tonne;
 6. Non-destructive evaluation area: 0.5 tonne mono rail;

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- 4. Five jib cranes in various workshops and laboratories ranging from 0.5 to 1.5 tonnes; and
- 5. A 1.5-tonne chain hoist in the tear down workshop;
- ii. Evolving laboratory, workshop, meeting room and office functional requirements;
- iii. Area calculations that include summaries of all building and Site areas and all the accommodation types and functions; and
- iv. Storage analysis and requirements for laboratory/workshop areas and meeting/assembly furniture for public events; and
- f) All applicable investigations and enabling projects.

4.3.4.2 Universal Design for Accessibility

The scope includes:

- a) An integrated design and construction integrated to make the TSTS hub and its Site accessible to all persons with disabilities, including uniquely defined RLDF requirements for laboratory spaces;
- b) Compliance with the principal governing regulations, policies and standards: the [Accessible Canada Act](#), the [Canada Occupational Health and Safety Regulations](#) (COHS), [Treasury Board's Policy on the Management of Real Property](#), Treasury Board's [Accessibility Standard for Real Property](#), the [Accessible Design for the Built Environment](#) (Canadian Standards Association ([CAN/CSA B651-18](#) and its supplements)), and the NBCC;
- c) Confirming, in advance of making design decisions, that proposed designs that do not confirm to the regulations, policies and standards meets their intent, or provides an alternate solution acceptable to the DR; and
- d) All applicable investigations and enabling projects.

4.3.4.3 Security

The majority of security-related Services and deliverables are protected B, with a few documents at the secret (level II) security classification. The Consultant and CM must make sure Contract deliverables are organized such that protected B and classified information are duly segregated and securely stored separate from standard design stage deliverables. Accordingly, to the extent possible and to the approval of the DR the Design Team and CM must prepare 'sanitized' (non-classified) versions of classified documents with the design stage deliverables (i.e., two security reports: classified and sanitized).

Considering the above paragraph above, the CM is required to support and tender the Design Team's designs, whose scope includes:

- a) Review and analysis of the Project-specific threat and risk assessment (TRA) prepared by the LC security team;
- b) Designing a secure environment that considers the principles of crime prevention through environmental design that also takes into account built and landscape;
- c) A holistic design for the TSTS hub and its Site, applied through a layered approach that follows and enhances the federal government and TSTS occupants' security processes, without impeding their operations or impacting the Project objectives, in accordance with Project Brief section 3;

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- d) Validating a hierarchy of physical security zones and transition areas which follow the RCMP [G1-026 Guide to the Application of Physical Security Zones](#);
- e) Validating preliminary security requirements (PSR), security space requirements, and security-related updates for the functional program and its room data sheets;
- f) Updating and documenting changes to LC's Project-specific security design brief;
- g) Developing physical security solutions and integrated security systems, including their performance requirements, for building assemblies and spaces, Site features, and technologically advanced systems with biometric data analytics (i.e., physiological and behavioural technologies), which:
 - i. Are based on the threats, vulnerabilities and recommendations included in the Project-specific TRA;
 - ii. Reflect defined security zones with contiguous operations within each security zone, transition areas, and include control measures;
 - iii. Integrate with the existing NRC Campus security operations centre and systems;
 - iv. Consider and integrate applicable emission standards (i.e., [Speech Privacy Classes](#), [Information Technology Standards Guidance](#), etc.);
 - v. Integrate emergency assistance stations in the building and parking areas; and
 - vi. Are responsive to change and based on defined security operational readiness levels when the Project is completed; and
- h) All applicable investigations and enabling projects.

4.3.4.4 Audio-Visual

The majority of audio-visual-related Services and deliverables are protected B, with a few documents at the secret (level II) security classification. The Consultant and CM must make sure Contract deliverables are organized such that protected B and classified information are duly segregated and securely stored separate from standard design stage deliverables. Accordingly, to the extent possible and to the approval of the DR the Design Team and CM must prepare 'sanitized' (non-classified) versions of classified documents with the design stage deliverables (i.e., two security reports: classified and sanitized).

Considering the above paragraph above, the CM is required to support and tender the Design Team's designs, whose scope includes:

- a) Validation of Project requirements;
- b) Definition of all AV functional program requirements and updates thereto for each AV support space or adjacent space, including criteria for architecture, acoustics, ventilation, power, and other building system requirements;
- c) Complete AV systems/components design and technologies appropriate to support document presentations, unified communications presentations, live webcast, sound reproduction, etc., which includes:
 - i. Due consideration for AV integration all other building systems;
 - ii. Due consideration and analysis for indirect diffuse lighting, illumination levels, and acoustics for all AV-related spaces, to avoid noise transmission to/from adjacent spaces, reflective surfaces, and provide optimal/true representation of individuals;

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- iii. Definition, per space, of ventilation requirements (i.e., low air speed, duct insulation), power requirements (i.e., normal, emergency and UPS systems), door requirements, and, if necessary, window treatments (e.g., blinds, electric blackout blinds); and
- iv. Detailed system/component programming of each AV subsystem;
- d) DP development, tender review, construction oversight and review, commissioning, performance verification, and post-construction adjustment and, as necessary, reverification; and
- e) All applicable investigations and enabling projects.

4.3.4.5 Information Technology

The majority of information technology-related Services and deliverables are protected B, with a few documents at the secret (level II) security classification. The Consultant and CM must make sure Contract deliverables are organized such that protected B and classified information are duly segregated and securely stored separate from standard design stage deliverables. Accordingly, to the extent possible and to the approval of the DR the Design Team and CM must prepare ‘sanitized’ (non-classified) versions of classified documents with the design stage deliverables (i.e., two security reports: classified and sanitized).

Considering the above paragraph above, the CM is required to support and tender the Design Team’s designs, whose scope includes:

- a) Undertaking a comprehensive Project-specific functional and operational assessment of all NCR Campus IT network systems, integrated systems, ancillary systems, and related components, pathways and spaces, architectural spaces, mechanical and electrical requirements;
- b) Provision of a complete functional program and related updates for all integrated IT systems based on Project requirements;
- c) Design of comprehensive IT and telecommunications systems to support high performance research and science network computing with an initial Baseline bandwidth of 10 GB, equipment that augment up to 40 GB, and high-end switches to enable increasing bandwidths to 100 GB, and also to support government enterprise- and cloud-based solutions;
- d) Integration of all IT systems with architectural and building elements, Site and in-building Connectivity requirements, and other systems and components requiring Connectivity, including inter-building Connectivity;
- e) IT requirements definition, DP development, tender review, construction oversight and review, commissioning, performance verification, and post-construction adjustment and, as necessary, reverification; and
- f) All applicable investigations and enabling projects.

4.3.4.6 Furniture, Fixtures and Equipment and Connectivity

4.3.6.3.1 General

Furniture, fixtures and equipment (FF&E) and building Connectivity, are essential in the use and the operation of the building. They contribute to how TSTS occupants perceive buildings and are necessary to achieve the functional requirements programmed for the interior and exterior spaces. For the TSTS, appropriate use of FF&E and Connectivity will reinforce the design vision of the Project.

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The Design Team is to confirm that proposed designs for FF&E and Connectivity will support the functional and operational requirements for each space. Occupancy by TSTS occupants will not occur without successful design and integration of these elements into the building fabric.

FF&E includes all building occupant fit-up elements, including non-furnishings, housekeeping/janitorial equipment, waste management, window coverings, as well as specialized scientific and laboratory equipment, etc.

Connectivity means physical and electronic systems that include information technology (IT) systems, audio-visual (AV) systems, and integrated security systems (ISS) and the related equipment that comprises each of these systems. These physical and electronic systems connect numerous buildings, spaces, and functions together.

While the Design Team has the most significant role in design and the overall design coordination, the TSTS occupants play an equally important role in the articulation of function and technical requirements. The CM plays a role in the procurement, sequencing of delivery and installation of Connectivity systems and custom or built in FF&E, including the construction interdependencies and prerequisites for FF&E and Connectivity installation. PWGSC will procure standard office furniture, etc. The TSTS occupants will procure some speciality goods. Refer to Project Brief APPENDIX G- FF&E AND CONNECTIVITY RESPONSIBILITIES MATRIX.

While the Connectivity design has a direct scope relationship with the electrical design, FF&E, and overall interior design, it requires enhanced architectural review, detailing and coordination. Accordingly, Connectivity scope is identified in this Project Brief as a subset of architecture to raise awareness of the architectural design impact of Connectivity and make sure this impact is properly addressed and coordinated in the Project design throughout the design process.

4.3.6.3.2 FF&E Overview

A work breakdown structure and definition of each FF&E element is in Appendix E–FF&E WBS Dictionary, which includes:

- a) Equipment:
 - i. Appliances;
 - ii. Health and safety;
 - iii. Housekeeping and janitorial;
 - iv. Laundry;
 - v. Maintenance and handling;
 - vi. Office;
 - vii. Postal;
 - viii. Printing;
 - ix. Security;
 - x. Specialty, including laboratory and scientific equipment;
 - xi. Visual aids;
 - xii. Waste management; and
 - xiii. Client locks.

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- b) Commercial:
 - i. Wood case goods;
 - ii. Lighting;
 - iii. Metal furniture;
 - iv. Office accessories;
 - v. Seating;
 - vi. Specialty;
 - vii. Systems furniture and laboratory case goods/casework; and
 - viii. Tables.

4.3.6.3.3 Consultant's FF&E Scope and Responsibility

The Design Team's scope and responsibilities includes:

- a) The detailed design, design coordination, and integration within the Model of all FF&E and signage into the building according to the design vision, validating compatibility with the interior design;
- b) Preparing and progressively updating detailed quantity listings for new or existing FF&E forming part of the Project design;
- c) Substantial coordination effort to define, test, and integrate TSTS occupant functional program requirements, on a space-by-space basis, within the overall Project design;
- d) Preparing furniture and equipment layout options;
- e) Designing custom furniture, laboratory casework/systems, and millwork or fabrication of new work, including those requiring embedded IT and/or AV equipment and, when warranted, in association with the manufacturer;
- f) Designing and coordinating all base building, fit-up, and infrastructure systems and their components to support and integrate with all FF&E and laboratory systems;
- g) Researching and selecting off-the-shelf FF&E or designing custom FF&E that are aesthetically compatible with each space;
- h) Designing bilingual temporary and final exterior and interior signage for the Project. Final interior signage is to be fully coordinated with approved room numbering;
- i) Participating in specific FF&E workshops throughout the schematic design and design development processes, and as required during the development of DPs and during construction;
- j) Preparing numerous DPs, each with Project-specific technical requirements/Specifications, detailed installation drawings/requirements, and as appropriate commissioning requirements for competitive tender;
- k) Detailing the placement of ancillary requirements (e.g., accent lighting);
- l) Developing a procurement strategy in liaison with the CM and DR. Generally speaking, any element built-in or physically attached (fixed) to a building, structure, or Site, that requires multi-trade/supplier involvement, and custom components and millwork are considered part of the base building for procurement by the CM. Other standard FF&E goods identified in manufacturers'

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catalogues are routinely procured through PWGSC, but may be procured through the CM if there are Project schedule constraints or other issues, as determined by the DR;

- m) Verifying on-Site the correct installation/set-up and commissioning, preparing deficiency lists in conjunction with the DR and CM; and
- n) All applicable investigations and enabling projects.

4.3.6.3.4 Connectivity Overview

Connectivity scope is defined in the proceeding Project Brief sections 4.3.4.3–Security, 4.3.4.4–Audio-Visual, and 4.3.4.5–Information Technology.

4.3.6.3.5 Consultant's Connectivity Scope and Responsibilities

The Design Team's scope and responsibilities, which are extensive, permeating almost every Project space and/or area include:

- a) The IT, AV, and ISS requirements definition, design, and coordination of physical requirements including conduits, cable trays, junction boxes and terminations points, vertical IT sleeves, AV & IT equipment room layouts and equipment, technical grounding, specialized power configurations (i.e., emergency power, UPS, isolated ground), cabling pathways to termination points, cable termination, system programming and performance, general lighting, task lighting, building and Site security, harmonic analysis, IT-, AV-, and ISS-specific HVAC, acoustical treatments, commissioning procedures and performance requirements;
- b) IT, AV, and ISS components design and built as whole systems and seamless integration with building systems, a very significant challenge. These systems are either built-in, physically connected to, or are embedded with other the building or Site components, or require multi-trade/supplier involvement for installation and commissioning, or reflect customized Project requirements;
- c) Overcoming significant challenges integrating physical technology requirements throughout the building. The level of effort of Connectivity Modelling, ongoing coordination among design disciplines (i.e., architectural, civil/municipal, structural, building envelope, electrical, mechanical, acoustical, landscape) and with the CM cannot be understated. Consider the location of Connectivity equipment in order to locate the junction boxes and various surface outlets within coordinated discipline designs and the Model;
- d) Participating in specific Connectivity workshops, defined in Project Brief sections 10.1.1.5 and 10.1.1.6, during the schematic design and design development stages, and as required during the development of DPs and during construction. Refer to APPENDIX F–CONNECTIVITY INTGRATION WITH DESIGN DELIVERABLES;
- e) Developing Connectivity DPs for tender and confirming the design and individual DPs reflect a seamless Connectivity solution with due regard for maintainability, segregation of pathways, minimal interference with other building services, with operational and performance requirements clearly specified. The CM will procure, install and commission Connectivity elements to make sure the Project schedule and Site safety are maintained, and to be the single point of responsibility for system integrity and performance, as specified by the Design Team. Accordingly, DP coordination and integration of systems-wide installation and performance requirements is critical to the success of the Project. Refer to APPENDIX G–FF&E AND CONNECTIVITY RESPONSIBILITIES MATRIX to further describe/define the design and implementation processes; and
- f) All applicable investigations and enabling projects.

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4.3.4.7 Acoustic Design

The scope includes:

- a) Analyse acoustic requirements and their effect on architectural, mechanical, electrical and other systems to support the functional requirements, particularly with respect to audio reinforcement in conference rooms, meeting rooms, offices, and public spaces;
- b) Identify and resolving functional program gaps for speech security and speech privacy per space;
- c) Developing an acoustics design and construction strategy/requirements suitable for each space, mock-ups as appropriate, and commissioning requirements and performance certification; and
- d) All applicable investigations and enabling projects.

4.3.4.8 Move Management

The scope includes:

- a) The Design Team definition of a holistic and detailed move plan, which includes all office, laboratory, scientific, and other building components whether under TSB's, NRC's or another party's ownership. The Design Team's move plan is to define all goods and office, laboratory and scientific equipment moving to the TSTS hub. While the pre-design functional program identifies about 600 laboratory and scientific items that influence the space design, there are many other small, hand-held and bench-top items which have to be moved to the TSTS hub. As well:
 - i. There are about 40 large embedded equipment pieces which, based on the Design Team's design, the CM will have to procure and incorporate/build into the TSTS construction; and
 - ii. There are about 60 non-embedded equipment pieces to be furnished by the TSTS occupants from existing operations or as a new purchase, which the Design Team is required to incorporate into their design through detailed analysis of said existing or proposed new equipment, and the CM is required to install;
- b) The CM moving TSTS occupant personnel, goods, and small equipment from their existing accommodations to the TSTS once the construction and its commissioning are complete, after handover to Canada. This Project is responsible for the complete packing and TSB and NRC move to the TSTS. The Design Team and CM are responsible to define the requirements and DPs to plan, crate as applicable, move and instate all laboratory equipment/systems to be relocated to the TSTS hub; and
- c) Supply moving materials, support the packing of goods and equipment process, undertake the move to the TSTS hub, and placement and set-up of goods and equipment in the TSTS office and laboratory setting, as defined in Project Brief APPENDIX G—FF&E AND CONNECTIVITY RESPONSIBILITIES MATRIX. The TSTS occupants will pack and unpack their office files, personal goods, specialty ancillary laboratory and scientific items as defined in Project Brief APPENDIX E—FF&E COMPONENT WBS DICTIONARY.

4.3.5 Sustainability

The Project sustainability strategies are required to integrate holistic sustainability evaluation. This evaluation includes GHG options analysis, energy efficiency, water, waste, embodied carbon, improvements to the extent possible for laboratory process such as green chemistry, sash management, laboratory waste

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reduction, and all other relevant sustainability requirements to meet the objectives prescribed in Project Brief section 3.3–Sustainability, while balancing all other Project objectives.

The scope includes:

- a) The Design Team choosing the most appropriate sustainability certification rating system for the Project,
- b) The Design Team producing a sustainable development strategy that will identify and develop integrated design and construction sustainability strategies which incorporate refrigerants with low global warming potential, define and update the benefits and complexities of one sustainability approach over another throughout Project implementation, and document expected sustainability performance per building component/system and summarize applicable sustainability rating(s) in a sustainability scorecard for the chosen rating tool;
- c) Differentiating science process loads (i.e., process energy use) from total base building operating energy use or carbon emissions, such that there is a clear distinction made between targeting carbon neutrality for the base building and targeting carbon neutrality TSTS occupant science processes;
- d) The Design Team undertaking a climate change risk assessment to identify future risks and vulnerabilities related to climate change;
- e) In collaboration with the DR, the Design Team undertaking whole-building LCA, 100% complete by 90% SD, revised at 50% DD, fully updated at 90% DD, and for DPs as per Project Brief section 14.3–Design Package Content, using the Athena [Impact Estimator for Buildings](#) (version 5.4 Build 0103 or newer), to evaluate environmental impact reduction opportunities related to:
 - i. Embodied and operating energy;
 - ii. Embodied carbon; and
 - iii. Related emissions to air, water, and land;

(Note: In this Project Brief, the Athena Impact Estimator for Buildings is referenced. The CM and Design Team may jointly choose an equivalent software, to the approval of the DR, so long as the approved software is consistently used for all sustainability-related Services throughout the Contract.)
- f) In collaboration with the DR, the Design Team undertaking whole-building energy analysis and energy Model meeting the ASHRAE 140 Standard, 100% complete by 90% SD, fully updated at 50% DD and at completion of all building fit-up DPs, and again before handover to Canada, using software approved by the DR, such as [IESVE](#) or [EnergyPlus](#), to evaluate design options and sustainability performance strategies through multiple simulations leading to a combination of best-value measures to optimize energy performance and maximize GHG reduction;
- g) In collaboration with the DR, the Design Team undertaking LCCA in accordance with Project Brief section 4.1.4.3, 100% completed by 90% SD, fully updated at 50% DD, and again before handover to Canada;
- h) Development of two enhanced sustainability performance options with whole-building LCA and LCCA, based on the approved SD option, completed by 50% DD. The Design Team's and CM's detailed Cost analysis of each enhanced option, and the proposed optimized recommended option, will be a fundamental input to the Design Team's recommendation of which enhanced option is to be brought forward for further development in the DD stage and within individual DPs;
- i) Defining building and energy performance and NRC's ongoing operations and maintenance and reporting requirements after handover to Canada, in accordance with Project Brief section 4.1.4; and

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- j) Applying for, follow-up on, and obtaining the sustainable design/construction certification(s) before Project Completion.

4.3.6 Building Envelope

The scope includes:

- a) Comprehensive design to meet the NBCC, PWGSC sustainability requirements, security design requirements and, where possible, to exceed the National Energy Code of Canada;
- b) Options analyses that consider a 60-year useful life and associated life-cycle Cost analysis, structural load capacity of the wall and components, and changing interior designs and environmental conditions to provide long-term, value-based building envelope solutions that consider the durability of materials and assemblies;
- c) Hygrothermal and systems/component Modelling to illustrate performance issues and design/construction options;
- d) Roofing, gutter system, and drainage system, to be undertaken in coordination with the structural and mechanical designs;
- e) High-performance windows and doors, including as appropriate commercial/industrial systems for laboratories;
- f) Waterproofing of foundations and other envelope components and coordination of foundation drainage with the civil/municipal discipline;
- g) Establishing building envelop commissioning and performance requirements, per subsystem, undertaking thermographic scans envelope and whole building air tightness testing to provide hard data regarding the performance of the building envelope, and certifying envelope performance; and
- h) All applicable investigations and enabling projects.

4.3.7 Structural and Seismic

The scope includes:

- a) Evaluating floor and roof loading requirement for the intended occupancies and uses, including specialized requirements for laboratories, hoist loads etc.;
- b) Undertaking a detailed wind impact and snow load study;
- c) Seismic design to meet the 2020 NBCC design requirements for new buildings, high importance factor: $I_E=1.3$, which considers a 100-year useful life and associated life-cycle cost analysis for the building foundations, superstructure and envelope. The design is to consider:
 - i. Conventional structural/seismic design options with detailed, ‘apples-to-apples’ comparative analysis with baseline benchmarking (i.e., hybrid cast-in-place concrete, steel, heavy timber framing). Consideration shall be given to implementing innovative technology and materials, such as element energy dissipating systems not including base isolation, and compatible combination construction (i.e., heavy timber framing for office and assembly spaces, with cast-in-place concrete laboratories); and
 - ii. The total building program and not purely the ideal structural and seismic design solution in isolation. The total building program includes:

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1. Reinforcing of other structural and non-structural building elements and systems;
 2. Operational requirements and specialized performance requirements for laboratories and sensitive equipment;
 3. Architectural layout and security zoning;
 4. Specialized overhead and jib cranes as defined in paragraph e) vi) of Project Brief section 4.3.4.1–Building and Site Program;
 5. Roof framing over high bay areas suitable for large clear spans;
 6. Shafts and openings for mechanical and electrical systems; and
 7. Building envelope design for thermal resistance;
- d) Impact resistant bollards, retaining walls, and other barriers;
- e) Determination of safe loads that can be applied onto the TSTS hub as it is being built or any other structure that is above or below grade imposed by the CM's temporary scaffolding, crane, lift or other systems;
- f) Developing structural Monitoring requirements and undertaking Monitoring before, during and after the construction period, coordinated with geotechnical and building envelope Monitoring;
- g) All temporary work for construction and construction phasing, including the specific requirements and sequencing of temporary structural bracing and support; and
- h) All applicable investigations and enabling projects.

4.3.8 Mechanical

The scope includes:

- a) A dedicated high-efficiency heating and cooling plant;
- b) A hydraulic fluid power plant to support SMPL materials processing and characterization equipment in the NRC high bay area, mid bay area and other lab spaces performing structural integrity type research, with hydraulic power hose(s) distribution terminating in manifold stations adjacent the equipment served;
- c) A high efficiency, high pressure compressed air plant with multiple high-pressure compressors, dryers, filters, water cooled after-cooler and receiver and distribution piping;
- d) A small dedicated, self-contained, closed loop recirculating chiller to support SMPL and TSB electron microscopy equipment, located in close proximity to the scanning electron microscope(s) with connection to the TSTS hub process cooling water loop, or alternative system(s) as defined by the Design Team's sustainability strategies;
- e) Building system water efficiency, including reduction in potable water consumption for laboratory processes and the re-use of waste process water;
- f) A dedicated jet fuel farm consisting of double wall storage tanks (one above ground and one below ground), distribution equipment and piping to deliver fuel to high temperature materials testing equipment, located in a secure exterior compound;
- g) Centralized storage and piped distribution of laboratory gases;

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- h) A detailed mechanical risk and hazard assessment of each existing TSB and SMPL engineering facility and their laboratory systems and subsystems, analysis of the pre-design functional program and preliminary risk and hazard assessment, and ongoing risk and hazard assessment update through all Project stages;
- i) Iterative development of a Laboratory Ventilation Assessment (LVA) through all Project stages, with progressively more detailed information regarding the presence of hazards, occupant requirements, thermal loads, and mechanical systems applied, ventilation strategies, and how energy consumption is to be effectively optimized;
- j) Heating, ventilation, air conditioning, plumbing, fire suppression, and ancillary systems that:
 - i. Reflects the planned occupancy and area use;
 - ii. Specifically addresses, in close coordination the architectural and building science disciplines, the treatment of the building envelope;
 - iii. Provides sufficient capacity for evolving future use and increase in occupancy over time;
 - iv. Supports new telecom closets, computer rooms, and related systems such as generators and back-up systems;
 - v. Include high performance fume hoods with occupancy sensors and sash alarms which:
 - 1. Integrate air sampling systems to reduce the air change rates within a laboratory space when there is little to no detection of contaminants;
 - 2. Cascade supply air from non-laboratory spaces to laboratory spaces when appropriate;
 - 3. Use high-plume variable volume exhaust fans complete with wind anemometers to lower fan energy; and
 - 4. Include heat recovery on all laboratory exhaust systems with full flow bypass dampers;
 - vi. Use enhanced filtration for small particulate matter (<2.5 microns) and viruses (e.g., COVID-19 and similar hazards);
- k) Intelligent building automation systems and subsystems with:
 - i. Workstations, networking, controllers, and smart devices listed with [BACNet Testing Laboratories](#);
 - ii. Network security, such as [BACnet Secure](#), with encryption between devices;
 - iii. Intelligent controllers residing at room level, with dedicated controllers per piece of science/laboratory equipment (e.g., fume hoods) capable of all necessary control functions, including:
 - 1. Management switches, at least 3 layers;
 - 2. All input/output points for each piece of equipment or full system residing on the same physical controller, thus the network cannot combine input/output points for any piece of equipment or any system;
 - 3. Fully programmable, [BACNet Testing Laboratories](#) certified, controllers with at least 33% spare capacity for all input and output control points; and
 - 4. Renewable energy and energy storage systems;
 - iv. Smart building and zone metering and smart submetering, with:

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1. Adequate flexibility and thermal and humidity to support wide fluctuations of loads (i.e., a high diversity factor) in conference rooms, meeting rooms, and assembly spaces; and
 2. Ability to undertake virtual calculations for power usage;
 3. Ability to track water consumption of specific uses and subsystems, including captured rainwater, indoor plumbing to washrooms and showers, make-up for cooling towers and boilers where applicable, and all large-use laboratory processes;
- l) Intelligent building automation systems and subsystems with multiple localized supervisory functions are forbidden;
 - m) Providing and maintaining reliable and stable environmental conditions within the interior spaces during construction;
 - n) Redundant water supply for fire protection and domestic use;
 - o) New storm water management systems;
 - p) Consideration of natural gas and high-efficiency systems for emergency back-up building heating, as an alternative to emergency generators;
 - q) Related sustainable performance design requirements; and
 - r) All applicable investigations and enabling projects.

4.3.9 Electrical

The scope includes:

- a) Connection to existing Hydro One high-voltage system, with relocation/reconfiguration as required to suit the Project requirements;
- b) IT and power duct banks coordinated with all civil/municipal works;
- c) One set of new transformers with sufficient transformation capacity to support the proposed building loads, plus additional future loads related to 10 electric vehicle charging stations;
- d) Primary and secondary switching with generators and UPS back-up;
- e) Main electrical rooms and distribution to satellite rooms and closets;
- f) Building ground and technical ground systems;
- g) Lightning protection system;
- h) Copper conductor wiring for cabling, bus ducts, transformers, panels and motors. Aluminum will not be accepted for electrical products;
- i) Automated load management (prioritization) for emergency power, in order of importance:
 - i. Life and safety;
 - ii. Security cameras, controls and all end devices;
 - iii. Integrity of the asset; and
 - iv. Support for operations and functionality for the TSTS occupants;
- j) Fire alarm system;

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- k) Data centre power supply and fit-up;
- l) Integrated security systems which reflect physical security zones and requirements in accordance with Project Brief sections 4.3.4.3;
- m) IT and audio-visual systems/components in accordance with Project Brief sections 4.3.4.4 and 4.3.4.5;
- n) Duct bank entry for inter-building connectivity to be undertaken concurrently with or after the construction stage by NRC or their agents;
- o) Sustainability performance design requirements;
- p) Energy efficient lighting per space;
- q) Site and Site security lighting;
- r) Building lighting that limit glare and flicker, maximize color rendering, integrate and circadian lighting where appropriate, and integrate with daylight harvesting where possible;
- s) Intelligent building automation systems and subsystems with:
 - i. Workstations, networking, controllers, and smart devices listed with [BACNet Testing Laboratories](#);
 - ii. Network security, such as [BACNet Secure](#), with encryption between devices;
 - iii. Intelligent controllers residing at room level, use of with dimming where appropriate, complete, with dedicated controllers per piece of science/laboratory equipment (e.g., lighting) capable of all necessary control functions, including:
 - 1. Management switches, at least 3 layers;
 - 2. All input/output points for each piece of equipment or full system residing on the same physical controller, thus the network cannot combine input/output points for any piece of equipment or any system;
 - 3. Fully programmable, [BACNet Testing Laboratories](#) certified, controllers with at least 33% spare capacity for all input/output control points; and
 - 4. Renewable energy and energy storage systems;
 - iv. Smart building and zone metering and submetering, with:
 - 1. Adequate flexibility to support wide fluctuations of loads (i.e., a high diversity factor); and
 - 2. Ability to undertake virtual calculations for power usage;
- t) Intelligent building automation systems and subsystems with multiple localized supervisory functions are forbidden; and
- s) All applicable investigations and enabling projects.

4.3.10 Vertical Transportation

The scope includes:

- a) At a minimum, two passenger and one freight elevator, as required by the NBCC.

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4.3.11 Commissioning

The scope includes:

- a) BIM enhanced commissioning of the building components, systems and integrated systems in accordance with the [PWGSC Commissioning Policy](#), its related guidelines and manual, the CSA Z320 (R2016) Commissioning Standard, ASHRAE 202-18, and the CAN/ULC S-1001-11-R2018 standard – INTEGRATED SYSTEMS TESTING OF FIRE PROTECTION AND LIFE SAFETY SYSTEMS;
- b) Due consideration and integration of the operating requirements developed over the life of the Project, as detailed in Project Brief section 4.1.4 and subsequent sections of the Project Brief for:
 - i. Architectural systems including building envelope and interior assemblies;
 - ii. All electrical systems;
 - iii. All IT, AV, and ISS systems;
 - iv. All mechanical systems; and
 - v. All control systems, including multi-system integration commissioning;
- c) For the Consultant, as the design authority:
 - i. Retaining a 3rd party commissioning Specialist Consultant (independent from the Design Team design disciplines);
 - ii. Develop and maintain the owners Project requirements (OPR), in accordance with ASHRAE 202-18, including requirements defined by the GEICs so that all OPRs are consolidated into one document;
 - iii. Defining a comprehensive, integrated, well managed commissioning plan (processes) with clear and documented performance requirements per component, system and integrated system, which includes all commissioning processes and requirements defined by the GEICs so that there is one consolidated and comprehensive commissioning plan for the Project;
 - iv. Defining future maintenance management equipment identification and reporting requirements;
 - v. Witnessing, validating, and certifying of actual performance achieved on-Site or off-Site, in accordance with the commissioning plan;
 - vi. Paying particular attention to systems commissioning to confirm 100% success, as intended, before starting final integrated systems commissioning;
 - vii. Providing operational training concerning the design intent/rationale for each system, explaining “why” a component/ system was or was or not selected. The training scope also includes an overview of the operational intent of all systems as the input to the design and the performance verification rationale for commissioning, including sustainable features and strategies and resulting implications for building performance and TSTS occupants (“what” are the changes and “how” and “why” were they decided), lessons learned, and final sustainability certification achieved;
 - viii. Development of Project-specific standard operating procedures per building system;
 - ix. Recording as-commissioned performance in the as-built (record) Model as well as standard operating procedures, maintenance schedules, and warranties;

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- d) For the Construction Manager, as the construction authority:
 - i. Providing input to commissioning requirements to confirm their reasonableness and the requirements are commissionable;
 - ii. After successful component start-up, undertaking detailed performance testing on-Site or off-Site as prescribed and recording the performance results;
 - iii. Retesting as required to achieve specified performance;
 - iv. Providing operational training concerning “what” each component/system is, “how” it works, and “how to troubleshoot and/or maintain it;
- e) Undertaking integrated systems commissioning twice: the first instance as a condition of Substantial Performance; the second instance just prior to handover to Canada;
- f) Undertaking seasonal commissioning and related activities as prescribed in the commissioning plan and update of the Model to reflect component/system changes and revised operating requirements; and
- g) All applicable investigations and enabling projects.

4.3.12 Cost

4.3.12.1 Design Team’s Scope

The Design Team’s Cost scope includes:

- a) Developing, maintaining and updating a work breakdown structure (WBS) to at least five levels for each of the Project’s two major Cost centre and their scope elements, sub-elements and Work activities;
- b) Undertaking ongoing Cost analysis and developing elemental Cost estimates in [ASTM E1557, UNIFORMAT II](#) and annual cash flows for the entire Project scope at 50% and 100% SD, and 50% and 100% DD, according to the approved WBS identified in subparagraph a), including all enabling projects and incorporating estimates from the GEICs to give an holistic Cost estimate;
- c) Developing Costs related to Project Brief section 4.1.4.1–Preliminary Building Management Plan as detailed in the Project Brief sections for Commissioning and Property Management: 11.14, 12.3.11, 13.2.11, 14.3.12;
- d) Developing full LCA economic Cost analysis in accordance with Project Brief sections 4.1.4.3-Life-Cycle Cost Analysis and paragraphs e) and h) of Project Brief 4.3.5–Sustainable Design, including development of discounted cash flows and sensitivity analysis. In advance of performing each LCA, confirm with the DR the LCA methodology(ies), calculation format, and all assumptions (e.g., escalation and discount rates, component repair/replacement frequency);
- e) Developing a comprehensive LCCA for all SD options and DD enhanced and enriched sustainable design options, in accordance with Project Brief sections 4.1.4.3-Life-Cycle Cost Analysis and paragraphs g) and h) of Project Brief 4.3.5–Sustainable Design, including development of discounted cash flows and sensitivity analysis. In advance of performing each LCCA, confirm with the DR the LCCA methodology(ies), calculation format, and all assumptions (e.g., escalation and discount rates, component repair/replacement frequency);
- f) Developing iterative Cost estimates for each of the estimated 45 DPs, each 50%, 90%, and 100% design submissions, excluding DPs by the GEICs;

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- g) Reconciling each estimate with independent estimates from PWGSC's 3rd party cost consultant and, when hired, the CM;
- h) Per estimate, preparing a reconciliation report which identifies the necessary follow-up activities, the person(s) responsible, and timelines to complete said activities;
- i) Determining and monthly reporting on the percentage complete of Design Team activities through all Project stages, linking this information (resource demand) with the Consultant's monthly resource-loaded schedule;
- j) Cost support to the Consultant's ongoing risk management planning and implementation, as per Project Brief sections 10.2.1.5–Risk Management Planning and 10.3.1–CMP Services and Deliverables;
- k) Preparing for, participating in, and providing Cost analysis related to each monthly Project control workshop, each value engineering workshop, and each risk management and lessons learned workshop, as detailed in paragraphs e), f), and g) of Project Brief section 10.1.1.5–Workshops.

4.3.12.2 CM's Scope

The CM's Cost scope includes:

- a) Review, understand, incorporate, and use the Design Team's defined WBS dictionary for each of the Project's two major Cost centre and their scope elements, sub-elements and Work activities—at least five activity levels;
- b) Undertaking ongoing Cost analysis and developing elemental Cost estimates in [ASTM E1557](#), [UNIFORMAT II](#) and annual cash flows for the entire Project scope at 100% SD, and 50% and 100% DD, according to the approved WBS identified in subparagraph a), including all enabling projects;
- c) Providing related Cost analysis and reporting for all parts of the Work; and
- d) Determining and monthly reporting on the percentage complete of the CM's services and work activities through all Project stages, linking this information (resource demand, plant, material, and equipment, and subcontracts) with the CM's monthly resource-loaded schedule.

4.4 Scope Exclusions

The following items are excluded from the scope and Cost of the Project:

- a) Reconfiguration of lands and buildings in the NRC Campus other than those affected by the work of the Project;
- b) Enabling Works
- c) Demolition or adaptation for future requirements of current/existing TSTS occupant office and laboratory spaces;
- d) Disposal of unwanted existing FF&E, laboratory/scientific equipment, Connectivity components, office goods, etc. located at any existing TSTS occupant location;
- e) Parking beyond 27 spaces and temporary parking for government officials and employees;
- f) Building envelope blast and ballistic resistance;
- g) The TSTS occupants' business continuity planning and operations;
- h) Temporary or permanent accommodation of the TSTS occupants;

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- i) New maintenance contracts and ongoing building operations after handover to Canada;
- j) Interbuilding connectivity other than what is required by building and fire code or expressly identified in this Project Brief;
- k) Move planning and moving of TSTS occupants' ongoing experiments and/or biological products; and
- l) Day-to-day office equipment, as well as operational and security requirements after handover to Canada (i.e., personal computers, network computer and servers, wheel chairs, emergency evacuation chairs, defibrillators).

5 CHALLENGES

The Consultant is to consider and proactively work with Project Team members to resolve Project management and implementation challenges. Other challenges will inevitably arise throughout the Contract. The Consultant is required to provide active and ongoing management of Project challenges and those implicated in the Project Team.

5.1 Project Management Challenges

The Design Team is to consider that:

- a) Aggressive Schedule: Implementation of the Project will require an aggressive design schedule, with concurrent DP streams and construction;
- b) Design Decisions: Key design decisions during the SD and DD stages, based on life cycle assessment and life-cycle Cost analysis, are required to allow the design to proceed in order to meet the Project schedule;
- c) Level of Effort: Ongoing project management of all the Consultant's resources, Sub-Consultants, and Specialist Consultants is required to design and deliver this Project;
- d) Collaboration: Constant communication between the DR, TSTS occupants, GEICs, Design Team and CM are essential to realize efficiencies, minimize disruption, and overcome resistance to change.
- e) Understanding: TSTS occupants have varying levels of experience with real property design and construction and their requirement to provide design decisions for their programmatic requirements.

5.2 Implementation Challenges

The Design Team is to consider that:

- a) Access to existing, occupied facilities to perform investigation work to advance the design requires detailed planning and advance notification. Destructive testing, if required, is to be constantly overseen and undertaken in a manner to maintain the NCR Campus operating environment. Investigations that are disruptive to the NCR Campus are to be completed during off-hours or weekends;
- b) Municipal, provincial, or federal priorities change over time, which could impact the Design Team's level of effort and approvals;
- c) NCC reviews/approvals are demanding, each requiring a unique, detailed and focused presentation by a highly-experienced, well-prepared design expert; and
- d) The identity and reputation of PWGSC is paramount as the Project will be scrutinized by the public and media. The management and implementation of Projects has the potential to undermine the reputation of PWGSC. Specific risks the Design Team, GEICs, and the CM need to consider in Project planning, development, delivery and ongoing coordination by the DR are:
 - i. How the natural environment is managed and cared for;

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- ii. How persons accessing and entering a Site are cared for in accordance with health, safety, security and accessibility;
- iii. How Cost efficiencies are integrated over the short-term and long-term for the better post-construction operation and management of the TSTS; and
- iv. How employee and public access to and use of the Project Site will be controlled.

6 CONSULTANT SERVICES

The Consultant is required to provide the integrated Services listed below. The Consultant's discipline resources may have the necessary qualifications and expertise to fulfill more than one role.

6.1 Architectural Services

- a) General architecture;
- b) Landscape architecture;
- c) Interior design; and
- d) Functional and building programming.

6.2 Engineering Services

- a) Civil/Municipal;
- b) Structural/Seismic;
- c) Mechanical; and
- d) Electrical.

6.3 Specialist Consultant Services

- a) Program and project management specialist(s) whose role will be to manage, coordinate and direct the Design Team, with experience in design and construction management of large projects (i.e., greater than \$100M in construction cost);
- b) Building code, life safety and fire protection, and accessibility specialist(s);
- c) Laboratory design and programming specialist;
- d) Building Information Modelling (BIM) specialist(s) with experience in 6D BIM (sustainability and energy Modelling analysis) and 7D BIM (facility management information);
- e) Building science specialist(s);
- f) Security specialist(s), both physical and electronic systems, with experience in:
 - i. Defining facility-wide design, construction, organizational and operational requirements and processes for high-security facilities;
 - ii. The design, construction, and operation of central command centres;
 - iii. Facility-wide biometric data systems with biometric recognition/identification (i.e., physiological and behavioural technologies, etc.); and
 - iv. Site and building-wide access control and surveillance systems;

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- g) Information Technology (IT) specialist(s) with experience in the design and construction data centres and facility-wide secure computer systems and networks;
- h) Audio-visual specialist(s) with significant experience in:
 - i. The design and construction of high-technology-related facilities (i.e., 3 to 5 projects each with an AV budget valued at \$1 million CAD or greater),
 - ii. The design and construction of a conference rooms and public assembly spaces; and
 - iii. Defining requirements for and leading architectural teams in the integration of audio-visual requirements which include, but are not limited to,
 - 1. Internet protocol television distribution (IPTV);
 - 2. Unified communication systems (e.g., MS Teams, etc.); and
 - 3. Local area network configuration and implementation;
- i) Sustainable design specialist(s) (i.e., certified professional(s) with a valid LEED AP or equivalent industry recognized professional accreditation) with experience in:
 - i. Defining, coordinating, and documenting high sustainable performance for buildings and sites;
 - ii. Net-zero-energy and neutral carbon design;
 - iii. Smart laboratory solutions;
 - iv. Evaluation of design solution for embodied energy and embodied carbon using life cycle assessment;
 - v. Evaluation of design solutions on occupant health, well-being, and productivity; and
 - vi. Construction and industry-recognized green building certification requirements;
- j) Intelligent building systems specialist(s) with experience in smart laboratory/building design and operation;
- k) Air flow Modelling, zonal Modelling, computational fluid dynamics Modelling/analysis, wind dispersion modelling, and energy simulation Modelling specialist(s) with experience in zero net energy building design and construction;
- l) Signage and way finding specialist(s);
- m) Vertical transportation specialist(s);
- n) Transportation and traffic specialist(s);
- o) Property/asset management specialist(s) with management experience in developing whole-facility operating budgets and establishing operations teams and maintenance contracts. The property/asset management specialist is independent from the third-party commissioning specialist;
- p) Dedicated commissioning specialist(s) with experience in development and execution of enhanced, whole-facility commissioning plans for projects of a similar scale, which include architectural, building envelope, engineering, and who's firm and personnel

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mandates for this Project do not include the design of building systems;

- q) Acoustics specialist(s) with acoustic design, construction and measurement experience for speech security and speech intelligibility in executive offices, boardrooms and meeting rooms, hard-surface halls and auditorium-type assemblies;
- r) Industrial engineering/material handling specialist(s) with experience in optimizing complex processes and systems involved in the short-distance movement of goods within the confines a building and a transportation vehicle, creating systems which coordinate the useful use of equipment and people; and
- s) Professional Quantity Surveyor(s) with experience in developing estimates for complex laboratory and scientific components and systems, undertaking whole-building life-cycle assessment, and undertaking building component-based life-cycle Cost analysis.
- t) Industrial Hygiene specialist

7 PROJECT TEAM ORGANIZATION

The Project Team is to manage and implement the Project in a collaborative manner. All members of the Project Team are required to work cooperatively at every phase of the design and construction process to provide a successful Project outcome.

All team members are responsible for establishing and maintaining a professional and cordial relationship.

7.1 Science Partners and PWGSC

7.1.1 Science Partners

The NRC and TSB will each assign a senior resource responsible for the coordination of occupancy planning, functional programming (office, physical security, IT/AV/ISS, etc.), design review, construction review, FF&E and Connectivity requirements, and move management.

These individuals are the single point of contact responsible for all internal management and communication for the Project within their organization.

As noted earlier, the TSB is the technical authority over their IT systems.

7.1.2 PWGSC Senior Management

The LC Office Director and Director General for implementation are accountable for the expenditure of public funds and the delivery of this Project. The LC Office Director General reports to the LC Program Board, a body of Assistant Deputy Ministers from federal science departments/agencies and PWGSC.

7.1.3 Departmental Representative

The LC Office Senior Project Manager is the Departmental Representative for the Consultant's Contract and the CM's contract. The Senior Project Manager is accountable to the LC Office Director General for the management of the Project and its implementation.

7.1.4 PWGSC Design Manager

The PWGSC Design Manager leads a team of internal technical resources which includes a broad range of professional disciplines, subject matter experts, and the PWGSC Commissioning Manager.

The design management team provides expert advice on coordination and quality assurance for architectural, engineering, interior design, and subject matter experts, including design reviews, to confirm technical requirements are suitably defined and incorporated through all phases of the Project. The Commissioning Manager will oversee and validate all commissioning activities undertaken by the Design Team and CM.

7.2 Advocate Consultant Team

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LC's advocate consultant team, FRAMEWORK, will review design and provide comments on each PD, SD and DD submission by the Design Team. FRAMEWORK may also participate in post-construction evaluation of the Project.

7.3 PWGSC's GEICs, Land Surveyor, and Other Consultants/Contractors

PWGSC will retain a geotechnical and environmental engineering firm, , a land surveying firm, and other design consultants and contractors to provide the necessary services not in the Consultant's design mandate. The Consultant and the CM are required to provide all necessary coordination and integration of the findings and requirements of PWGSC's consultants at every stage of the Project.

7.4 Shared Services Canada

Shared Services Canada (SSC), the Government of Canada's common service provider for shared IT systems, is an IT technical authority for IT systems. SSC does not provide common IT services for the TSB. This is currently under review.

SSC, through the DR and the LC Enterprise Planning and Operations office, may provide supplemental IT design requirements and information beyond those defined in the Project Brief section 8—Reference Information. SSC and the LC Enterprise Planning and Operations office will review and comment on all design submissions and review and comment on construction and commissioning activities as they progress.

The supply and installation of IT infrastructure for science facilities will be determined by the DR and the LC Enterprise Planning and Operations office to meet the TSTS occupants' business requirements.

It is expected that SSC will provide all active IT equipment (i.e., servers, routers, switches, telephones, etc.) for day-to-day use by TSTS occupants, as well as all inter-building connectivity not defined/prescribed by the building and fire code or in this Project Brief.

7.5 Project Management Support Services

PWGSC will engage an external project management support services (PMSS) firm to provide Project management and administration support for PWGSC. PMSS personnel report to the DR and will assist in the day-to-day management of the Project. PMSS personnel will operate on the Project as an extension of and part of the DR's responsibilities but do not exercise any financial authority.

7.6 Third-Party Cost Consultant

PWGSC will engage an independent cost management firm to provide support to PWGSC, reporting to the DR. The firm's personnel will operate on the Project as an extension of and part of PWGSC's responsibilities, including as an independent assessment of the Consultant and CM's Services.

This firm will define information formatting and provide review of Cost information prepared by the Consultant and the CM.

7.7 Construction Manager

The CM formally reports to the DR. The CM will discuss technical matters with the Design Team and the DR. The CM will be part of the integrated Project Team and participate in meetings and workshops, provide Cost,

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time and risk analysis, bid-ability and constructability advice, and provide recommendations for construction phasing and DPs content and sequencing. The CM will also:

- a) Provide technical support, services and work to PWGSC in accordance with the terms and conditions of the CM's contract;
- b) Lead the construction team composed of its own forces and all subcontractors and suppliers retained by the CM;
- c) Act as constructor in charge of the construction Site(s);
- d) Establish and enforce Site health and safety rules for all individuals working on the Site, including members of the Project Team;
- e) Confirm that all individuals, before gaining access to the Site, participate in a Site training and orientation program;
- f) Provide all necessary personnel to perform the services and duties for the Project, either by assignment of CM qualified staff or by engagement of services contracted directly by the CM;
- g) Provide continuity of personnel and maintain a dedicated working team for the life of the Project(s);
- h) Receive and review all Project related documentation provided by the DR and update all future CM deliverables related to scope, budget, and schedule;
- i) Provide ongoing Cost, time, risk, procurement, administrative, and security services;
- j) Work constructively supporting and enhancing a collaborative and cooperative team approach with knowledgeable and timely input and contribution to all Project Team members;
- k) In cooperation with the Design Team, confirm at all times the design solution and construction are maintained within the accepted Construction Cost Estimate for the Project;
- l) In cooperation with the Design Team, confirm at all times the design solution and construction can, and is, undertaken within the fixed schedule objectives of the Project;
- m) Provide ongoing design management services and, when requested by the DR, design-assist services; and
- n) Organize and attend meetings and workshops with Project Team members or, as needed, separate meetings with the DR.

7.8 Consultant

The Consultant is required to:

- a) Discuss technical matters with the DR and the Construction Manager;
- b) Provide technical support and Services to PWGSC as prescribed in this Project Brief and in accordance with the Contract; and

Obtain, or cause to be obtained, all federal, municipal and other government regulatory requirements and approvals necessary for the Project.

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8 REFERENCE INFORMATION

The following information/reports will be provided to the Consultant after Contract award.

Doc #	Title	Author	Date	Pages
001	Master Schedule			
	a. Master Schedule (Full)	PSPC / LC	TBD	TBD
	b. Master Schedule (Roll Up)	PSPC / LC	TBD	TBD
002	Pre-Design Functional Program			
	a. Master Programming Report	Framework	2020-06-05	169
	b. Detailed Functional Programming Report	Framework	2021-05-21	510
	c. Siting Options Analysis Report	Framework	Fall 2021	TBD
	d. TSTS Science Hazard List	Framework	2021-03-11	N/A
	e. TSTS LVA Survey Data	Framework	Fall 2021	N/A
003	Security Documents			
	a. Preliminary Security Requirements (Protected B)	PSPC / LC	2020-07-14	9
	a. Security Space Requirements (Protected B)	PSPC / LC	2019-01-19	4
	b. RDS Security Input Document (Protected B)	PSPC / LC	2021-05-21	N/A
	c. Threat and Risk Assessment Recommendations (Protected B)	PSPC / LC	2021-02-15	5
	d. Security Design Brief (Protected B)	PSPC / LC	2021-10-21	TBD
004	Supplementary Investigations, Reports, and drawings			
	a. Designated Substances Survey – Building M21	Oakhill Environmental Inc.	2011-10	69
	b. Designated Substances Survey – Building M22	Oakhill Environmental Inc.	2009-01	111
	c. TBD Geothermal Report	TBD	Fall 2021	TBD
	d. TBD Site Contamination Report	TBD	Fall 2021	TBD
	e. TBD Environmental Services Report	TBD	Fall 2021	TBD
	f. TBD Survey – Once Final Site Decisions is made	TBD	Fall 2021	TBD
	g. M56 Site Plan with Sewer Sep Phase 1-2-3.dwg	NRC	N/A	N/A
	h. Ottawa North Campus Labs Canada	Annis, O’Sullivan, Vollebakk Ltd.	2012-04	1
	i. Ottawa South Campus Labs Canada	Annis, O’Sullivan, Vollebakk Ltd.	2010-02	1
	j. Building Condition Assessment – M21	NRC	2008-03-10	15
	k. Building Condition Assessment – M22	NRC	2008-03-11	25
005	Repeatable Laboratory Design Framework (RLDF)			
	a. 100% RLDF	PSPC / LC	Fall 2021	TBD
	a. Strategy Document – Universal Accessibility	PSPC / LC	Spring 2021	N/A
	b. Strategy Document – Science Office Accommodations	PSPC / LC	Spring 2021	N/A
	c. Strategy Document – Indigenous Engagement	PSPC / LC	Spring 2021	N/A
	d. Strategy Document – Public Realm	PSPC / LC	Spring 2021	N/A
	e. Strategy Document – Sustainability	PSPC / LC	Spring 2021	N/A

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Doc #	Title	Author	Date	Pages
	f. Strategy Document – Mass Timber	PSPC / LC	Spring 2021	N/A
	g. Strategy Document – DCA QA??	PSPC / LC	Spring 2021	N/A
	h. Strategy Document – Master Planning	PSPC / LC	Spring 2021	N/A
006	a. Project GHG Option Analysis Methodology (Guideline)	PSPC	2020-11-26	11
	b. Federal GHG Accounting and Reporting Guidance	Centre for Greening Government	2019-05	60
	c. Greening Government Strategy: A Government of Canada Directive	Treasury Board of Canada	2021-02	N/A
	d. Greening Government Strategy: Real Property Guidance	Treasury Board of Canada	2019	32
008	GCworkplace Fit-up Standards and Design	PSPC		
	a. GCworkplace Fit-up Standards (updated GCworkplace Fit-up Rates are under development)		2021-March	146
	b. GCworkplace Fit-up Rates: 2017-2018		2018-May	8
	c. GCworkplace Solutions PowerPoint		2020-04-01	97
	d. GCworkplace Design Guide		April 2019	47
	e. Covid-19 & GCworkplace Design		TBD	14
	f. Guidelines for Special Purpose Spaces		2002	4
	g. TSB HO Workpoint Distribution		2020-10-09	2
009	Campus master plan/A & B - Preliminary Report	Griffiths Rankin Cook Architects /NRC	1996-Nov	N/A
018	Memorandum of Understanding - FF&E and Connectivity (DRAFT)	PSPC, S	2020-12-31	33
021	Laboratory Ventilation and Risk Assessment Use Guide	I2SL	2019-02-25	25
037	Federal Sustainable Development Strategy 2019-2022	Environment and Climate Change Canada	2019	135
038	Federal Contaminated Sites Action Plan (FCSAP)	ECCC	2016-06	59
039	Public Services and Procurement Canada's Departmental Sustainable Development Strategy: 2020-2023	PSPC	2020	15
040	Real Property Sustainability Handbook (Provided after award)	PSPC	2021	-
041	Real Property Baseline Greening Commitments	PSPC	2021-02-25	4
044	NCC Federal Land Use, Design and Transaction Approval Process	NCC	2016-01-19	3
047	Guide for the Management of Archaeological Resources	NCC	2008-Feb	31
048	NCC Canada's Capital Views Protection	NCC	2007-Nov	153
049	New Tools for View Controls in Canada's Capital	Queens University, NCC	2016-Dec	76
050	PSPC RPS NPMS Technical Guides	PSPC		
	a. Accessibility		2019-04-11	4
	b. Computer Aided Drafting and Design Standard		2017-11	67
	c. Commissioning		2019-11-06	5
	1) Commissioning Standard: PWGSC 2015		2015-08-11	8
	d. GCworkplace Fit-Up Standards		-	6
	e. Heritage		2013-01-09	13
	f. Architecture and Engineering			
	1) Technical reference for Office Building Design		2017-07-20	85

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Doc #	Title	Author	Date	Pages
	2) Mechanical Design 15000-2012 Mechanical Environmental Standards for Federal Office Buildings		2012-02	34
	3) Mechanical Design 15161-2013 Control of Legionella in Mechanical Systems		2016-03	72
	g. Security		2020-05-25	6
	h. Seismic Standard		2019-11-28	6
	1) Seismic Resistance of PWGSC buildings		2018-07-19	9
051	PSPC Asbestos Management Standard	PSPC	2019-06-01	41
054	ASHRAE 202-18 – Commissioning Process for Building & System	ASHRE	2018-01-31	14

9 REQUIRED SERVICES

9.1 General

The Consultant must take into account the preceding sections of the Project Brief in providing the required Services as described in the following Project Brief sections and appendices.

The Consultant, as an expert in matters of design and Cost planning and implementation, must:

- a) Provide comprehensive and continuous design and Cost planning, analysis, management and implementation Services throughout the Contract until the completion of seasonal commissioning activities and the DR has approved/signed the certificate(s) of completion. The Consultant's Services include the review any warranty related call-backs and confirmation of appropriate repairs required after the issuance of the certificate(s) of substantial performance;
- b) Submit deliverables to the DR for review and approval at various intervals as stated within each Project Brief section;
- c) Actively participate with the CM, once hired, and the DR, placing decision making for the Project as the first priority; and
- d) Immediately notify the DR and the Design Team in writing of any potential increases or decreases in the scope of work that could affect the ability to meet the Project objectives.

All plans and reports, or their updates, as indicated in Project Brief section 10–ADMINISTRATION and MANAGEMENT SERVICES must accompany each invoice for Services rendered for the period in question. The invoice will not be due and payable until the duly completed monthly report, in accordance with Project Brief section 10.1.6, is submitted to the DR.

10 ADMINISTRATION and MANAGEMENT SERVICES

The following Services are required for the duration of the Contract.

10.1 Administration Services

10.1.1 Meetings and Workshops

Meetings, workshops and presentations all require advance preparation and follow-up actions by the Consultant, GEICs, and the CM. In summary:

- a) Project and design meetings must take place at the LC office located at Ottawa, Ontario, as agreed by the DR;
- b) Construction and commissioning meetings may take place at the LC office or at the Site, as agreed by the DR; and
- c) All workshops and presentations must take place at the LC office in the Ottawa, as agreed by the DR.

Meetings and workshops will occur in accordance with Project Brief section 10.1.1.6–Frequency of Meetings and Workshops.

10.1.1.1 Project Meetings

The Consultant must co-chair Project meetings with the DR to review and discuss the overall Project and the activities of the Project Team(s).

The Consultant must prepare and deliver the agenda, notice to invitees and minutes. The Consultant must issue draft meeting minutes within 2 Working Days of meeting. The Consultant must create and maintain a database of action items and issues and this database forms part of the Consultant's risk management Services. The Consultant must include the top five risks from this database with the draft minutes of each meeting.

Attendance at these meetings will vary in accordance with the stage of the Project and includes the Consultant, the GEICs, CM, DR and other Project Team members or Design Team members as required and according to the work/issues in question. The CM will prepare, in advance, issues relevant to the CM's delivery of its services, construction services, and work.

The purpose of these meetings is to:

- a) Monitor the overall Project progress against Project objectives;
- b) Monitor Project progress against the approved scope, Construction Cost Estimate, cash flow and prioritized construction schedule;
- c) Assess design and construction productivity against agreed on performance requirements;
- d) Confirm clear communication between all participants; and
- e) Identify opportunities or issues, assigning responsible individuals and dates for resolution.

10.1.1.2 Design Meetings

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The Consultant must co-chair Project design meetings with the DR to review and discuss the activities of the Design Team.

The Consultant must prepare and deliver the agenda, notice to invitees and minutes. The Consultant must issue draft meeting minutes within 2 Working Days of meeting. The Consultant must create and maintain a database of action items and issues and this database forms part of the Consultant's risk management Services. The Consultant must include the top five risks from this database with the draft minutes of each meeting.

Attendance at these meetings will vary in accordance with the stage of Project design and usually include the Consultant, GEICs, DR, CM, PWGSC's Design Manager or subject matter experts, or any entity or person contracted or employed by the Consultant for the specific Services as identified by the Consultant and according to the matter in question. The CM will prepare in advance of each meeting to discuss in an open manner all Project related matters that affect the CM's ability to support the design development and design reviews.

The purpose of these meetings is to:

- a) Monitor design progress against the approved scope and Construction Cost Estimate, and construction schedule;
- b) Confirm clear and efficient communication between all participants;
- c) Confirm effective design and DP prioritization and coordination;
- d) Identify opportunities or problem issues, assigning responsible individuals and dates for resolution; and
- e) Confirm effective quality management, including integration of approval body requirements.

10.1.1.3 Construction and Commissioning Meetings

The CM will chair Project construction and commissioning meetings during the construction stage of the Project.

The CM will prepare and deliver the agenda, notice to invitees and minutes. The CM will issue the draft meeting minutes within 2 Working Days.

The CM will create and maintain a database of action items and issues. This database forms part of the CM's risk management services. The top five risks from this database are to accompany the draft minutes of each meeting.

Attendance at these meetings will vary in accordance with the stage of Project construction and usually include the Consultant, GEICs, DR, CM, other Project Team members if required, or any entity or person contracted or employed by the Consultant or CM for the specific matter in question.

The purpose of these meetings is to:

- a) Monitor the progress and administration of the prioritized construction against the approved Project scope, Construction Cost Estimate and construction schedule;
- b) Confirm efficient communication between all participants;
- c) Confirm effective construction coordination with Site and building operations;
- d) Confirm effective and efficient Site coordination of all design disciplines and subcontractors and suppliers;

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- e) Identify opportunities or problem issues, assigning responsible individuals and dates for resolution; and
- f) Confirm effective quality management.

10.1.1.4 Design Submission Presentations

For each 100% SD and DD submission, the Consultant must co-chair submission meetings with the DR and make a formal presentation to the LC Office, Hub Management Office the science departments/agencies, and the LC Program Board.

The Consultant must conduct dry-run presentations to the LC Office to gather feedback and fine-tune their NCC ACPDR presentations, as indicated in sub-section c) of Project Brief APPENDIX D – PROCESS MAPS.

Submission meetings/presentations will take place at LC Ottawa office and include the Consultant and design disciplines relevant to the presentation, the DR and other Project Team members.

10.1.1.5 Workshops

Various workshops will occur throughout the Contract, tailored to the stage of Project development. Project control workshops will occur routinely throughout the Contract. The Consultant must attend these workshops with the CM, once hired, and DR and be able to discuss in an open manner Project matters that affect DPs and delivery of the Project. Workshops include, but are not limited to:

- a) Subject Matter Workshops: These workshops for technical design matters and Project challenges are required at 50% SD, 90% SD, 50% DD, 90% DD, and at other stages of the Project, as required by the DR. Individual subject matter specific workshops are to be held either just before or just after the SD and DD submission, as agreed by the DR. The Consultant must issue draft workshop minutes within 2 Working Days of each workshop, update the database containing action items and issues, and append the top five risks identified at the workshop to the draft workshop minutes. Individual subject matter workshops include:
 - i. Landscape architecture;
 - ii. Security (physical and ISS technologies), vehicle circulation, etc.;
 - iii. Mechanical and laboratory systems;
 - iv. Electrical systems;
 - v. Structural, seismic, and geotechnical systems;
 - vi. Information and audio-visual technologies;
 - vii. Architecture and interior design;
 - viii. Sustainability; and
 - ix. Model quality and coordination;
- b) Functional Program and Security Workshops: These workshops identify the functional, operational, and security requirements of TSTS occupants, and their long-term operational requirements, as outlined in the Pre-Design, SD and DD sections of this Project Brief. The Consultant must chair these workshops and issue workshop draft minutes within 2 Working Days of each workshop.
- c) FF&E Workshops: These workshops are for TSTS occupants to work through their detailed space, fit-up, laboratory and scientific requirements with the Design Team. These workshops will be held

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during the SD, DD, and DP phases of Projects. The Consultant must chair these workshops and issue draft workshop minutes within 2 Working Days of each workshop. During these workshops, the Consultant may choose to address several of the following topics:

- i. Commercially available FF&E;
 - ii. Custom furniture and laboratory/scientific casework, systems, and equipment;
 - iii. Connectivity integration within millwork and FF&E;
 - iv. Office, laboratory and scientific equipment relocation and move sequencing;
 - v. Procurement, delivery, and installation requirements; and
 - vi. Mock-ups;
- d) Constructability Workshops: These workshops are for construction related matters as they relate to the design progress or Site conditions. The Design Team disciplines and GEICs relevant to the discussion topics must attend these workshops. Workshop discussion points could include materials selection, work sequencing, temporary roadways, design prioritization, design completion status, design coordination, tender-ability, tender sequencing, or other matters that could influence the ability to build the work. Depending on timing and subject-matter importance, these workshops may be combined with DD, and DP submission review workshops, identified in section b) of Project Brief APPENDIX D–PROCESS MAPS.

The CM will chair and take a leading role in conducting these workshops, which forms part of the CM's design management services. The CM will prepare and deliver the workshop agenda, notice to invites and minutes. The CM will issue draft workshop minutes within 2 Working Days of workshop, update the database containing action items and issues, and append the top five risks identified at the workshop to the draft workshop minutes;

- e) Project Control Workshops: These workshops address Project control matters (Cost, schedule, risk and implementation). The primary workshop objectives are to:
- i. Promote open discussion of Project control issues between the Design Team, as applicable the GEICs, and the CM;
 - ii. Confirm the Design Team and CM have the same basis of understanding for Project Cost elements (inclusions, exclusions, assumptions, and basis of costing), schedule activities (design and construction), activity durations, and Float use and allocation;
 - iii. Determine and update responsibilities, scope, related matrices, and workflow for delegated design and materials testing, inspections, and surveying; and
 - iv. Re-review and openly discuss the time, Cost, risk and design management Services of the Design Team, CM, DR, and the PWGSC's cost consultant.

The Design Team must attend these workshops and chair these meetings until the CM is hired. When the CM is hired, the CM will chair and take a leading role in conducting these workshops, which forms part of the CM's cost and time management services. As applicable, the Design Team and the CM will prepare and deliver the workshop agenda, notice to invites and minutes. As applicable, the Design Team and the CM will issue draft workshop minutes within 2 Working Days of workshop, update the database containing action items and issues, and append the top five risks identified at the workshop to the draft workshop minutes;

- f) Risk Management and Lessons Learned Workshops: These workshops are to address program and Project related risks and provide a forum for ongoing learning and improvement of PWGSC's project

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delivery processes. The DR will chair and organize these workshops, prepare and deliver the workshop agenda, notice to invitees and minutes. The Design Team, GEICs, and CM must actively participate at these workshops. Workshops will typically be a one-half Working Day and may be combined with other meetings or workshops. Workshop discussion topics may include topics such as short, mid and long-term opportunities and risks, the cumulative effect of opportunities and risk, lessons learned at different Project stages, and ways to reduce or eliminate workflow processes;

- g) Value Engineering (or target value) Workshops: These workshops are to address complex matters related to excessive Project Cost or time and related complex technical issues. The goal of these (potentially multi-day) workshops is to find alternative ways or means of obtaining value-for-money, while respecting the general intent of the Project scope. The Consultant must chair these workshops, prepare and deliver the workshop agenda, notice to invitees and issue draft workshop minutes within 2 Working Days of each workshop. The Design Team, GEICs, and CM, once hired, must actively participate at these workshops. The length of these workshops will be determined on a case-by-case basis but are usually one Working Day per workshop, as identified in section a) of Project Brief APPENDIX D–PROCESS MAPS;
- h) Partnering Workshops: These workshops occur at the start of the Project and again during construction to provide a forum for meeting all Project Team stakeholders, understanding their objectives and concerns, and establishing agreed Project Team values. The DR will chair and organize these workshops, prepare and deliver the workshop agenda, notice to invitees and minutes. The Design Team, GEICs, and CM, once hired, must actively participate at these workshops. Workshops will typically be a one-half Working Day; and
- i) Handover Workshops: The Design Team and CM must actively participate in these bi-weekly workshops to organize the smooth transition of the Project to the TSTS occupants. These workshops will start six months in advance of handover to Canada and continue as needed until full occupancy is reached. The DR will chair these workshops, prepare and deliver the workshop agenda, notice to invitees and issue workshop minutes within 2 Working Days of each workshop.

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10.1.1.6 Frequency of Meetings and Workshops

	Pre-design stage	SD stage	DD stage	DP stage	Construction and commissioning stages
Meetings or Presentations:					
Project	Monthly				
Design	Weekly				Until all DPs are awarded
Construction and commissioning	None			Every two weeks until Project completion	
Design submission presentations	None	≥4	≥4	As required	
Workshops:					
Subject Matter Specific	As required	At 50% & 90% submissions	At 50% & 90% submissions	To be determined	
Functional Program	As required	15	5	None	
FF&E, security & Connectivity	As required	5	5	Every FF&E, security & Connectivity DP	As required
Constructability	None		Monthly	Every Base-Building DP	As required
Project Control	Monthly				
Risk Management and Lessons Learned	Every 4 months				
Value Engineering	None	At 50% & 90% submissions	At 50% & 90% submissions	None	
Partnering	1	None			1
Handover	None				Bi-weekly starting 6 months before handover to Canada

10.1.2 Response Time

The Design Team must be available to attend meetings or respond to inquiries within one-half Working Day, or within a timeframe agreeable to the DR.

10.1.3 Media

The Design Team and any entity or person contracted or employed by the Design Team must abide by the non-disclosure clause in the Contract.

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10.1.4 Security of Information

Refer to PWGSC's supply manual clause 2035, Confidentiality (<https://buyandsell.gc.ca/policy-and-guidelines/standard-acquisition-clauses-and-conditions-manual/3/2035/18#confidentiality>).

Except as they relate to the direct provisions of Services and work under this Contract, the Design Team and any entity or person contracted by or employed by the Design Team are forbidden to discuss issues pertaining to the Project, including, but not limited to, a Project layout, design, content and security provisions.

The Design Team must take all necessary steps to confirm that documents and records, or any information, are not copied, provided to, discussed, or disclosed in any manner whatsoever, to any person or entity, other than PWGSC personnel possessing the appropriate security level and authorization, unless expressly authorized by the DR.

If a third-party information-sharing or collaboration system, such as BIM360, etc., is used for Project-related information, protected B and classified information is prohibited from being posted on said systems.

10.1.5 Official Languages

The Contract requires Services in both official languages. Communication between Canada and the Design Team shall be in the language of choice of the Design Team, which shall be deemed to be the language of the Design Team's bid. During the planning and implementation of the Work, the Design Team must provide all communication with external stakeholders, including but not limited to authorities having jurisdictions, in both official languages (English/French) unless otherwise approved in advance by the Department Representative.

The Design Team must provide deliverables produced in both official languages to a professional standard and be responsible for the translation accuracy, completeness and consistency unless otherwise approved in advance by the Department Representative. Both languages are considered equal in status, that is, neither is considered to be of lesser standing because it is a translation of the other.

10.1.6 Monthly Reports

The Consultant must prepare and submit for review by the DR a sample of the Consultant's report structure following the requirements described in Project Brief section 10.1.10–Contract Deliverables. If requested by the DR, the Consultant must revise the reporting structure within 5 Working Days of receipt of the DR's comments. The Consultant must use the reporting structure approved by the DR for monthly reporting to the DR. As the Project progresses, the Consultant must revise the reporting structure if requested by and to the approval of the DR.

The Consultant must compile and submit monthly reports at fixed submission dates as agreed between the Consultant and the DR. Sub-elements of the Consultant's monthly report may be staggered in time as mutually agreed between the Consultant and DR. Monthly reports must align with the approved reporting

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structure and provide progress updates over the review period and challenges foreseen in the upcoming reporting period.

The Consultant's monthly report must include:

- a) A summary of monthly invoicing for the period since the last monthly report, which includes:
 - i. A detailed breakdown of monthly invoicing aligned with the approved WBS and indicating the percentage complete of Design Team activities:
 - 1. By Project stage (i.e., PD, SD, DD, DPs, Tendering, Site Services, and Post-Construction), per major Cost centre, and itemized by Subconsultant and Specialist Consultant; and
 - 2. Inclusive of authorized Contract amendments and disbursements;
 - ii. A summary of all Contract amendments;
 - iii. A forecast of Design Team Services:
 - 1. In detail to the end of the PWGSC's fiscal year (March 31), with a forecast accuracy of +/- 5 % by November 30th of each year; and
 - 2. Annually to completion of the Contract;
 - iv. A detailed narrative explaining the fee and construction expenditures to date and those forecasted for the upcoming quarter, and each remaining year to Contract completion, including all inclusions, exclusions, assumptions and analysis considered;
- b) A current copy of the Project Brief section 10.1.6.1–Decision Log and Project Brief section 10.1.6.2–Issues Log;
- c) An updated IPP, on a quarterly basis, in accordance with Project Brief sections 10.1.9–Indigenous Participation Plan Reporting and 10.1.11–Deliverables–Administration Services;
- d) A section or sections for deliverables in accordance with Project Brief sections 10.2.1.7–CMP Deliverables, 10.3.1–CMP Services and Deliverables, and 10.2.2.3–BXP Deliverables;
- e) A section or sections for deliverables in accordance with Project Brief section 10.3–IMPLEMENTATION SERVICES;
- f) A section or sections to summarize the status of deliverables and challenges thereto as indicated in Project Brief sections 11–PRE-DESIGN SERVICES to and including section 17–POST-CONSTRUCTION SERVICES.

The delivery of a compliant monthly report is a pre-requisite for invoice payment, in accordance with the Contract GC5, "Terms of Payment – Architectural and/or Engineering Services".

10.1.6.1 Decision Log

The Consultant must:

- i. Develop and update on an ongoing basis a separate decision log for the Project, recording participants, date and place of all decisions affecting Baseline parameters: scope, schedule, Cost, and quality;

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- ii. Include in the decision log a summary of all post-SD changes with explanation of why the change was necessary, who and when each change was requested, and who and when each change was authorized; and
- iii. Include the decision log with the Consultant's monthly report.

10.1.6.2 Issues Log

The Consultant must develop and update on an ongoing basis a separate 'issues' log for the Project. The issues log may be linked to meeting and workshop minutes or be a separate list (database), but must follow the principles/approach for triage and tracking similar to submittals and requests for information (RFIs), in accordance with paragraph e) iii) of Project Brief section 16.2–General Services.

The Consultant's issues log must document:

- a) The specific issue(s) related to design, workshop, performance requirements/verification, construction, etc.;
- b) Where and who raised the issue;
- c) What is the priority of the issue;
- d) Who is the issue owner;
- e) When a decision to resolve the issue is required; and
- f) The potential consequences/impacts of delays in decision-making.

High priority issues must be discussed at the appropriate meeting or workshop with a focus to resolve the issue. The Consultant must include the issues log with the Consultant's monthly report.

10.1.7 Security Clearances

10.1.7.1 General

Proper planning and active management are essential for all security screening processes.

The DR will assign a PWGSC Security Officer (SO) who will be the central point of contact for the Consultant security clearances. All personnel employed on this Project will be subject to a security check and must conform to the security requirements stipulated in the Contract. Only personnel with a valid security clearance will be permitted to provide Services for this Project.

The Consultant must have a Corporate Security Officer (CSO) in charge of screening all Design Team personnel. The Consultant's CSO must keep track of all applications, the status/availability of each person and their security clearance application, and follow up as required with the PWGSC SO.

If an applicant has a current valid clearance with PWGSC, the CSO will provide the SO with the applicant's complete name and date of birth.

If an applicant does not already have a valid security clearance, the applicant must complete, sign, and submit the following forms to the SO:

- a) TBS/SCT 330-23 Personal Security Screening Form (<http://www.tbs-sct.gc.ca/tbsf-fsct/330-23-eng.asp>); and
- b) TBS/SCT 330-60 Security Clearance Form (<http://www.tbs-sct.gc.ca/tbsf-fsct/330-60-eng.asp>).

Forms are to be filled out in advance and sent to PWGSC SO in original format. Only after preliminary

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verification of the forms submitted and retained by the PWGSC SO, will the PWGSC SO request security screening of the individual be submitted to Personnel Security Screening Division (PSSD) of the Canadian Industrial Security Directorate (CISD) for processing. If forms are not complete, signed and original (copies, PDFs, or faxes are not permitted) the PWGSC SO will notify the Consultant's CSO in writing.

The Consultant must confirm that it provides sufficient information to permit government authorities to conduct a background inquiry.

10.1.7.2 Finger Printing

New security clearance applications require individuals to provide their fingerprints. The PWGSC SO can take individual's fingerprints at the PWGSC Security Office in the National Capital Region, or as directed by the DR.

Applications for security clearance renewals may or may not require fingerprinting; however, if required would be on a random basis as determined by the PWGSC SO, CISD, or the RCMP.

10.1.7.3 Processing Time

The processing time to obtain a security clearance for reliability or site access is estimated at eight weeks from the time the application (complete with no errors and /or omissions) is received by the SO. For those who will be required to hold a Secret level clearance, this may take approximately three to six months. These timeframes are for applicants who are domestically based and who have not travelled outside of Canada for an extended period. Timeframes for clearances could be considerably longer for non-domestic applicants.

The Consultant must be aware that processing time for applicants with criminal convictions may take longer and could extend to six months or longer depending on the nature of the conviction. An interview with such applicants may be required as part of the security clearance process.

Replacement or substitute personnel must undergo the process identified above.

10.1.7.4 Access to Construction Site

The Design Team must consider that:

- a) The CM will issue a Project security card for those who will access the construction Site(s) with instructions to wear the security card in plain view at all times;
- b) The CM will confirm that only those who have a CM building security card can access the Site;
- c) The CM will check all personnel daily to confirm personnel are wearing their photo ID passes at all times; and
- d) The CM will conduct spot checks. If the Design Team's personnel or any entity or person contracted or employed by the Design Team is found in breach of security, the facility clearance of the employer or entity may be revoked and /or personnel without clearance will be removed from Site.

10.1.8 Project Approvals

10.1.8.1 Authorities Having Jurisdiction—Federal

A list of authorities and their federal jurisdiction is included below.

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Authority	Federal Government Jurisdiction
National Capital Commission (NCC)	Real property Project approval within NCA; and Federal Land Use and Design Approval (FLUDA)
Employment and Social Development Canada	Canadian Labour Code
Environment and Climate Change Canada (ECCC)	Species at Risk Act (2002); Impact Assessment Act (IAA 2019); Canadian Environmental Protection Act, 1999 ; Migratory Birds Convention Act, 1994 ; Storage Tank Systems for Petroleum Products and Allied Petroleum Products Regulations (SOR/2008-197) ; Federal Halocarbon Regulations, 2003 ; and Ozone-Depleting Substances and Halocarbon Alternatives Regulations, 2016
Shared Services Canada	Government of Canada Information Technology Technical Authority

10.1.8.2 Authorities Having Jurisdiction–Other

A list of other authorities and their jurisdiction is included below. The Project is to comply with the jurisdictional requirements of other authorities. The Design Team must observe codes, regulations, by-laws, and decisions of all authorities having jurisdiction. In the case of overlap, the Design Team must apply the most stringent requirement. All Design Team Services must comply with the applicable Ontario construction health and safety Acts and Regulations, in addition to the related Canada Occupational Safety and Health Regulations.

Ontario Provincial Authority	Jurisdiction
Ministry of Labour (MOL)	Employment Standards; Designated Substance Management; Workers Compensation; and <i>Ontario Construction Health and Safety Act</i> , and its related regulations
Ministry of the Environment and Climate Change (MOECC)	Environmental Protection Act, R.S.O. 1990, c. E.19 ; Endangered Species Act, 2007 ; and Transportation and disposal of designated substances, including contaminated soils, water, asbestos, lead, etc.
Technical Standards and Safety Authority (TSSA)	Construction hoists, elevators, escalators, dumbwaiters, pressure vessels, and generators
Electrical Safety Authority (ESA)	Electrical equipment & distribution
Local Municipalities	Jurisdiction

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	Planning and design submissions; Building, demolition and plumbing permits and inspections (Building Code Act, 1992, S.O. 1992, c. 23); Tree Protection By-law, 2021 ; Sewer Use By-law No. 2003-514 ; Fire safety, equipment and access for fire-fighting equipment; and Occupancy Permits
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10.1.8.3 Federal and Provincial Authorities

PWGSC is a Responsible Authority as defined in the 2019 [Impact Assessment Act](#). PWGSC will fulfill its obligations as a Responsible Authority and comply with provincial legislative requirements to make certain the Project will not cause significant adverse environmental effects on federal land.

In support of the DR, and to meet the PWGSC's Responsible Authority obligations, the:

- a) Design Team must facilitate and participate in any discussion or negotiation required to obtain Project approvals with federal and provincial authorities and confirm that the technical and legal compliance of Project designs follow the said approvals and conditions; and
- b) The CM will confirm that all work and construction operations comply with said approvals and conditions.

All communication with federal and provincial authorities will be through the DR. The DR will address federal and provincial approval fees on a case-by-case basis and may request the CM to pay such fees as a disbursement to the CM's contract.

10.1.8.4 Municipal Authorities

On behalf of PWGSC, the Design Team must prepare and provide to the CM all documentation for building and other permits necessary for approval by municipal authorities. The CM will manage the building permit application process itself. All communication with the municipal authority related to permits and permit payment will be through the CM. The CM will involve the Design Team and together participate in any discussion or negotiation necessary to obtain permits and assist in resolving issues before the tender of each DP. Submissions by the CM will begin with the Schematic Design when Site plan approval is required or well-advanced DPs for construction permits, with subsequent filings as required by the municipal authority and for design revisions in response to reviews.

The CM will apply for interim and final use or occupancy permits and resolve all outstanding issues relating to permit approval. The CM will also provide municipal authorities access to the Site as and when they require access and obtain reports of their findings, and will provide them to the DR for review and handling as necessary.

The Design Team must address and respond to all issues by municipal officers through the CM including:

- a) Purpose of review and approval: to obtain Site plan and building code compliance (permits);
- b) Submission format: Drawings, Specifications, oral presentations for Site plan applications, SD and advanced DP design submissions;

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- c) Submission schedule: SD for Site plan approval; advanced DPs for building permit approval; and
- d) Expected turnaround time: from four weeks to three months.

10.1.8.5 Presentations

10.1.8.5.1 General

Presentations for approval bodies are required in advance for review by the DR and subsequent revision by the Consultant as described in section c) of Project Brief APPENDIX D—Process Maps. The Consultant must prepare, submit for DR approval, and formally present Project information.

10.1.8.5.2 Building Information Modelling

Approvals and presentations must be derived from and facilitated by Models and Model-based data. The importance of the Model for visualization, real-time analysis and coordinated information sharing is paramount. TSTS occupants will benefit from this data source.

The Design Team must facilitate collaborative sessions to present and navigate the Model. The Design Team must provide the necessary technical and support services for TSTS occupant information sessions in an interactive and audience-responsive manner.

Models must be submitted to the DR for review and approval of functional and technical Project requirements.

The Design Team and CM are to derive information for permitting submittals from the Model.

10.1.8.5.3 National Capital Commission

The [National Capital Act](#) establishes the NCC as the responsible agency for review and approval of all proposals for work or alterations to federal buildings and sites through the Federal Land Use, Design and Transaction Approval (FLUDTA) process. This Project will require a level 3 FLUDTA, meaning it is a major Project having a high symbolic value for Canada's Capital. The Project will require a detailed internal review by the NCC and presentation for approval to the NCC's ACPDR before being submitted to the NCC's Board of Directors for FLUDA approval.

With the DR, the Design Team, in consultation with NCC staff, must establish a strategy and timetable incorporating the sequential and incremental development of the Project design. Enabling projects may not begin until FLUDTA approval is received, typically a level 2 FLUDTA.

In addition, as prescribed in the [Impact Assessment Act](#), an environmental effects determination concluding that the Project is not likely to cause significant adverse environmental effects must be signed by PWGSC and the NCC before FLUDA approval by the NCC.

The Design Team must:

- a) Link proposed planning and design of the Site and building and rationale for FLUDTA;

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- b) Include reports, Model generated Drawings, sample boards, Power Point presentations, and oral presentations at 100% SD and 100% DD stages;
- c) Allow for supplemental DP-specific submissions;
- d) Plan in advance the timing of FLUDA submissions as ACPDR meets only four times per year: March, May, September and December;
- e) Consider and integrate recommendations that require design changes in subsequent FLUDA presentations. Accordingly, through the DR, liaise with NCC personnel periodically throughout the design process to obtain consensus on the Project design and confirm NCC concerns are appropriated addressed. ACPDR presentations will be scheduled after ACPDR concerns have been addressed. Refer to the [NCC Federal Land Use, Design and Transaction Approval Process](#)
- f) Allow for about 3 weeks after each presentation for ACPDR approval, followed by formal approval by the NCC Board of Directors approximately 4 weeks thereafter.

10.1.9 Indigenous Participation Plan Reporting

The Consultant must:

- a) Provide a quarterly IPP report which includes details of:
 - i. Specific IPP-related activities that the Consultant has taken in the previous quarter and the IPP-related activities anticipated to be carried out during the next quarter;
 - ii. How each IPP-related activity was/will be carried out, the IPP objectives and activity schedule, necessary resources, activity dependencies, and summary of participation (i.e., employment, subcontracting, skills development) that were/will be provided;
- b) PWGSC will assess the reported quarterly progress against the IPP and compare the participation forecast against actual results accomplished; and
- c) PWGSC may require that additional Indigenous participation be included in addition to those proposed in the Consultant's IPP, at PWGSC's cost. Should PWGSC require additional IPP participation, the Consultant must undertake the necessary actions to integrate the additional participation in the IPP.

10.1.10 Contract Deliverables

Where submissions include summaries, reports, Drawings, Specifications, presentations and schedules, the Consultant must provide six hard copies along with an electronic copy in editable native format and Portable Document Format (PDF), unless otherwise indicated by the DR.

All reports, Drawings, Models, data, simulation and analysis outputs and other graphical material must be submitted to the DR in both PDF and an editable, non-PDF format (original software of operation) and if applicable, interoperable with a BIM and related third-party software

10.1.10.1 Acceptable Native Format

Native format for deliverables means:

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Deliverable	Acceptable Native Format
Written reports and studies	MS Word
Consultant Fee updates	MS Excel
Presentations	MS PowerPoint
Drawings	DWG (from Autodesk REVIT or similar) and PDF
Design Schedules	MS Project or Primavera P6 or newer
Change management and daily logs	MS Word
Organizational Charts	MS Word or Visio
National Master Specifications (NMS)	MS Word
Building Information Model	Software selected by Consultant and CM to the requirements of Industry Foundation Classification– IFC4.2– ISO 16739:1-2018

10.1.10.2 Writing Style

The Design Team must use a writing style that presents information in a logical, objective, clear and concise manner. The Design Team must write reports so that the reviewer can easily locate references and respond to related information contained in the report. Reports will include the following sections:

- A cover page indicating the Project title, nature of the report, Consultant's Contract number and author name, PWGSC Contract name and reference number, and a date in a non-ambiguous format (i.e., February 6, 2019, 2019-02-06 or similar);
- A table of contents;
- An executive summary;
- An introduction;
- A methodology section explaining the methods and tools used, such as weightings, comparative analysis;
- A conclusion or synopsis; and
- Appendices containing supporting material referenced in the report, supplementary and supporting information.

10.1.10.3 Report Content

The Consultant must:

- Confirm that the executive summary is an accurate and complete summary of the report following an identical structure, including only key points, results and recommendations;

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- b) Use an organizing system, such as MS Word Document Map, for ease of reference and cross-referencing;
- c) Use correct grammar including complete sentences to avoid ambiguity and facilitate translation when required. Do not use technical and industry jargon and cryptic phrasing;
- d) Write efficiently, with only essential information included in the body of the report and supporting information in an appendix, if required; and
- e) Analyze and confirm all relevant correspondence against accepted goals, objectives and the requirements identified in this Project Brief.

10.1.11 Deliverables–Administration Services

The Consultant must:

- a) As indicated, prepare and issue meeting and workshop minutes with 2 Working Days of said meeting or workshop;
- b) Develop and update as required a monthly report structure within 20 Working Days of Contract award;
- c) Submit monthly reports with the approved report structure, including an up-to-date design production schedule in accordance with Project Brief section 10.2.1.4–Time Management Planning and paragraph d) of Project Brief section 10.3.1–CMP Services and Deliverables;
- d) Submit security clearance for the Consultant’s personnel and track security clearance submissions by the Consultant’s Sub-Consultant’s and Specialist Consultant’s personnel;
- e) Provide ongoing Services to obtain, or cause to obtain, the approvals necessary to advance and complete the Project;
- f) Submit a refined and sufficiently detailed IPP within 60 Working Days of Contract award for review and comment. Revise and resubmit the refined IPP within 5 Working Days of receipt of PWGSC’s comments;
- g) Submit a quarterly IPP report for review and comment within 10 Working Days of each quarterly anniversary of the Contract award date, as agreed by the DR and Contracting Authority. Revise and resubmit the refined IPP within 5 Working Days of receipt of PWGSC’s comments.
- h) Develop and submit Contract deliverables in the format, content, and writing style indicated.

10.2 Planning Services

10.2.1 Contract Management Plan

The Consultant must:

- a) Prepare, submit, maintain/update and implement a Contract management plan (CMP) governing the Design Team’s activities and effective management of the Design Team’s resources;
- b) The Consultant’s CMP must include at least six distinct plans:
 - i. Design management plan;

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- ii. Quality management plan;
 - iii. Cost management plan;
 - iv. Time management plan;
 - v. HR management plan; and
 - vi. Risk management plan; and
- c) The Consultant's plans must clearly detail how the Design Team's Services will be managed, Monitored, reported and controlled during the implementation of Services;

10.2.1.1 Design Management Planning

The Consultant must develop, update, and implement a design management plan specific to this Contract.

The Consultant's design management plan must include, but is not limited to:

- a) A description of the processes and methods to validate communications throughout the Design Team, including the Consultant's internal control processes to confirm only the approved Project scope is incorporated into the design;
- b) A description of the processes and methods to update (record) and track the functional program throughout the SD, and DD stages, and functional program changes during DP production and in the construction and commissioning stages;
- c) A description of the processes and methods for the development and ongoing update of a BIM Execution Plan (BXP), with the participation and agreement of the CM and the DR, including a list of exclusions from the Project scope and the Model;
- d) A description of the processes and methods to incorporate lean design, design review, and lean construction processes for investigations and enabling projects ;
- e) The development and ongoing update of a delegated design Specification and design responsibility matrix, with the participation and agreement of the CM and the DR, which must take into account the Design Team professional responsible for the design, review, acceptance with or without conditions, and workflow(s) of certain scope components to be assigned to a design entity other than the Design Team (i.e., subcontractors and suppliers), which include:
 - i. In the Specification:
 - 1. References to applicable associations, regulating bodies, standards, etc. at the Place of the Work;
 - 2. Intent of design delegation and applicable scope elements, which may include:
 - a) Design and structural analysis of specialized load bearing components and connections;
 - b) Design of fire safety, life and health safety, and associated compliance during deconstruction and construction;
 - c) Design of designated mechanical, electrical, and architectural systems and components where the specialist design expertise resides with the manufacturer or supplier;
 - d) Design of laboratory systems and subsystems; and

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- e) Design of other structural, architectural, electrical, mechanical, civil, and other scope;
- 3. Scope elements excluded from delegated design which the CM is required to undertake;
- 4. Definition of Design Team professional(s);
- 5. Definition of the delegated design professional (e.g., architect, engineer, technologist) and their required expertise, certification, or accreditation;
- 6. Submittal technical requirements, review and acceptance process/workflow, and associated timelines;
- 7. Products, manufacturing requirements, and execution requirements and workflow(s) be the entity of the subject design delegation; and
- 8. Field review and certification (i.e., commissioning and performance verification) requirements and workflow by the Design Team professional;
- ii. In the design responsibility matrix, scope elements usually carried out by the CM or the CM's subcontractor or supplier and scope elements the Design Team will complete, which includes:
 - 1. Design Team design professional and their responsibility(ies);
 - 2. Scope element description (e.g., crane base design/building loading, attachment of construction structures, wall/floor loading capacity; pipe rack weight, bends, and reaction forces; stairs and ladders; cutting/coring openings; stud gauge/size; steel to steel connections; shoring; miscellaneous metals: stepovers, walkways, piles, micropiles, laboratory systems and systems);
 - 3. Design and field review and performance verification responsibility(ies) by the Design Team, the CM, as applicable the CM's subcontractor or supplier, and the CM retained design professional; and
 - 4. Related information, notes or comments;
- f) The Design Team's processes and methods to support the CM's development and ongoing update of a material testing and inspection responsibilities matrix, with the participation and agreement of the Design Team and the DR, in which the CM is to:
 - i. Identify component or system to requiring testing, inspection, or both testing and inspection (e.g., laboratory systems and subsystems, structural steel, rebar, concrete, roofing, firestopping, acoustics, building envelope, drainage, compaction, waterproofing, insulation, sustainability-related, elevators, elements and sequencing related to temporary work);
 - ii. Indicate:
 - 1. If material testing or inspection is a joint activity involving the CM and Design Team, when said activities are to occur (i.e., conditions, if any), and workflow between those involved in the process(es);
 - 2. Whether the CM or the Design Team is to undertake materials testing or inspection itself or retain a third-party; and
 - 3. How said inspection or testing relates to performance requirements in Design Team's or CM's DP Specifications and the contractual mandate of the Design Team as the design authority and the CM as the constructing authority.

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10.2.1.2 Quality Management Planning

The Consultant must develop, update, and implement a quality management plan specific to the Contract and consistent with the provisions of ISO 9001:2015.

The key to quality management success is ongoing measurement, record-keeping and commitment from management. These steps will help the Consultant meet its quality goals, but also help them spot ways to improve in areas where they may be falling short, an important aspect of a quality management system.

The Consultant must continuously adhere to the Contract-specific quality management plan for the duration of the Contract and:

- a) Eliminate quality problems with the Design Team's Services and correct, in a timely and effective manner, all issues as they occur;
- b) Confirm the quality of the processes and methods to manage and create Contract-related deliverables, revising said processes and methods based on lessons learned through this Contract and from other sources;
- c) Complete the Contract-related deliverables with a level of quality acceptable to the DR; and
- d) Define in their quality management plan:
 - i. How the Consultant will manage all Contract deliverables subject to quality review with a clear rationale of what and why deliverables and processes are not subject to quality review, if any;
 - ii. A description of the processes and methods for the day-to-day execution and ongoing review/improvement of the quality management plan, describing who, how many resources, the scope of the resources(s) mandate and responsibilities, and where these Services will occur (e.g., on the Site, in the Consultant's office);
 - iii. A description of the processes and methods in the use of lean design principles for pre-construction works ;
 - iv. A description of the processes and method for full inter-disciplinary coordination of sustainability requirements and verification of design integration of said requirements per design discipline;
 - v. A description of the processes and methods to confirm the thoroughness and completeness of PD, SD, DD, and DP submissions. Define the thoroughness of Consultant's PD, SD, DD, and DP quality review processes and the quality review timeframe before submission release, as well as the process(es) associated with the review, integration, and rejection of submission review comments before the next PD, SD, DD, or DP submission;
 - vi. A description of the processes and methods to confirm compliance with the Project Brief APPENDIX A—GUIDE TO PREPARATION OF CONSTRUCTION DOCUMENTS. Define the thoroughness of Consultant's DP quality review processes and the quality review timeframe before DP submission release, as well as the process(es) associated with the review, integration, and rejection of DP review comments before the next DP submission;
 - vii. A description of the processes and methods for determining, with the DR and then with the CM once hired, the scope of and the roles and responsibilities related to delegated design and design-assist services and material testing or inspection;

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- viii. A description of the processes and methods for analyzing, validating, commenting on, and accepting or rejecting RFIs and submittals of any type, notices, or any other document to/from the DR, Design Team and the CM;
- ix. A description of the processes and methods for developing, managing, and maintaining a searchable database for all quality management matters, referencing the Consultant's cost, time, and risk management Services;
- x. A description of the processes and methods for the Design Team undertaking work inspections, providing feedback/comments and timing thereof to the DR, CM and the CM's Superintendent, to address Site visit inspection comments (e.g., nonconformities or changes) and corrective actions;
- xi. A description of the processes and methods for quality management awareness training of the Design Team's personnel;
- xii. A description of the processes and methods to assess PWGSC's satisfaction, including communication feedback and handling complaints (e.g., who, how often, issue escalation within the Consultant's organization); and
- xiii. A description of the processes and methods for performance requirements identification as prescribed by ASHRAE 202-18, verification of the identified performance requirements, including seasonal performance verification and corrective actions.

10.2.1.3 Cost Management Planning

The Consultant must develop, update, and implement a cost management plan specific to this Contract. The Consultant's cost management plan must include, but is not limited to:

- a) A description of the processes and methods for establishing, Monitoring, and controlling Design Team fees and disbursements in relation to the established Contract fees per stage (i.e., Services for PD, SD, DD, DP and Tendering, Site Services, and Post-Construction Services), including:
 - i. The rationale for determining the percentage complete of Design Team activities through each Project stage;
 - ii. The process of transferring and integrating the Design Team percentage complete information (resource demand) with the Consultant's monthly resource-loaded schedule;
 - iii. The role and timing of the DR in the review and revision of the rationale described in article a) i) above;
- b) An description of the processes and methods to develop and Monitor an acceptable WBS and separate (individual) Cost estimates, inclusive of FF&E and Connectivity, against the two major Cost centres: NRC's ARC SMPL; and TSB office area; and
 - i. Before describing this requirement, meeting with the DR and LC's Planner to make certain there is a solid understanding and agreement of the WBS requirements and related information PWGSC's ongoing internal Cost and time analysis;

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- c) A description of the processes and methods for establishing, Monitoring, and controlling the elemental Cost estimates and Cost allocation between the two Cost centers identified in subparagraph b), and:
 - i. Identifying the types of estimate contingencies (i.e., design, construction, escalation) and a description of the processes and methods and rationale for quantification, conditions and authorization for use and for reallocation of Costs between estimate Cost centres, and documentation and notification process(es) to the DR, the CM, and PWGSC's third-party cost consultant of intended use and reallocation;
 - ii. Identifying the rationale and approach to integrating and revising design and construction durations and their affect on the Consultant's fees and the Construction Cost Estimate for this Contract;
- d) An explanation of the processes and methods to establish the initial estimate of the Construction Cost Estimate after Contract award and control the Cost during the delivery of the Project;
- e) An explanation of the processes and methods to extract and incorporate 5D (Cost estimation, budget analysis), 6D (sustainability), and 7D (facility management) information in the Model into estimates and LCA and LCCA analysis (i.e., to what extent, when, Cost exclusions from the Model);
- f) An explanation of process and methods explaining to develop Costs for future maintenance contracts and LCCA, in accordance with ToR section 4.1.4–Operating Requirements;
- g) A description of the processes and methods explaining the Design Team's scope analysis and iterative Cost update from information presented/discussed in meetings and workshops, as defined in Project Brief section 10.1.1–Meetings and Workshops;
- h) A description of the processes and methods explaining the iterative development of 50% and 100% update of SD and DD submission Cost estimates, which incorporate estimates prepared by the GEICs, and 50%, 90% and 100% DP Cost estimates, including lean design and DP process related to investigations and enabling projects;
- i) A description of the processes and methods for estimate reconciliation with the PWGSC's third-party cost consultant and, once hired, the CM, including the timing to issue an estimate reconciliation report and follow-up procedures with the Design Team, DR, third-party cost consultant, and CM;
- j) A description of the processes and methods for the Design Team's Cost review and acceptance or rejection of CM submittals such as supplementary instructions that attract Cost, contemplated change notices, change orders, and progress payments. Describe the conditions for rejection of said submittals;
- k) An explanation of the Design Team's involvement in and its processes and methods related to value engineering and Cost control; and
- l) A description of the processes and methods for the Consultant's Cost analysis of potential or actual disagreements, disputes, or claims identified by or submitted by members of the Design Team.

10.2.1.4 Time Management Planning

The Consultant must develop, update, and implement a time management plan specific to this Contract. The Consultant's time management plan must include, but is not limited to:

- a) A description of the processes and methods for:

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- i. Establishing a WBS to at least 5 levels that aligns with LC's master schedule and its coding, by Project stage: Project Brief sections 11–Pre-Design Services; 12–Schematic Design Services; 13–Design Development Services; 14–Design Package Services; 15–Tendering Services, 16–Site Services and 17–Post -Construction Services, and
 - 1. Before describing this requirement, meeting with the DR and LC's Planner to make certain there is a solid understanding and agreement of the WBS requirements and related information PWGSC's ongoing internal Cost and time analysis;
 - ii. Establishing the Design Team's Critical Path Method design production schedule that integrates Design Team resource-loading aligned with the approved WBS;
 - iii. Establishing and sequencing design production activities and activity durations for the PD, SD, DD stages and, based on the CM's determination of DP scope, timing, and sequencing, during DP stage, including:
 - 1. When and how much schedule contingency and resulting Float will be incorporated into the design production schedule;
 - 2. Identification of the design production Critical Path and correct completion date for each 50%, 90% and 100% SD, DD, and DP submission, with the intermediate and final DP submission dates determined by the CM to optimize and accelerate construction;
 - 3. The approach to Float use and reallocation with the DR's authorization; and
 - iv. Determining the design production and Service progress measurement rationale and criteria (i.e., triggers) for revising the progress measurement rationale;
- b) A description of the processes and methods for establishing, compiling, a monthly resource-loaded schedule and accelerated reporting within 3 Working Days of the schedule data date, with last Working Day of each month as the schedule data date;
 - c) A description of the processes and methods for establishing, Monitoring, controlling, and reporting on a time recording and time control system related to the Design Team's production and productivity, include actions to address productivity shortfall of one or more members of the Design Team;
 - d) A description of the processes and methods for Monitoring, analyzing and determining the CM's work progress;
 - e) A description of the processes and methods to identify and track opportunities to reduce design durations or reorganize design activities with the objective of managing Project risks;
 - f) A description of the processes and methods for establishing, compiling, and monthly reporting of a monthly and a 3-month design production look-ahead schedule;
 - g) A description of the processes and methods for the Design Team's triage, review, and acceptance or rejection of CM submittals and request for information (RFIs) based on submittal and RFI importance, and criteria to reclassify importance when required; and
 - h) A description of the processes and methods to establish and update a recovery schedule should a Design Team design submission, CM tender package, or Contract milestone key intermediate date, as defined in Project Brief section 1.3.3–Milestones, be delayed. Describe the Design Team's enhanced mitigation effort to recover lost time as compared to the approved Baseline schedule.

10.2.1.5 Risk Management Planning

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In collaboration with the DR and, one hired the CM, the Consultant must develop, update, and implement a risk management plan that is specific to this Contract. The Consultant's risk management plan must include, but is not limited to:

- a) A description of the processes and methods for developing a risk register including when, how and by who data and information will be integrated into the register;
- b) A description of the processes and methods for determining how, when and by who opportunities and risks are deemed relevant, including how opportunities and risks will be included, tracked, and archived in the risk register;
- c) A description of the processes and methods for the assessment of and quantification of opportunities and risks;
- d) A description of the processes and methods for reassessing the probability of occurrence per risk and opportunity;
- e) A description of the processes and methods for establishing, implementing, and managing a claims avoidance program related to the Consultant's Sub-Consultants and Specialist Consultants; and
- f) A description of the processes and methods for how, when and to whom lessons learned are disseminated, including the timing and frequency of follow-ups to validate those lessons learned are being applied/adapted in the application of the Design Team's Services.

10.2.1.6 Human Resource Management Planning

The Consultant must develop update, and implement a Design Team human-resource management plan that is specific to this Contract and which considers the IBP requirements. The Design Team human resource management plan must include, but is not limited to:

- a) The roles and responsibilities of the Design Team's resources, including expected number and level of resources per area of expertise, by Project stage, to meet the requirements of the Project throughout the Contract;
- b) The processes, methods, and criteria for increasing and for reducing resources and their management throughout the Contract;
- c) The processes, methods, and criteria for using overtime throughout the Contract;
- d) A Design Team organization chart(s) and how the various positions (resource) interact/relate to other members of the Project Team;
- e) A staffing plan that includes:
 - i. A detailed justification of when and how many resources/skill-sets will be deployed;
 - ii. Timeline to bring resources/skill sets on-line;
 - iii. Transition period duration for succession of all positions (could vary depending on the resource level);
 - iv. A forward-looking resource plan reflective of all Design Team Services required over the next three-month, six-month, 12-month periods; and
 - v. How Project-related information will be transferred to new personnel; and

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- f) Any other relevant human resource information regarding the provision of the Design Team's Services for the Contract.

The Consultant's Design Team human resource management plan approved by the DR and the Contracting Authority will form part of the Baseline for invoicing Design Team's time-based Services.

10.2.1.7 Contract Management Plan (CMP) Deliverables

The Consultant must submit to the DR for approval within 30 Working Days of Contract award, or as indicated later in this section, or if/as agreed by the DR over a defined period of time. The Consultant must:

- a) Submit for each of the six plans that form the CMP:
 - i. An initial proposed layout, format, template, assumptions and preliminary information, sample information including table of contents for review by the DR within 30 Working Days of Contract award. Before finalizing assumptions and preliminary information for these plans, review with the DR and LC's Planner their expectations and, in particular, the specific requirements for the cost and time management plans;
 - ii. A draft addressing all issues raised by the DR on the initial layout and format for review by the DR within 20 Working Days of the acceptance of the plan layout and format; and
 - iii. A final for acceptance by the DR within 20 Working Days after receiving DR's review comments on the draft;
- b) Once the final plans are accepted by the DR, follow and implement each plan and submit monthly CMP updates, if applicable, including updates to individual sub-plans. If there are no month-to-month changes in the sub-plans, indicate as such in the Consultant's monthly report;
- c) Review with the DR the contents and implementation of each of the plans, the monthly updates, and take the necessary actions as may be required to address any concerns as directed by the DR;
- d) For the Design Team human resource management plan, submit plan updates to the DR and Contracting Authority every three months with resource projections for the following three-month, six-month, 12-month periods. Provide justification to the DR and Contracting Authority for proposed increases and decreases in staffing; and
- e) Revise and resubmit the CMP sub-plans over the progression of the Contract as warranted, or as required by the DR.

10.2.2 BIM Execution Plan

10.2.2.1 Overview

BIM will be the primary collaboration and communications medium for the Project Team. Unless otherwise agreed by the DR, the Design Team will use the Model to convey design and the CM, the CM's subcontractors and suppliers will use the Model to interpret the design and to co-ordinate and build the work.

The Consultant must establish a BIM management team within 20 Working Days of Contract award. The BIM management team must develop a Project-specific BIM Execution Plan (BXP) to reflect, at a minimum, the requirements in this Project Brief, with the input and to the approval of the DR. Once hired, the CM's BIM

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manager will form part of the BIM management team. The Consultant's BIM manager must thoroughly review the BXP requirements established and seek input from the CM regarding their BXP requirements, making BXP changes as appropriate and as agreed by the DR.

The BXP must outline the strategy and schedule to implement Project-specific BIM standards and best practices for the creation and use of shared Models and Model Elements by the Design Team and the CM. The BXP must define the use and extent of high-resolution scanning and photogrammetry, combined, to create a shared co-ordinate system and provide the information necessary to create and update the Model.

With the input of the DR, the combined BIM management team must re-evaluate the BXP monthly and provide recommendation for enhancement to and for the DR's approval. Incorporate individual roles, responsibilities, and workflow(s) for delegated design and design assist as requirements as these CM services are identified, developed and approved by the DR (e.g., steel/piping fabrication/installation). The Model(s) developed in accordance with the BXP are for use by the entire Project Team.

The DR will provide the Design Team with existing information, CADD files and sitting option Model files. To further develop the Project-specific Model, the Design Team must integrate information from the existing reference files, PWGSC's legal and topographical surveys of the Site, the Design Team's pre-construction building condition surveys with visual and tactile review/analysis and, when appropriate, on terrestrial laser scanning, photogrammetry, Site inspections, on-Site hand measures, and historical research.

With the input of the DR, the combined BIM management team must develop best practices and protocols for the digitization of existing conditions and the integration of that and other data through BIM, including development of a level of accuracy Specification for the Model which all Project Team members are to follow.

The BXP must consider and address:

- a) How the Model will support the design, construction, post-construction activities, and the extent of interoperability for the TSTS occupants' ongoing use and management;
- b) A strategy for compliance with Project-specific BIM requirements and how compliance will be managed for the entire Design Team, the CM, and delegated design professionals. Indicate the required workflow(s) between those involved to confirm compliance (i.e., who-does-what, when, and who checks/validates);
- c) A strategy for software compatibility, plug-in software for specialty Services (e.g., acoustics Modelling, sustainability analysis, air flow and energy Modelling), the Design Team's and the CM's Cost estimating and the CM's construction sequencing, the use and merging of file formats, Model hosting, information transfer, and access of data between CM subcontractors and suppliers (i.e., use of Model server(s), extranet, security access);
- d) A strategy for integration and extraction of maintenance management nomenclature, in accordance with paragraph e) of Project Brief section 11.14–Commissioning and Property Management Requirements;
- e) A strategy for integration of FF&E goods and equipment, including specialized laboratory and scientific equipment, whether new or relocated from existing accommodations, each tagged with a code number linked in the Model to an attributes list;
- f) Requirements and processes for defining, incorporating, and extracting 5D estimation, 6D sustainability, and 7D facility management information, including complete laboratory and scientific equipment within the Model;
- g) Options, to the approval of the DR, to determine and confirm IT technical requirements within the Site office, and requirements the Design Team and CM require to communicate to their home office(s);

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- h) Interaction within and between the Design Team, CM and the CM's delegated design professionals and the DR;
- i) A listing of CM subcontractors and suppliers who will use digital fabrication;
- j) Proposed Model software for use by the Project Team and the CM's subcontractors and suppliers;
- k) Processes and methodologies to confirm all CM subcontractor and supplier information is accurately Modelled and integrated into the Project Model;
- l) When and where to use drone technology to increase the rate of data collection and accuracy, and to provide information necessary to develop the Model and manage the Site;
- m) Proposed Model workshops and training, including frequency and who is to attend;
- n) BIM equipment and resources, users and their responsibilities, qualifications, experience, and contact information (i.e., Design Team, DR, CM, CM's subcontractors and suppliers);
- o) Authorized uses for Model Elements, including required Level of Development (LOD) and level of information required for TSTS hub facility management interoperability in the final, as-built Model;
- p) A [UNIFORMAT II](#) Model Element Table, identifying element authorship and LOD;
- q) The appropriate LOD, level of information, and detailed Modelling protocols for the federated Model;
- r) Additional Model uses appropriate to the Project's design and construction delivery;
- s) Modelling methods and protocols needed to:
 - i. Reliably extract quantities from the Model;
 - ii. Incorporate design and construction submittals; and
 - iii. Plan construction operations and track construction progress; and
- t) Recommendations arising from paragraph k) of Project Brief section 11.8.4–Security Analysis. Modelling and information-sharing strategy to comply with Contract security requirements, where classified and protected information must not be shared in the common data environment; however, with the correct safeguards, could potentially be incorporated in the Model, subject to the DR's approval.

10.2.2.2 Model Structure

The BXP must define within the Model structure:

- a) Common file naming for all members of the Project Team;
- b) Segmentation of Models (e.g., by building, by floors, by zones, by areas, and/or by disciplines);
- c) Coordinate system (geo-referenced/origin point) to be used to for Model integration;
- d) Set up of BIM space, including protocols for the use of grids, levels, pins, locks and constraints;
- e) Creation of room or space objects for all inside volumes;
- f) Accuracy, completion, correctness when placing, creating, or modifying object elements;
- g) Stages of Modelling and the progression of Model development by each member of the Design Team and as applicable the CM;

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- h) Template requirements;
- i) Capturing deviations or special circumstances;
- j) How Models must share a common coordinate system, given that design discipline-specific Models and division of a Model by another classification are anticipated and acceptable;
- k) How Models must be made to a level of integrity to allow for modification or dimensional movement to accommodate on-Site measurement;
- l) How Model parameters must function as they are intended and named; and
- m) How object categories (physical elements) must use the appropriate object class (intended object type) and how:
 - i. Every object is described, where it is located, and if possible, when it is installed, who installs it, and a process chart associated with its installation (movement and process);
 - ii. Objects must be associated with the correct level (i.e., a wall at level 1 is to be drawn/placed at level 1, with element properties indicating its association to level 1, plus or minus an offset, if required);
 - iii. Industry Foundation Class (IFC) space objects are required to support non-proprietary or “OpenBIM” standards and assure interoperability;
 - iv. Model Element authors must confirm all objects determined as “room bounding” are functioning correctly, and all rooms are properly enclosed; and
 - v. Model Element authors must maintain a room schedule from the Consultant’s BIM Manager to verify proper enclosure and data completeness.

10.2.2.3 BXP Deliverables

The Consultant, with the input of the DR and, when hired, the CM, must:

- a) Submit a draft BXP to the DR for review within 60 Working Days of the Contract award, or as agreed by the DR; and
- b) Re-evaluate the BXP monthly and confirm to the DR if changes are necessary. If changes are required or recommended by the combined BIM management team, the Consultant, with the input of the CM, must prepare and submit to DR for review and approval a summary of proposed changes within 10 Working Days, or as agreed by the DR.

10.3 Implementation Services

The Consultant must immediately notify the DR and CM in writing of any potential increase or decrease in the Project scope that could affect the ability to meet the Project objectives.

10.3.1 CMP Services and Deliverables

Throughout the Contract, the Consultant must provide ongoing Services in accordance with the latest version of the approved Consultant’s Contract Management Plan, as well as monthly reporting unless noted otherwise, as they relate to:

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- a) Design Management Planning, in particular the up-to-date delegated design Specification and design responsibility matrix;
- b) Quality Management Planning and all current quality management issues;
- c) Cost Management Planning and all current Cost management issues, along with:
 - i. The current overall estimate per major Cost center and cash flow by fiscal year;
 - ii. A summary of Cost changes and current variance from the Construction Cost Estimate identified in Project Brief section 1.3.2–Cost;
 - iii. Pertinent Cost information per Project stage as identified in Project Brief sections 11.15, 12.3.12, 13.2.12, 14.3.13, 15.1, 16.2, and 17.1 and the related deliverables subsections for each Project stage; and
 - iv. Analysis and reporting of Design Team resources progress percentage complete against each WBS element, integrated with the Consultant’s monthly schedule submission;
- d) Time Management Planning, including:
 - i. A Critical Path Method design production schedule that reflects the approved WBS within 3 Working Days of the last Working Day of each month, along with:
 - 1. An unprotected, unredacted, complete Primavera .xer file with WBS dictionary;
 - 2. Identification of the Critical Path, near Critical Path, and interdependencies between Project design and construction elements, including submittals, RFIs, and required decisions or approvals;
 - ii) A monthly and a 3-month design production look-ahead schedule which is resource-loaded against the approved WBS and reflects the Design Team progress to date per Project stage, and, in discussion with and agreement of the DR:
 - 1. At the end of each Project stage, formally revisit and as appropriate for the subsequent stage, readjust the method/rationale to determine the Design Team resource percent completion;
 - iii) A variance report to summarize slippages and or improvements in schedules against Baselines and previous monthly reports, including the reasons for the changes;
 - iv) An assessment of progress and assessment of risk of delivery for the Critical Path activities;
 - v) A written summary of design production progress and design issues;
 - vi) A list of issues and risks of items that may have future impact on the schedules and what actions are being taken to reduce/eliminate the impact;
 - vii) Throughout DP production, an analysis of the impact of DR approved scope change(s) after the 50% DP submission and the Design Team’s ability to incorporate said change(s) in subsequent DP submissions. Immediately inform the DR and CM in writing of the impact of said change(s) on DP production; and
 - viii) List of the top five issues that must be resolved in order not to jeopardize the Project schedule; and
- e) Risk Management Planning including detail information and quantification regarding all applicable risks (Note: The DR will maintain a risk registry for the overall Project); and

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- f) Human Resource Management Planning, including updates every three months with resource projections for the following three-month, six-month, 12-month periods. Implement the approved human-resource management plan. Obtain written DR and CA approval for Design Team resourcing prior to deploying/changing resource strength or personnel identified in or added to the Contract.

10.3.2 BIM Services

10.3.2.1 Overview

The Consultant must:

- a) Use BIM and the Model in developing the Project and the BXP;
- b) Assure that all BIM criteria is incorporated into Sub-Consultant or Specialist Consultant contracts or agreements affecting the Services required by Contract;
- c) Use the standards developed in the Design Management Plan (DMP) to minimize the risk of claims arising from the use of the Model or Model Elements;
- d) Adopt the parameters for Level of Development (LOD) established in the BIMForum Level of Development 2020 Specification, available at: <http://bimforum.org>;
- e) Model all elements required to perform Model-based software validation, coordination, required for and to the LOD determined in the BXP;
- f) Share the Model(s) with the CM for the tendering processes. Use of the Model(s) by other parties is for reference only unless otherwise stated;
- g) Deliver Models that are detailed sufficiently for design reviews and Model-based validation through a rule-sets Model-checking tool (e.g., Solibri Model Checker or equivalent);
- h) Use the Model as follows:
 - i. Site analysis including but not limited to planning setbacks, Site and civil /municipal system gradients and drainage patterns, map access and circulation patterns, view corridors and privacy patterns, solar shadow studies, wind studies, and security planning;
 - ii. Programming, spatial program validation, space and equipment validation, including:
 - 1. All space and equipment data in the Model with consistent field name designations and text values;
 - 2. Maintenance management nomenclature;
 - 3. FF&E and Connectivity goods, their attributes and tagged code number; and
 - 4. At each submittal stage, space and equipment/goods information must be derived from the Model and validated;
 - iii. Design authoring for connecting the 3D geometry of digital architectural representations with intelligent Model Elements with assigned properties, quantities, means and methods, Costs and schedules. As the design progresses and specific materials and components are selected, replace all generic assemblies by intelligent Model Elements with assigned material properties, sizes, and other element specific information to identify building components such as walls, floors, roofs, windows, sensors;
 - iv. Internal and external lighting analysis for analytical Modelling software within the Model to

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- determine the behaviour of lighting systems, including artificial (indoor and outdoor) and natural (daylighting and solar shading) lighting, speciality lighting, emergency evacuation lighting;
- v. Acoustic analysis for acoustic Modelling software within the Model to determine the behaviour of materials and geometry on reinforced and non-reinforced sound via performance simulations;
 - vi. 5D Cost estimation for all SD, DD, and DP submissions;
 - vii. 6D sustainability (green building) evaluation for assessment of the design challenges and benefits associated with implementing a sustainable design strategy enhancing the effectiveness (ability to impact design), efficiency (Cost and schedule of decisions);
 - viii. 7D TSTS hub facility management interoperability requirements for defined Model Elements, including full integration of laboratory and scientific equipment;
 - ix. Design reviews linked to the Consultant's quality management plan, providing a comprehensive review process including clash detection and weekly resolution that includes data focused Project parameters which can be accessed remotely (e.g., Autodesk 360 or equivalent) and incorporate visualization and immersive technologies (e.g., Oculus Rift or equivalent virtual-reality technology);
 - x. Visualization for communication for the production of still images, interactive and immersive models, and high-resolution animations;
 - xi. Generation of Drawings: all Drawings produced for use by the Project Team must be derived from the Model as views and follow the [PWGSC Computer Aided Drafting and Design \(CADD\) Standards](#). All Drawings are to be linked to the Model by a digital object identifier. Drawings produced for public consultation or communication may require additional information and graphic enhancement;
 - xii. Structural Modelling and analysis/BIM-enabled structural design for a BIM-enabled structural design process, including but not limited to, the analysis and optimization of structures for effective and economic solutions to design, fabricate and construct utilizing the information in the existing conditions Model and information gathered via the exploratory work and investigations program;
 - xiii. Energy, air flow, zonal analysis, and automation analysis to optimize the zero-net energy building design. Derive analytical Modelling from the Model and developed to a LOD appropriate for the design phase and the tools used for analysis. Energy simulation must be based on information extracted from the Model;
 - xiv. Mechanical-Electrical-Plumbing-Fire Suppression (MEPF) virtual balancing and testing for analysis of the MEPF design options through simulated testing and balancing;
 - xv. Site Management for the use of the Model for all aspects of planning and documenting investigation work, temporary work, as found conditions and new installations prior to and after to concealment validation, as well as, verification and certification of the as-balanced, tested, and commissioned systems; and
 - xvi. Record Model that shows the as-built location of building and Site elements containing accurate attribute data on major equipment and systems for facilities management.

The CM will:

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- a) Use BIM and the Model in planning and delivering Project as stipulated in the CM's ToR and the BXP;
- b) Incorporate BXP requirements into the CM's sub-contracts affecting the CM's services and work;
- c) Prioritize MEPF overhead coordination/reviews. Retain an MEPF coordinator to undertake constructability reviews of the Model to identify components items 'beyond-the-clash'. These are items such as, but not limited to: compromised fire ratings from multiple penetrations; pipes out of walls; height access issues causing undue safety hazards; potential clashes with content which may not be in the Model;
- d) Establish which subcontractors and suppliers will assign an individual to the role of BIM coordinator for coordination their part(s) of the work with the CM's BIM Manager;
- e) Mandate subcontractor(s) and supplier(s) to provide Model(s) and/or Model Element files representing their scope of work. The CM's BIM Manager will review the Model(s) and/or Model Element files for before submitting to the Consultant's BIM Manager. As part of this process, the CM's BIM Manager will use digital coordination tools and software to identify and track problems with bid-ability and constructability, including clash detection. The CM will provide interference/clash reports for review and resolution by the Design Team. Resolved information must be integrated into federated Models by the Consultant's BIM Manager, for review by the Project Team;
- f) Incorporate Model element files from all Submittals into the Model as the Design Team reviews and accepts said files to serve as the basis for the as-built Model;
- g) Use digital coordination tools and software to identify and track constructability issues in the Model and provide the Design Team interference/clash reports for their review and resolution. The Design Team must integrate their resolved design into the federated Models, for review by the Project Team;
- h) Manage classified or protected information within the Model in accordance with the Contract security requirements/classification guide; and
- i) Use the Model for:
 - i. Constructability and design assist services, if and when requested by the DR;
 - ii. Site planning, temporary facilities, and field management;
 - iii. 4D scheduling and planning to generate accurate sequencing of construction for the Site, rooms, and spaces, to the extent agreed to by the DR;
 - iv. 5D Cost estimating; and
 - v. Digital and digitally-assisted fabrication.

10.3.2.2 Model Management

The Consultant's BIM manager must coordinate the ongoing development of the Model and must serve as the primary BIM point of contact for the Project Team. The CM's BIM manager will coordinate, manage, and verify all Models submitted by subcontractors and suppliers prior to integration with the common data environment by the Consultant's BIM manager. The combined BIM management team must have access to the Model(s) and common data environment throughout Project delivery.

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The common data environment is the collection of all data developed through design and delivery. The Consultant's BIM manager must confirm that the common data environment represents all relevant and up-to-date information at all stages of the Project; therefore, will include data from multiple sources and in multiple formats.

The Design Team and CM must derive 2D Drawings from the Model as views. Each Drawing is to be linked to the Model by means of a digital object identifier (e.g., QR codes or agreed equivalent).

The Consultant's BIM manager must create a UNIFORMAT Model Element table to define reliance and assure that the CM and other users of Models do not infer more precision or information than the designer of the system or component intends at a given point in the design process. The Consultant's BIM manager must use the Model Element table to coordinate between design disciplines, and as approved by the DR the CM's design-assist/delegated design designers, and give the Project Team an overview of who needs to provide what information and at what time to meet Contract milestones and key activity dates.

The Consultant must also:

- a) Have or obtain the trained personnel, hardware, and software needed to successfully use BIM as outlined in this Project Brief and defined in the Project-specific BXP;
- b) Confirm the reliability and accuracy of information incorporated into the federated Model(s) through a quality management process established in the BXP and the Consultant's Contract Management Plan;
- c) Manage classified or protected information within the Model in accordance with the security classification guide for the Contract;
- d) Derive Model Elements from the following sources:
 - i. BIM authoring software element: Model objects must contain parts and components as opposed to simple 3D geometry and be assigned as a part of a family or group;
 - ii. Manufacturer's Model Elements created by and acquired from manufacturers: LOD of manufacturer's Model Elements will be appropriate to the Project phase; and
 - iii. Custom created Model Elements: Created with BIM authoring tool templates and assigned as a part of a family or group;
- e) Coordinate the information in Models and Model Elements of all members of the Design Team and CM's design-assist/delegated design designers, into a single federated Model, weekly, to avoid uncoordinated design progression;
- f) Use digital coordination tools and software to identify and track problems with constructability, including clash detection; and
- g) Publish weekly interference/clash reports for review by the Design Team, CM and DR for resolution by the Design Team weekly with validation by the Consultant's BIM manager, including spatial coordination and clash detection as follows:
 - i. Architecture and Structure: Below-grade spaces, proposed floor plates with major penetrations, floor-to-floor heights, beam clearances, heavy utility locations, floor loads, core and vertical shafts, beam depths and required clearances, soffit-mounted equipment, slab thickness, columns and column baseplates/anchorage, column caps and lateral systems/seismic bracing. Provide adequate space for construction and maintenance access to structural elements, building equipment, and distribution systems;

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- ii. Architecture and MEPF: Structural and space elements, flow and isolation requirements, proposed functional area configurations, floor-to-floor heights, fire containment, vertical and horizontal transportation. Possible future expansions must be considered in consultation with the DR and must be clash-free;
- iii. MEPF/HVAC and Architecture, Structure, Connectivity (IT/AV/ISS): Main distribution and collection systems, configurations and sizes for piping, ducts, conduits, raceways, outlet boxes, IT/AV/ISS equipment racks, wiring and end devices (all types), fans, diffusers, intakes, exhausts, and all other related equipment. Clearance reservations for equipment maintenance, filter removal and equipment removal and replacement must be Modelled with the equipment;
- iv. Architecture and Fire Protection: Fire zone compartmentalization and fire detection and suppression pipe and end device location, egress paths and exit distance requirements, equipment, and pipe and end device penetrations;
- v. Major Non-HVAC Equipment and Architecture, MEPF, HVAC, Structural: Major equipment positioning and location requirements, specialist service distribution and waste collection, and public communications, Connectivity, and building controls. This includes equipment adjacencies and guards, barriers, pipes, venting and air intake and exhaust locations and other limitations;
- vi. Architecture, HVAC and Interiors: Merges must include ductwork, piping and end devices, ceilings, FF&E, Connectivity, signage, and HVAC;
- vii. Space Validation: There must be no space gaps. Bounding boxes used to represent room and zone spaces must match with architectural requirements and data values, and all must be coordinated;
- viii. General Model Quality Checking: All assemblies must be properly joined to prevent “space leaks” in areas defined by enclosing walls and floors and ceilings. Bounding boxes must not conflict;
- ix. Security: Security zoning, internal building and external Site;
- x. Accessibility Compliance: Wheelchair clearances, internal building and external Site pathways, inclusion and position of wayfinding, signage, and visual aids; and
- xi. Site and MEPF: Landscape architecture and Site lighting with building envelope, MEP, civil/municipal systems and components, security components, and signage.

10.3.2.3 BIM Services Deliverables

The Consultant must:

- a) Submit to the DR and the CM’s BIM Manager weekly clash detection reports as defined in the BXP; and
- b) Develop the Model in conformance with the prescribed standards, the BXP, and the Project Brief. Submit the up-to-date Model to the DR for review and interrogation at 50%, 90% and 100% SD and DD, and again during the DP and construction stages as requested.

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11 PRE-DESIGN SERVICES

11.1 Intent

The objective of the PD stage is to review and validate Project requirements, identify information gaps and necessary approvals, permits, etc., and investigate through various means (e.g., exterior non-destructive and destructive testing/openings, surveys with visual and tactile review/analysis) to confirm and record existing building and Site conditions.

The Design Team's background research and investigation findings will serve to further define their SD activities and investigations. The Design Team must plan and undertake investigations to confirm the Site and NRC Campus conditions, either known or unknown at the time of Contract award.

The Consultant must prioritize the Design Team's project delivery (PD) services and produce interim PD reports for review by the DR, and advance the prioritized analysis with concurrent SD activities.

The PD requirements and Services in this Project Brief section 11 apply to each of the enabling projects identified in Project Brief section 4.2, but adapted and streamlined to the maximum extent possible, as agreed by the DR.

11.2 Existing Documentation

A significant amount of information exists from previous investigations, building improvements, building condition assessments, lessons learned from similar projects, as well as information on approval process, standards, policies, etc. The documents identified in Project Brief section 8–REFERENCE INFORMATION provide information to understand the general condition of the TSTS, its Site, its urban context, as well as the government policies and processes that apply to this Project. Other reports, studies, and Drawings (Project documentation) may be available from the DR for review if identified as necessary by the Design Team's gap analysis.

11.2.1 Activities

The Design Team must:

- a) Review and understand the reports, studies, and related information in Project Brief section 8–REFERENCE INFORMATION;
- b) Conduct interviews with the TSTS occupants and their operational staff to understand their current operations and ongoing operational challenges, including hazards;
- c) Validate and confirm to the DR the relevance of information from interviews and from Project Brief section 8–REFERENCE INFORMATION in the context of Project Brief section 4–SCOPE;

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- d) Review and confirm with the DR the life-cycle Cost analysis assumptions (e.g., escalation and discount rates, component repair/replacement frequency, etc.);
- e) Review and confirm the integrity and completeness of the existing conditions Model and NRC survey control network; and
- f) Develop a preliminary gap analysis report based on the Design Team's review of all Project Brief section 8–REFERENCE INFORMATION and information from interviews.

11.3 Investigations

The Design Team must develop a Project-specific investigations program to systematically analyze, test and determine existing TSTS and Site conditions. This will include a site assessment and a contract documents review of the Enabling Works to determine what has been completed and what remains to be done to complete project design. **Activities**

The Design Team must:

- a) Carefully consider the building/Site access requirements, in consultation with and with the input of CM, submit to the DR a prioritized listing of investigations necessary, per discipline, to meet the PD requirements described in the following subsections and to inform SD options, meet key intermediate activities outlined in Project Brief section 1.3.3–Milestones;
- b) Update the prioritized investigation list to reflect new or evolving requirements and resubmit to the DR monthly, or more often if requested; and
- c) Per investigation, with the input of the DR:
 - i. Identify individual investigation scope and rationale (i.e., location(s), objectives, why now), consequence of deferral, detailed methods (e.g., observations, measurements, specific information that will be collected in the testing, destructive testing, digging, laboratory testing, tools/equipment necessary (e.g., crane, ladders, etc.));
 - ii. For destructive testing or highly public investigations, obtain direction from the DR and, if required, prepare and present investigation rationale and supporting documents to the authorities having jurisdiction (i.e., City of Ottawa, NRC) and integrate their recommendations or requirements in the investigation scope and method;
 - iii. Provide a list of all personnel involved in the investigation (i.e., Design Team, others);
 - iv. Provide a detailed schedule and indicate start and completion times, activity sequencing, duration for reinstatement for destructive testing, and other information as deemed necessary by the DR to obtain NRC approval to proceed;
 - v. Obtain the DR's approval before proceeding with each investigation;
 - vi. Provide ongoing oversight of each investigation activity and, unless there is an emergency situation (e.g., system failure), limit the investigation scope planned and approved is undertaken;
 - vii. Prepare a detailed investigation summary and submit to the DR within 10 Working Days of each investigation;
 - viii. Incorporate into the Model all findings resulting from each investigation; and
- d) Complete a pre-construction survey with tactile and visual review of nearby buildings and infrastructure to confirm and document existing conditions.

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11.4 Regulatory Analysis

Regulatory analysis identification and confirmation of the requirements that will govern the Project design and approval processes in the SD, DD and DP stages and future occupancy.

11.4.1 Activities

The Design Team must walk through and audit the Site and undertake a complete analysis of the Project regulatory framework and requirements, including but not limited to:

- a) A summary of regulatory and statutory requirements (i.e., federal, provincial, and municipal);
- b) Identification of Authorities having jurisdiction, their role, when their approval is necessary, and how their approval is linked to (a prerequisite for) design progression and construction;
- c) Identification of applicable codes, regulations, plans, policies and standards, including those for risks and hazards related to science-activities and for the facility as a whole, seismic and structural assessment, the environment, and sustainability;
- d) A listing of potential conflicts between federal and provincial codes, policies, and Acts and rationale of which code, policy, Act, etc. should apply to this Project; and
- e) A summary of the interim life safety requirements necessary during construction (e.g., water supply requirements, sprinklered scaffolding, fire compartment zones, fire protection, health and safety obligations within the building and on and around the Site).

11.5 Geotechnical Analysis

The Design Team must coordinate their design requirements and analysis with PWGSC's geotechnical consultant and incorporate relevant geotechnical findings into their PD reports.

11.6 Environmental Analysis

The Design Team must coordinate their design requirements and analysis with PWGSC's environmental consultants and incorporate relevant environmental findings into their PD reports.

11.7 Site Analysis

11.7.1 Landscape Architecture and Urban Design Analysis

The Design Team must analyze landscape architecture and urban planning requirements for the Project, as part of the PD report, which includes but is not limited to:

- a) Undertaking comprehensive research and review of past reports related to prepare an illustrated landscape background analysis chapter within the PD report on the history and development of the NRC Campus and the landscape immediately around the TSTS hub;
- b) Analysis and documentation of existing Site conditions including all above and below grade landscape features, wayfinding and signage (e.g., regulatory and directional information), exterior lighting, security features (e.g., surveillance cameras, emergency stations), landscape furniture, amenities, trees and vegetation, grading, soil and soil structure condition, drainage and irrigation, and mechanical, electrical and fire protection infrastructure;

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- c) Analysis of land patterns and spatial organization on the NRC Campus, including planning and design principles, relationships between the landscape, buildings, built infrastructure, support functions, operation and maintenance, etc.;
- d) Analysis of current pedestrian and vehicular circulation and potential changes necessary to meet circulation requirements and, if applicable, security requirements;
- e) Analysis of universal accessibility requirements for proposed TSTS hub access and egress points and the surrounding Site, including transitions to areas adjacent to the Site;
- f) Analysis and implications of the Site landscape and Site security and Project approval processes;
- g) Preparing a tree conservation report that includes, but is not limited to species composition, size, age, condition and health, environmental value of the trees within the Site and their ecological function and context within the surrounding landscape;
- h) Analyzing surface drainage patterns;
- i) Analysis and identification of requirements for an exterior signage and way-finding strategy with interior signage and way-finding strategy to demonstrate integration of the outdoor experience leading to the indoor circulation;
- j) Identifying requirements for and location of temporary signage and wayfinding during construction;
- k) Identifying and describing opportunities and strategies to limit and protect the impact to landscape features of future work and winter maintenance (e.g., snow removal or storage);
- l) Identifying and describing landscape features within and adjacent to the Project Site that require protection during construction;
- m) Analysis and identification of landscape design objectives and approach;
- n) A gap analysis of existing conditions and documentation, the landscape design objectives and approach and other Project requirements; and
- o) Assessing and implementing further investigations to identify, quantify, and determine landscape requirements.

11.7.2 Civil/Municipal Analysis

The Design Team must analyse the civil/municipal requirements for the Project, as part of the PD report, which includes but is not limited to:

- a) Analyse infrastructure, subsurface and above grade services and water flow patterns. Include capacities and limitations for storm water and sanitary sewer systems, foundation drainage, tunnels, fire protection, power, water, and telecommunications;
- b) Create a hydraulic model for the existing water distribution network to verify if the NRC's watermain grid can accommodate the proposed fire flows and domestic usage. The hydraulic model must assess the existing water distribution system response to:
 - i. Maximum day demand with fire flow, minimum operating pressure 138kPa; and
 - ii. Peak rate (maximum hourly demand), minimum operating pressure 276kPa;
- c) Create a hydraulic model for the existing storm water management system to verify if NRC's storm water system can accommodate the anticipated flows;

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- d) Field verify watermain and sewer invert and size to the extent required to permit a professional assessment of the impact of the Project mandate on the NRC Campus and municipal infrastructure;
- e) Identify all improvements that may be required on-Site as well as off-Site (i.e., the NRC Campus at large and potential City of Ottawa municipal water distribution);
- f) Determine the degree of on-Site testing and carry out said testing as part of the Design Team's investigation plan. Follow the technical requirements of the local municipality; and
- g) Incorporate into the BIM Model the location and technical parameters of the existing water main and sanitary sewer systems and their appurtenances, subsurface and surface water flow patterns, underground tunnels, other municipal infrastructure, existing power and IT duct banks/conduits.

11.7.3 Surveying Analysis

The Design Team must analyse and incorporate PWGSC's surveying information into the Model, as part of the PD report. Should additional legal or topographic survey information be required, the Design Team must advise the DR of what information is needed and by what date.

11.8 Architectural Analysis

11.8.1 Building Program Analysis

The Design team must analyze the building program requirements for the Project, as part of the PD report, which includes but is not limited to:

- a) Review, analyze and validate the TSTS occupants' functional program, PWGSC's siting options study, and other pertinent documents in Project Brief section 8—REFERENCE INFORMATION ;
- b) Study the differences between the reference information and the pre-design functional program and the siting options study;
- c) Coordinate with and obtain input from the CM regarding early advice on construction challenges arising from the reference information and the TSTS occupants' pre-design functional program and PWGSC's siting options study;
- d) Analyze and compare the expectations and requirements outlined in this Project Brief versus the TSTS occupants' pre-design functional program and PWGSC's siting options study;
- e) Confirm the boundaries of the Project Site;
- f) Test the capacity of the TSTS hub to accommodate the pre-design functional program; and
- g) Prepare and submit to the DR a gap analysis within 12 weeks of Contract award.

11.8.2 Functional Program Analysis

The Design Team must analyze the pre-design functional program of the Project, as part of the PD report, which includes but is not limited to:

- a) Participation in two information workshops with the FRAMEWORK consultant team who prepared the pre-design functional program to review the information within and discuss the structure of the program and known issues/challenges;

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- b) Review and validate the pre-design functional program report and room data sheet format. If necessary, make recommendations to the DR for revisions during the SD stage;
- c) Analyze the pre-design functional program and spatial requirements for proposed functions and operations, which include:
 - i. Office, support and special purpose space requirements;
 - ii. Unique laboratory space requirements and proximities, including the LVA per space in accordance with paragraph c) of Project Brief section 11.12–Mechanical Analysis;
 - iii. Acoustic requirements including speech security and privacy offices, meeting rooms, and public gathering spaces, base building mechanical and electrical rooms and operations spaces;
 - iv. Building system requirements including flexible approach to evolving use and occupancy of the TSTS occupants;
 - v. Potential interoperability requirements of building system components (e.g., architectural elements, mechanical and electrical elements, sensors, end devices, metering and sub-metering, security and occupancy sensors) required for the final, as-built Model;
 - vi. Programmatic options including circulation paths;
 - vii. PWGSC and NRC/TSB reports, studies;
 - viii. Physical security zoning and requirements compliant with the RCMP [G1-026 Guide to the Application of Physical Security Zones](#), in accordance with Project Brief section 11.8.4–Security Analysis;
 - ix. Audio-visual requirements in accordance with Project Brief section 11.8.5–Audio-Visual Analysis;
 - x. IT requirements in accordance with Project Brief section 11.8.6–Information Technology Analysis;
 - xi. FF&E requirements including design approach and Connectivity integration requirements;
 - xii. Site requirements; and
 - xiii. Vibration and electro-magnetic interference control and requirements; and
- d) Prepare and submit to the DR a gap analysis within 12 weeks of Contract award.

11.8.3 Accessibility Analysis

The Design Team must analyze the accessibility requirements for the Project, as part of the PD report, which includes but is not limited to:

- a) Review and analysis of the Project Brief section 8–REFERENCE INFORMATION and confirmation of requirements in the governing Acts, regulations, policies and standards, as described in Project Brief section 4.3.4.3–Universal Design for Accessibility;
- b) Identification of any other pertinent regulations, policies and standards that apply to the Project;
- c) Undertaking a visual audit of the TSTS Site and its surrounding NRC Campus landscape, including transition zones to adjacent areas; and

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- d) Identification of specific [Accessibly Canada Act](#) requirements that represent incremental scope beyond the [CAN/CSA B651-18](#) standard and its supplements, and changes to existing TSTS occupant operations (e.g., laboratory spaces, meeting rooms, public access).

11.8.4 Security Analysis

The majority of security-related Services and deliverables are protected B, with a few documents at the secret (level II) security classification. The Consultant must make sure Contract deliverables are organized such that protected B and classified information are duly segregated and securely stored separate from standard PD stage deliverables. Accordingly, to the extent possible and to the approval of the DR the Design Team must prepare ‘sanitized’ (non-classified) versions of classified documents with the PD stage deliverables (i.e., two security reports: classified and sanitized).

The Design Team must analyze the security requirements for the Project, as part of the PD report, which includes but is not limited to:

- a) Review and analysis of the threat and risk assessment (TRA), preliminary security requirements (PSR) and Security Design Brief (SDB) prepared by LC’s security team;
- b) As part of the pre-design functional program gap analysis identified in Project Brief section 11.8.2, assessment of security application(s) definition for each room/space; such as, access control, security video, security intercom, duress, speech privacy, chemical-biological-radiological-nuclear (CBRN) monitoring/HVAC, metal detection, x-ray scanning, electronic emission mitigation, counter technical intrusion requirements;
- c) Assessment, analysis, and summary of new security technologies such as biometric data systems with biometric recognition/identification (i.e., physiological and behavioural technologies). Identify similar facilities/organizations (public and governmental) integrating said technologies into their security operations. Identify benefits, drawbacks/limitations, and staffing implications related to said technologies;
- d) Undertaking a thorough review and description of the surrounding landscape and transition zones to adjacent areas, and their security implications, as an input to the Project-specific security design options;
- e) Identification the types, frequency, volume and timing of vehicular movement and of pedestrian traffic to, from, within, and around the building and its surrounding landscape during summer and peak use (business) periods;
- f) Through the DR, interviews with the LC security team and the TSB and NRC security personnel to understand and confirm current and proposed security operations intent, within the TSTS hub and its Site;
- g) Review and confirmation high-level preliminary security requirements (PSR), which identify security:
 - i. Purpose and objectives;
 - ii. Scope, assumption, and limitations;
 - iii. Site context and considerations;
 - iv. Building envelope considerations;
 - v. Building interior considerations;

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- vi. Zoning with graphic illustration (exterior and interior – all floors), and zone definition/rationale, taking into account the space types, blocking and stacking;
- vii. Technologies and systems; and
- viii. Operations and workforce requirements;
- h) Review and confirmation the preliminary security governance framework, which:
 - i. Describes the overarching security governance principles;
 - ii. Describes the stakeholders involved in the Project, along with their respective roles and responsibilities, including, at a minimum: the NRC, TSB, PWGSC, the RCMP, the Commissionaires of Canada, the Consultant, Design Team members, the Construction Manager; and
 - iii. Includes an outline RACI (Responsible, Accountable, Consulted, Informed) matrix;
- i) Identification and recommendation of other areas of analysis to consider. Obtain the DR's approval before proceeding with said recommendations;
- j) With the DR, assessment and confirmation of the classification of security-related Project documentation under development. Develop the rationale and examples to genericize ('sanitize') security-related information to the extent possible, while safeguarding classified information within secure documents and storage; and
- k) As an input to the Project Brief section 10.2.2–BIM Execution Plan, provide recommendations to the DR regarding the type and extent of information to incorporate into the Model, as well as control protocols for the handling and access of classified information. Incorporate only the information permitted into the Model.

11.8.5 Audio-Visual Analysis

The majority of AV-related Services and deliverables are protected B, with a few documents at the secret (level II) security classification. The Consultant must make sure Contract deliverables are organized such that protected B and classified information are duly segregated and securely stored separate from standard PD stage deliverables. Accordingly, to the extent possible and to the approval of the DR the Design Team must prepare 'sanitized' (non-classified) versions of classified documents with the design stage deliverables (i.e., two AV reports per submission: classified and sanitized).

The Design Team must analyze the audio-visual requirements for the Project, as part of the PD report, which includes but is not limited to:

- a) As part of the pre-design functional program gap analysis identified in Project Brief section 11.8.2, assessment of AV requirements for each room/space, such as meeting rooms, other special use and office spaces, if applicable, laboratories as applicable, exterior AV applications/opportunities; and any other spaces managed, operated or occupied by AV personnel;
- b) Assessment, analysis, and summary of advanced AV technologies. Identify similar facilities/organizations (public and governmental) integrating said technologies into their AV operations. Identify benefits, drawbacks/limitations, and staffing implications related to said technologies;
- c) Undertaking a thorough review and description of the physical spaces and the architectural features of the building, and the surrounding landscape, as an input to the Project-specific AV design options;

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- d) Through the DR, interviews with NRC and TSB AV personnel to understand and confirm current and proposed AV operational intent, within the TSTS hub and support on the Site. Probe and understand potential opportunities and limitations for AV and other systems integration; and
- e) Development of high-level preliminary AV requirements (PAVR), which identify AV:
 - i. Purpose and objectives;
 - ii. Scope, assumption, and limitations;
 - iii. Site context and considerations;
 - iv. Building interior and exterior considerations (e.g., architectural and structural/seismic design);
 - v. AV space requirements with graphic illustration (exterior and interior – all floors), taking into account the space types, blocking and stacking;
 - vi. Technologies and systems; and
 - vii. Operations and workforce requirements.

11.8.6 Information Technology Analysis

All IT-related Services and deliverables are classified in the Contract at the secret (level II) security classification. The Consultant must make sure Contract deliverables are organized such that classified information is duly segregated and securely stored separate from standard design stage deliverables. Accordingly, to the extent possible and to the approval of the DR the Design Team must prepare 'sanitized' (non-classified) versions of classified documents with the design stage deliverables (i.e., two IT reports per submission: classified and sanitized).

The Design Team must analyze the IT requirements for the Project, as part of the PD report, which includes but is not limited to:

- a) As part of the pre-design functional program gap analysis identified in Project Brief section 11.8.2, an assessment of IT requirements for each room/space; such as, all laboratory spaces, telecommunications rooms (TR), server rooms, backup server rooms, equipment rooms including audio-visual equipment rooms, IT testing and workshop facilities, , meeting rooms, other special use and office spaces, other exterior IT applications/opportunities, and any other spaces managed, operated or occupied by IT personnel;
- b) Assessment, analysis, and summary of advanced IT technologies, including, but not limited to smart system technologies and platforms, implementing IOT (Internet of Things) strategies and connectivity platforms. Identify similar facilities/organizations (public and governmental) integrating said technologies into their IT operations. Identify benefits, drawbacks/limitations, and staffing implications related to said technologies;
- c) Undertaking a thorough review and description of the physical spaces and the architectural features of the proposed building, and the surrounding landscape, as an input to the Project-specific IT design options;
- d) Through the DR, interviews with NRC and TSB facilities management, IT, AV, and security operations personnel to understand and confirm current and proposed IT operational intent, within the TSTS hub and support on the Site. Probe and understand potential opportunities and limitations for IT and other systems integration, including requirements to segregate TSB IT systems; and
- e) Development of high-level preliminary IT requirements (PITR), which identify IT:

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- i. Purpose and objectives;
- ii. Scope, assumption, and limitations;
- iii. Site context and considerations;
- iv. Building interior and exterior considerations (e.g., structural/seismic upgrades, square meter availability, and expansion/contraction opportunities, etc.);
- v. IT space and cabling pathway requirements with graphic illustration (exterior and interior—all floors), taking into account the space types, blocking and stacking, and the TSB's need to separate and protect their IT systems;
- vi. Technologies and systems; and
- vii. Operations and workforce requirements.

11.8.7 Move Analysis

The Design Team must analyse the TSTS occupants move requirements for the Project, as part of the PD report, which includes but is not limited to:

- a) On-site review at the current TSB head office, TSB engineering laboratory, and NRC ARC SPML facilities, as organized and coordinated by the DR, to review and identify office, laboratory, and scientific goods and equipment that are to be moved to the TSTS hub and integrated into the Project design and construction, or moved to the TSTS hub after handover to Canada and placed within and/or connected to building systems (e.g., power, mechanical, IT);
- b) Development of a detailed listing per good and per piece of office, laboratory and scientific equipment regarding its location, office and laboratory space requirements, building systems connection requirements as applicable, start-up and commissioning requirements, and all other pertinent information to further develop complete SD options;
- c) Identify pieces of equipment which require highly sensitive calibration and require strict environmental and handling measures during relocation, installation, and recommissioning; and
- d) Identify equipment, ongoing experiments and/or biological products that are the responsibility of the TSTS occupant to move.

11.8.8 FF&E and Connectivity Analysis

The Design Team must analyse the FF&E requirements for the Project, as part of the PD report, which includes but is not limited to:

- a) With the CM's input, validation of Project-specific FF&E goods identified in Project Brief APPENDIX E—FF&E COMPONENT WBS DICTIONARY and responsibilities/listing in APPENDIX G—FF&E AND CONNECTIVITY RESPONSIBILITIES MATRIX with, if necessary, proposed modifications to the approval of the DR;
- b) In coordination with the functional program analysis, determination of:
 - i. Preliminary types and quantities of existing and new FF&E forming part of the Project design; and
 - ii. Preliminary identification and assessment of TSTS occupants' office and laboratory goods and equipment to move and integrated into the Project design, in coordination with the preceding Project Brief section—Move Analysis;

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- c) Development the format of an FF&E matrix (FF&EM) to list and identify FF&E new and existing items/goods, to track FF&E through the SD, DD and DP stages, including FF&E information in the Model, as well as track FF&E through move, delivery, installation, and commissioning. Include in the FF&EM provision to define and detail, per FF&E good/item:
 - i. Item room number and location;
 - ii. Dimensions;
 - iii. Sample manufacturer, make, and model number;
 - iv. Generic description including mandatory requirements and finishes;
 - v. Work Breakdown Structure (WBS) category, aligned with Project Brief APPENDIX E–FF&E COMPONENT WBS DICTIONARY;
 - vi. Procurement group number;
 - vii. Delivery requirements; and
 - viii. Installation requirements;
 - ix. Confirmation if the FF&E good/item is a new procurement or existing inventory; and
 - x. For existing inventory, include the original good/item location;
- d) Definition of how FF&E will be identified and linked in the Model to an attributes list. The list must identify, at a minimum, the type, finish, dimensions, connectivity requirements, and other characteristics of the item/good. Define, identify, coordinate, and integrate FF&E as part of/in conjunction with Project Brief section 10.2.2–BIM Execution Plan;

11.8.9 Acoustic Analysis

The Design Team must analyse the acoustic design requirements and their effect on architectural, mechanical and other building components and systems for the Project, as part of the PD report, which includes but is not limited to:

- a) Understanding the TSTS occupants' functional program and security analysis and requirements;
- b) In consultation with the security design discipline, identify gaps between existing conditions and functional program requirements for speech security and speech privacy per space;
- c) In consultation with the security design discipline, analyzing acoustic requirements for architectural, mechanical, electrical systems to support the functional requirements, particularly with respect to laboratories and their ancillary support spaces, meeting rooms, office and public spaces;
- d) In consultation with the security design discipline, developing an acoustics design and construction strategy suitable for each space; and
- e) Analyze how similar installations could be designed and constructed, considering design (Modelling) requirements.

11.9 Sustainability Analysis

The Design Team must analyse the sustainability requirements for the Project, as part of the PD report, which includes:

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- a) Identifying government policies and objectives, environmental considerations or other requirements that would influence the Project sustainability strategy;
- b) Establishing a sustainability vision for the Project and sustainability principles that govern all design disciplines;
- c) Defining the rationale for and select the most appropriate sustainability certification rating system for the Project;
- d) Undertaking a climate change risk assessment to identify future risks and vulnerabilities related to climate change based on a vulnerability assessment methodology such as the Engineers Canada's [Public Infrastructure Engineering Vulnerability Committee](#) (PIEVC) protocol or equivalent. Include in the assessment:
 - i. Current and projected climate conditions for the next 60 years;
 - ii. Effects from changes in local climate conditions and potential extreme weather events (e.g., temperature, precipitation, flooding, wind, slow onset hazards, other hazards);
 - iii. Potential design measures must take into account:
 - 1. Accelerated deterioration (reduced durability) of the TSTS hub and its landscape; and
 - 2. Extreme weather events (e.g., increased snow load and slow onset impacts such as heatwaves, cold snaps, changes to water supply, more freeze-thaw cycles); and
 - iv. Changes to the scope and frequency of building and Site operations and maintenance activities and cyclical repairs (i.e., minor capital works). Identify said changes in the development of Project Brief sections 11.14, 12.3.11, 13.2.11, 14.3.12–Commissioning and Property Management, in accordance with Project Brief section 4.1.4–Operating Requirements;
- e) Identifying and developing preliminary design and construction sustainability strategies, benefits and complexities of potential design/construction approaches, and:
 - i. Assessing the use of mass timber construction in whole or in part for building elements;
 - ii. Summarizing potential sustainability credits in the sustainability scorecard for the chosen rating tools; and
 - iii. Not limiting sustainability strategies by or only to credits identified in the chosen rating tools, as rating tools are only a guide to verify an industry recognized level of performance and do not define the Project sustainable design or its delivery;
- f) Confirming the scope, assumptions, and analysis process(es) for whole-building LCA, using the Athena [Impact Estimator for Buildings](#) (version 5.4 Build 0103 or newer), to evaluate environmental impact reduction opportunities including:
 - i. Embodied and operating energy;
 - ii. Embodied carbon; and
 - iii. Related emissions to air, water, land;

(Note: In this Project Brief, the Athena [Impact Estimator for Buildings](#) is referenced. The Consultant and CM may choose an equivalent software, to the approval of the DR, so long as the approved software is consistently used for all sustainability-related Services throughout the Contract.)

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- g) Developing an initial base building energy Model, based on preliminary sustainability and energy efficiency strategies identified by the FRAMEWORK consultant team, calibrating the energy Model accordingly;
- h) Confirming the assumptions regarding inflation and discount rates, fuel cost escalations, TSTS hub alteration improvement and demolition, recycling and disposal, in accordance with Project Brief section 4.1.4.3–Life-Cycle Cost Analysis;
- i) Confirming the scope, assumptions, and analysis process(es) for whole-building energy analysis, and energy Models meeting the ASHRAE 140 Standard, using software approved by the DR, to evaluate SD options and determine best-value measures for optimal energy performance. Integrate energy analysis and energy Models with Project Brief section 4.1.4.3–Life-Cycle Cost Analysis;
- j) Obtaining from the DR conversion information/factors to determine GHG emissions based on SD energy analysis and the energy Models;
- k) Input to the development of the Consultant’s quality management plan in accordance with Project Brief section 10.2.1.2–Quality Management Planning;
- l) Develop preliminary budgets for sustainability strategies;
- m) Providing an overview of the guidance and education requirements for all building occupants (i.e., occupant employees and managers, operations and maintenance staff, third-party contractors, etc.) related to all proposed sustainability features within the building and Site; and
- n) Defining ‘green’ cleaning procedures, materials, and services for the Project Site and CM’s control (i.e., waste collection, storage and pick-up requirements, cleaning, recycling and composting), etc.

11.10 Building Envelope Analysis

The Design Team must analyze the building envelope requirements for the Project, as part of the PD report, which includes:

- a) Confirming the scope, assumptions, and analysis process(es) for the envelope design, including environmental and operational parameters.

11.11 Structural and Seismic Analysis

The Design Team must analyze structural, seismic, and physical security requirements for the Project, as part of the PD report, which includes:

- a) A structural analysis that is iterative from the PD and SD stages and incorporates increasing levels of sufficiently detailed static and dynamic assumptions and methods;
- b) Development and analyze of a Project-specific structural Modelling framework; and
- c) Outline requirements of a structural Monitoring program, Monitoring equipment, techniques, and activities to be implemented by the CM (e.g., testing, calibration, installation, verification, operation, maintenance, data acquisition, management and storage)

11.11.1 Structural Modelling Framework

The Design Team must develop a structural Modelling framework for creating an analytical Model to support analysis using both detailed static and dynamic methods.

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The Design Team must submit to the DR the structural Modelling framework within 7 months of Contract award.

The structural Modelling framework and subsequent SD analytical Models must:

- a) Meet all requirements for a high importance performance level in accordance with the 2020 NBCC. Include any rationalization for increased performance requirements related to the functional requirements of the building (i.e., specialized deflection requirements for sensitive laboratory areas) and provide justification if the performance requirements exceed the requirement of the 2020 NBCC
- b) Communicate the relationship between and methodology that will be followed for the structural analysis and the Model;
- c) Define the various components of the structure, identifying how:
 - i. Properties will be estimated or measured;
 - ii. Interconnection of the assemblies will be determined; and
 - iii. The above will be Modeled;
- d) Identify where simplified analysis or Model of members, assemblies and connections can be used in the analysis;
- e) Identify loading, acceleration and deformation conditions and define how they will be Modelled including:
 - i. Gravity load breakdown and distribution on members;
 - ii. Wind load and distribution;
 - iii. Seismic load; including the retention of the envelope and integrity of interior finishes and laboratories during and post seismic design event;
 - iv. Environmental loads, including the effects of climate change in accordance with paragraph d) of Project Brief section 11.9; and
 - v. Mechanical system(s) risks and hazards in accordance with paragraph b) of Project Brief section 11.12;
- f) Define boundary conditions, their potential impact on the analysis and results, and how or whether they will be Modeled in the analysis;
- g) Define a parametric analysis that will be used to calibrate the Model:
 - i. Identify how anticipated upper and lower bounds of material properties, component behavior, and boundary conditions will be determined;
 - ii. Define upper and lower boundaries for key parameters to bracket actual behavior; and
 - iii. Provide the design and Model input assumptions for review and approval of the DR;
- h) Define how operational and functional components (OFC) such as roof parapets; assemblies over exit ways; decorative columns, arches and partitions; ceiling systems, mechanical and electrical systems and fixtures will be analyzed and Modelled;
- i) Define the OFC risk analysis to perform, based on CSA S832;
- j) Demonstrate how information from geotechnical soil and rock information and Modelling will be incorporated into the structural Model and analysis;

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- k) Be capable of:
 - i. Analyzing and evaluating the effectiveness of various different seismic design techniques; and
 - ii. Assessing the impact of seismic loads on non-load bearing assemblies and other OFC's; and
- l) Define a regulatory review that will be completed to establish an appropriate design standard and target reliability level for the seismic evaluation.

11.12 Mechanical Analysis

The Design Team must analyse the mechanical and vertical transportation design requirements and sustainability objectives, as part of the PD report, which include:

- a) An analysis of proposed building and specific laboratory systems, approach and guidelines to support and service the mechanical requirements for construction including the construction yard and the enclosed scaffold environment (heating, ventilation and fire protection). Take into consideration:
 - i. The [International Institute of Sustainable Laboratories](#) (I²SL) ventilation risk assessment methodology for data gathering, specifically developed for laboratories, and I²SL's free [User Guide](#) and [hazard assessment tool](#), or equivalent analysis process; and
 - ii. Availability of water, gas and electrical utilities and include analysis and confirmation of available utility limitations, tie-in locations, and capacities to support temporary construction requirements;
- b) A detailed mechanical risk and hazard assessment of each existing TSB and SMPL engineering facility and their laboratory systems and subsystems, as well as review and analysis of the FRAMEWORK pre-design functional program and risk and hazard assessment. For the TSB engineering facility and the NRC's SMPL's engineering facility, identify per building and laboratory system/subsystem:
 - i. Types of hazards, including any use of toxic chemicals;
 - ii. Type(s) of hazard generation (e.g., gas, vapour, dust), the frequency, and the approximate quantity generated during laboratory processes;
 - iii. A list of all of potential exposure control devices (e.g., fume hoods) in laboratory spaces, along with their use(s) and appropriateness;
- c) Development of a preliminary Project-specific LVA, for furtherance during the SD, DD, and DP stages, which:
 - i. To the extent reasonable, prioritizes safety over all other considerations including thermal comfort and sustainability;
 - ii. Incorporates the paragraph b) mechanical risk and hazard analysis to identify requirements for effective management of the risk/hazard and the required ventilation air to maintain safety;
 - iii. Incorporates known and assumed thermal loads in science-spaces to identify the necessary ventilation air to maintain thermal comfort in accordance with ASHREA Standard 55-2020;
 - iv. For perimeter spaces, incorporate known or assumed values thermal loads; and
 - v. Apply sustainability strategies in the management of the hazards and thermal comfort;
 - vi. Incorporate techniques which include but are not limited to:
 - 1. Forming a specialized team, which:

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1. Will take the preliminary industrial hygiene assessment by FRAMEWORK and determine with the Consultant's industrial hygienist the project requirements.
 2. Include specialized LC subject matter experts; and
 3. Where appropriate, include knowledgeable individuals such as the TSTS occupant Health & Safety Officer(s), Facility Manager, and designated science advisor(s) from the TSTS occupants;
2. Analyzing the mechanical risk and hazards identified in paragraph b), including but not limited to:
 1. Laboratory data analysis such as risk banding, hazard rating, exposure generation potential, location of exposure generation;
 2. Generate required forms for further refinement in the SD, DD, and DP stages which include:
 1. Biological, radioactivity, or other risks/hazard exposure information and assessment for equipment such as fume hoods, canopies, vent cabinets, snorkels, etc.;
 2. Survey forms which include laboratory type, hazards present, quantity of hazards and their generation potential, production/generation method, and risk rating(s) based on hazard, quantity, generation; and
 3. Use of algorithms to establish various risks, hazards and their classification(s);
 3. Identifying operational and life cycle management requirements for further definition during the SD, DD and DP stages; and
 4. Establishing outline requirements for furtherance during the SD and DD stages for optimized laboratory ventilation and associated parameters, based on all applicable parameters required for a safe, high-performance and sustainable laboratory;
- d) Identification of temporary mechanical systems necessary for construction;
- e) Analysis of the capacities of existing underground utilities and any required reconstruction of the Site;
- f) Analysis of building automation requirements and extent and methodology of air flow, gas and fluid (all TSTS systems), zonal Modelling, including BIM interoperability requirements of building system components (e.g., sensors, end devices, systems, metering and sub-metering) in the final, as-built Model;
- g) Identification and confirmation of scope, assumptions, analysis process(es), and frequency of both systems and whole-building energy analysis, and energy Models meeting the ASHRAE 140 Standard, using software approved by the DR, to evaluate SD and DD options and determine best-value measures for optimal energy performance, as well as overall Project design and post-construction building performance;
- h) Review and confirmation of requirements for, inter-disciplinary input to, calculation frequency of, systems and overall Project LCA and LCCA, in accordance with Project Brief sections 4.1.4.3–Life-Cycle Cost Analysis and 11.9–Sustainability Analysis;
- i) Analysis of entry points for mechanical services and opportunities or limitations considering the Site and adjacent buildings and infrastructure;

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- j) Analysis of vertical transportation requirements, outdoor air supply and exhaust systems and development of proposals to meet the Project's requirements and objectives; and
- k) Analysis of strategies for the separation/isolation and ongoing Monitoring of proposed building and laboratory mechanical systems, both temporarily and permanently, to provide systems separation for controlling/containing all air borne contaminants based on programmatic and security requirements, such as building security guard posts, central monitoring station(s), Connectivity closets, laboratory storage and work spaces, outside fuel storage and distribution systems, meeting rooms, safe rooms.

11.13 Electrical Analysis

The Design Team must analyse the electrical design requirements and sustainability objectives, as part of the PD report, which include:

- a) An analysis of the condition, loads, capacities, routing of existing normal, emergency and UPS power and Connectivity systems;
- b) A short circuit and coordination study of the existing electrical infrastructure;
- c) An arc flash study in accordance with CSA Z462: Workplace Electrical Safety;
- d) A risk assessment associated with the relocation, replacement, reuse, and upgrade of electrical infrastructure and existing telecom carrier cabling and Site infrastructure;
- e) Confirmation of the electrical supply authority's requirements and supply line capacity, including configuration of the supply network (e.g., lines, switch gear, vault access, etc.) and confirmation of supply authority's fees, disbursements, and timelines for network engineering and construction/reconfiguration;
- f) An analysis and Modelling of entry points for electrical and Connectivity services and opportunities or limitations considering the Site and adjacent buildings and infrastructure;
- g) Confirmation of lighting levels and other electrical requirements based on the Project's program requirements, validating that building, Site, and security-related lighting requirements meet the Canada Occupational Health and Safety Regulations, PWGSC's Technical Reference for Office Building Design, and Illuminating Engineering Society of North America;
- h) Identification and confirmation of scope, assumptions, analysis process(es), and frequency of both systems and whole-building energy analysis, and energy Models meeting the ASHRAE 140 Standard, using software approved by the DR, to evaluate SD and DD options and determine best-value measures for optimal energy performance, as well as overall Project design and post-construction building performance;
- i) Review and confirmation of requirements for, inter-disciplinary input to, calculation frequency of, systems and overall Project LCA and LCCA, in accordance with Project Brief sections 4.1.4.3–Life-Cycle Cost Analysis and 11.9–Sustainability Analysis;
- j) Proposed normal, emergency and UPS electrical distribution requirements and:
 - i. Provide a narrative description of the new electrical requirements including, in coordination with the architectural lighting, sustainability, and mechanical disciplines:
 1. Future loads for building including the Site and Site lighting;
 2. Future mechanical loads for increased microparticulate filtration; and

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- 3. Provision for 10 electric car charging stations in parking area;
- ii. Provide tables, calculations, and full-load projection of the system;
- iii. Provide a comparison graph to demonstrate power requirements over the year timeline of future load projection;
- iv. Define the opportunities related to innovation and requirements to achieve integrated building, sub-system, and localized energy metering systems and integration of new intelligent building technologies;
- v. Include a narrative description and sketches of findings and incorporate into the Model. Include physical constraints on proposed distribution (i.e., Site infrastructure, building layouts, conduits, and chases); and
- vi. Model and provide narrative explanation of the approach and guidelines for temporary power systems for construction operations, including within enclosed scaffolding. Confirm power supply limitations, tie-in locations, and capacities;
- k) Identification of lighting, security and Site lighting and related control requirements, and:
 - i. Provide narrative of the new requirements;
 - ii. Include a narrative of proposed lighting control system(s), their spatial requirements, and incorporate proposed control systems into the Model. Describe building and security and Site lighting control requirements and functionality, location of central control station(s), and integration with the control and metering of other power systems;
- l) Identification of fire alarm system requirements and:
 - i. Provide narrative of the proposed system and sub-systems, their spatial requirements, systems' architecture, panel locations and other features that potentially contribute to an integrated life safety approach, interconnection with remote monitoring station(s), and incorporate proposed systems into the Model; and
 - ii. If required, Model and provide narrative explanation of temporary fire alarm system and remote Monitoring for construction operations;
- m) Identification of public address system requirements and:
 - i. Provide narrative of the proposed system and sub-systems, their spatial requirements, systems' architecture, panel locations and other features that potentially contribute to an integrated life safety approach, interconnection with remote monitoring station(s), and incorporate proposed systems into the Model;
- n) Identification of lightning protection system requirements and:
 - i. Include a narrative on and Model existing system;
 - ii. Include a narrative and Model options for proposed systems type, capacity and interconnection requirements, based on detailed risk analysis and calculations, verification of soil/rock grounding composition;
 - iii. Include and Model each type of building envelope assembly to affix lightning system; and
 - iv. Provide complete risk analysis, calculations, and assumption for the proposed options;
- o) Identification of Connectivity requirements and:

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- i. Describe and Model the existing carrier infrastructure and existing NRC Campus Connectivity systems/components and architecture;
 - ii. Include a narrative and Model options and requirements for proposed IT, audio-visual, an integrated security system, and capacity and interconnection requirements; and
 - iii. Model and provide narrative explanation of temporary Connectivity system for construction operations; and
- p) An analysis of BIM interoperability requirements of electrical and Connectivity system components (e.g., sensors, end devices, systems, metering and sub-metering, etc.) in the final, as-built Model.

11.14 Commissioning and Property Management Analysis

The Design Team must review and identify all design disciplines involved in commissioning and property management requirements and provide an outline the Project-specific commissioning plan, as part of the PD report, which includes:

- a) Validating, or as necessary defining:
 - i. The system-by-system and space-by-space operational criteria in the Project functional program;
 - ii. The process(es) to assess and verify the content and accuracy of the Model at each SD and DD design submission and during DP development; and
 - iii. The process(es) to assess and verify whole building air-tightness to validate the Modelled data for energy efficiency and to identify hot spots for future maintenance/repairs;
- b) Information necessary to fully develop a Project-specific commissioning plan, as well as an outline commissioning plan (i.e., table of contents, preliminary assumptions, roles and responsibilities of the Design Team, CM, PWGSC, and building occupants);
- c) Developing and maintaining the owners Project requirements (OPR), in accordance with ASHRAE 202-18, linked to the functional program and design requirements;
- d) A listing of all requirements necessary, and to be provided by who, for a preliminary building management plan (BMP), as described in Project Brief section 4.1.4.1;
- e) In consultation with the DR and the PWGSC Commissioning Manager, a definition of future maintenance management nomenclature for integration in SD, DD, and DP equipment lists, Specifications and Drawings (i.e., which types of building systems/components and applicable Design Team disciplines, extent of system/component labeling and system/component information reporting). Incorporate the maintenance management nomenclature requirements in the BXP, as identified in Project Brief sections 10.2.2 and 10.3.2;
- f) Overview of the post-construction guidance and education requirements for building occupants (i.e., occupant employees and managers, operations and maintenance staff, third-party contractors) outlining, by group/sector:
 - i. Model use (e.g., accessing, extracting, and adding information); and
 - ii. All sustainability features within the building and Site, including 'green' purchasing and operations and maintenance guidance, cleaning materials and methods, landscape and integrated pest management practices within the building and on the Site, performance objectives for energy, water, and waste streams (i.e., waste collection, storage and pick-up requirements, recycling and composting).

11.15 Cost Analysis

The Design Team must analyse the Cost management requirements and Project objectives, as part of the PD report, which includes:

- a) Development of a work breakdown structure (WBS) dictionary to at least five levels for each of the Project's two major Cost centre and their scope elements, sub-elements and Work activities, that includes:
 - i. Major Cost centre account code or identification number;
 - ii. Estimate account code or estimate mapping code;
 - iii. Element or activity name or Work description;
 - iv. Related milestones, key intermediate dates, and due dates; and
 - v. Provision for the breakdown of labour and Material(s), including hours/units and rates for each;
- b) Developing an estimate format according to the [ASTM E1557, UNIFORMAT II](#) for the entire Project broken down by each major Cost centre and approved WBS;
- c) Undertaking a complete quantity survey of the Project based on the pre-design functional program, sitting options analysis, and related Project documentation as listed in Project Brief section 8–REFERENCE INFORMATION. Incorporate Cost information from the GEICs to present total class D (+/- 20%) estimate of the Project and annual cash flows as per the Project schedule. Code the estimate to the detailed WBS for each scope element, sub-element and Work activity, aligned with each of the Project's two major Cost centers;
- d) Detailing a comprehensive basis of estimate, which beyond the standards established by the Canadian Institute of Quantity Surveyors includes:
 - i. Detailed definitions for each type of contingency, their percentages and their intended use;
 - ii. Detailed information related to the approach and method of measurement, including a summary of the differences in how PWGSC measures space according to PWGSC's space management standards;
 - iii. A narrative summary of all items covered and not covered by general requirements, fully considering the constraints identified in Project Brief section 1.4.11–Work Restrictions and Sequencing (e.g., winter construction premiums, plant, material and equipment, building permits versus trade permits built into trade estimates, subcontractor default insurance, bonding, and related matters affecting Cost);
- e) Itemizing the LCA and LCCA requirements and confirming with the DR the LCA and LCCA methodology(ies), calculation format, and all assumptions (e.g., escalation and discount rates, component repair/replacement frequency, annualized operating Costs, and related information), as described Project Brief sections 11.9–Sustainability, 4.1.4.1–Preliminary Building Management Plan, and 4.1.4.3–Life-Cycle Cost Analysis;
- f) Determining and monthly reporting on the percentage complete of Design Team activities through all Project stages, linking this information (resource demand) with the Consultant's monthly resource-loaded schedule; and

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- g) Developing a preliminary budget for sustainability strategies.

11.16 Pre-Design Deliverables

The Consultant must submit to the DR:

- a) A prioritized listing of investigations necessary, per discipline, within 60 Working Days of Contract award;
- b) Per investigation, appropriated detailed Specifications and Drawings for the DR's tendering;
- c) A detailed investigation summary within 10 Working Days of each investigation, or as agreed by the DR;
- d) A summary of the reference documentation reviewed and an initial gap analysis per discipline within 60 Working Days of Contract award;
- e) A PD report template complete with table of contents and subsections identified within 60 Working Days of Contract award. Revise the PD report template and resubmit the template within 20 Working Days of receiving the DR's comments;
- f) A monthly gap analysis update until the end of the PD stage, incorporating additional investigation findings and ongoing research and analysis. Include an overall gap analysis summary in the Pre-Design Report;
- g) A monthly investigations program update, or more frequently if warranted, of prioritized investigations which reflect new or evolving requirements; and
- h) Provide a PD report which consolidates completed investigations findings, progress of on-going investigations and discipline-specific requirements/deliverables identified in this Project Brief section 11. The PD report must illustrate an analysis of the Project requirements and investigation findings and serve as a benchmark inform the SD options development. The body of the pre-design report is to include, as a minimum, the following sections:
 - i. Executive summary;
 - ii. Glossary of terms;
 - iii. Summary of reviewed documentation;
 - iv. Summary of investigations;
 - v. Regulatory analysis;
 - vi. Site analysis;
 - 1. Landscape architecture and urban design analysis;
 - 2. Civil/municipal analysis; and
 - 3. Surveying analysis;
 - vii. Architectural analysis;
 - 1. Building program analysis;
 - 2. Functional program analysis;
 - 3. Accessibility analysis;
 - 4. Security analysis;

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5. Audio-Visual Analysis;
6. Information Technology Analysis;
7. Move Analysis;
8. FF&E and Connectivity analysis; and
9. Acoustics analysis;
- viii. Sustainability analysis including, among other requirements, the climate change risk assessment, the scope, assumptions, and analysis process(es) for whole-building LCA, whole-building energy analysis and Modelling, and complete the LCA and LCCA in accordance with Project Brief section 4.1.4.3;
- ix. Building envelope analysis;
- x. Structural and seismic analysis;
- xi. Mechanical analysis, including the detailed risk and hazard assessment of existing TSB and SMPL laboratory operations, and preliminary Project-specific LVA;
- xii. Electrical analysis;
- xiii. Commissioning and property management analysis including, among other requirements, an outline commissioning plan and a listing of requirements (inputs) to develop a complete BMP;
- xiv. Cost analysis, including a preliminary sustainability budget; and
- xv. Monthly reporting of Design Team resources progress percentage complete against each WBS element, integrated with the Consultant's monthly schedule submission;
- i) Include, as a minimum:
 - i. Identification of opportunities to accelerate Project delivery;
 - ii. Identification of potential conflicts with the implementation of phased DPs; and
 - iii. Analysis of risk implications and preliminary mitigations strategies for managing risk during the Consultant's subsequent required Services stages of the Project.

11.17 Response to Pre-Design Report

The Consultant must:

- a) Review and analyse all the comments provided by the Project Team;
- b) Prepare and submit a written response to the DR within 20 Working Days to all the submission comments; and
- c) Integrate comments into the subsequent submissions as directed by the DR.

12 SCHEMATIC DESIGN SERVICES

12.1 Intent

The objective of the SD stage is to develop and analyze design options, balancing them against the Project objectives. All SD options will be reviewed and approved by the DR at a minimum of 50%, 90%, and 100%.

In order to respond to the schedule, the Consultant must prioritize design production and review those design elements already prioritized during PD stage. The Consultant must optimize the individual work flow of each Design Team member to meet production milestones.

The Design Team must develop and present a minimum of two complete, distinct and viable options at 100% SD. The two options must be integrated holistic solutions, which incorporate the planning strategies to meet the building and functional program, and whole-building and site sustainability strategies. In support of the two options, each design discipline must complete their designs with sufficient detail to provide a comparison and analysis against Project requirements, as well as a narrative explanation of the merits of their options and rationale for their recommended option, balancing all Project objectives. The Design Team must consult with PWGSC's GEICs to provide these consultants a complete understanding of the proposed SD options. The Design Team must analyze and incorporate the applicable design requirements and information from PWGSC's GEICs as they apply to their design discipline.

Each submission must be illustrated in renderings and Drawings generated from the Model, narrative chapters with the submission report, as well as PowerPoint presentations. Sufficient design detail is required to indicate all key elements of the functional program are met. Each SD submission is to provide more detail and refinement than the previous submission. The Design Team must indicate a preferred option and sub-option and indicate the advantages and disadvantages of each option.

The Design Team must confirm design interferences within the Model are identified and resolved weekly, or as defined in the up-to-date BXP.

SDs will be presented in an integrated and coordinated Model with colour-coded spatial analysis to summarize each SD option. Rendered Model and fly-through presentations are required for specific key design elements such as, but not limited to, high and mid bays, workshops, laboratories, the Site, building exterior, landscape design, and other spaces as agreed by the DR.

Once hired, the CM will participate in the design process, provide constructability reviews and design-assist services if and when requested by the DR, and review design options.

At 100% SD the functional program must be fully developed and presented for approval, along with the preferred design option. A combination of SD options may be identified by the DR and TSTS occupants as

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their preferred SD option, in which case the Design Team will be responsible for integrating the features of SD options in the DD stage.

12.2 Enabling Project Services

The SD requirements and Services in this Project Brief section 12 apply to the Pre-Construction Works identified in Project Brief section 4.2, but adapted and streamlined to the extent possible, as agreed by the DR. The number of interim submissions and review periods will be reduced to optimize the schedule.

Although Pre-Construction Works are not expected to start until after the DD stage, due a delay in funding, the SD of these sub-projects are to be developed at the same time as the SD for the overall main construction,

Once hired, the CM will define the Consultant's DP framework (the format and number of packages) for these sub-projects. As depicted in Project Brief section 1.3.3.1–The First Four Years, these sub-project DPs are not expected to start until after 50% DD, prioritizing the Design Team's development of a robust 50% DD submission for the main construction and PWGSC's funding submission.

Design Packages for Pre-Construction Works must follow the requirements of Project Brief section 14, DESIGN PACKAGE SERVICES. The Design Team must confirm design interferences within the Model are identified and resolved weekly, or as defined in the up-to-date BXP. The Consultant must adapt and optimize the individual work flow of each Design Team member to meet the sub-project DP production and CM's tendering schedule, for DP award at or immediately after 100% DD.

12.3 Main Construction Design Services

12.3.1 Regulatory

The Consultant must prepare and submit the following regulatory requirements within the SD report. The Consultant must define:

- a) Detailed Site and building code requirements;
- b) Fire and life safety strategy, exemptions, including smoke control and the means of egress and exit;
- c) Universal design for accessibility Site and building analysis, strategy and exemptions; and
- d) Applicable fit-up standards and laboratory regulations.

12.3.2 Geotechnical

The Design Team must coordinate their SD options and analysis with PWGSC's geotechnical consultant and incorporate relevant geotechnical findings and requirements into their design options and SD reports.

12.3.3 Environmental

The Design Team must coordinate their SD options and analysis with PWGSC's environmental consultants and incorporate relevant environmental and industrial hygiene findings and requirements into their design options and SD reports.

12.3.4 Site

12.3.4.1 Landscape Architecture and Urban Design

The Design Team must develop, Model, and submit in the SD report distinct and viable landscape and urban design options that support the building and functional program and the security and sustainable design SD options. The options and related analyses must include, for each design option:

- a) The landscape architecture and urban design vision, including the protection and/or enhancement of the TSTS and NRC Campus Site;
- b) Complete landscape and Site graphics and narrative description including:
 - i. A tabular summary of the pros and cons of the option, indicating how the option:
 - 1. Addresses the inter-relationships between the landscape and the TSTS hub, adjacent buildings, and built infrastructure, which includes, but is not limited to:
 - 1. Pedestrian and vehicular circulation and potential changes necessary to meet security requirements;
 - 2. Universal design for accessibility requirements and possible exceptions, including transition zones to adjacent lands, parking areas, access points to the TSTS delivery and loading areas, gathering places, state and public events, staging areas, etc.;
 - 2. Supports employee activities at the TSTS hub; and
 - 3. Addresses season maintenance requirements, include snow storage and no/low salt treatments;
 - ii. Modelling of all works proposed, with particular attention to and coordination with the Site lighting, security requirements for the Site (e.g., existing and new controlled entry points for the TSTS hub, etc.), which include but not be limited to;
 - 1. Model renderings;
 - 2. Colour-coded landscape Drawings indicating programmatic requirements and proposed materials;
 - 3. Grading Drawings, sections and elevations and explanatory sketches;
 - 4. Planting Drawings and listings, including tree protection Drawings and requirements;
 - 5. Exterior furniture designs, Drawings, and materials;

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6. Integration of all landscape features and infrastructure existing and new wayfinding and signage (i.e., regulatory, directional, information), Site and security lighting, security features (e.g., surveillance cameras, bollards, lockable pull-boxes), landscape furniture, Site amenities, vegetation, grading, soil and soil structure condition, drainage, storm water management, irrigation, and mechanical, electrical and fire protection infrastructure;
 7. Scenarios for exterior wayfinding and signage, linked with interior wayfinding and signage, to demonstrate integration of the outdoor experience leading to the indoor circulation; and
 8. All temporary wayfinding and signage requirements for construction, to be 100% complete by 90% SD, for presentation to and approval by the NCC; and
- c) Identification of a preferred landscape design option that best integrates all other design disciplines and best balances functionality with Project control objectives.

12.3.4.2 Civil/Municipal

The Design Team must develop civil/municipal design options that align with and support the design options of other design disciplines, notably geotechnical, structural, physical security, environmental and sustainability, and submit civil/municipal requirements within the SD report. The options and related analyses must include:

- a) Confirmation of pre-design information to support the development of civil/municipal design options;
- b) Complete hydraulic analysis of proposed alterations to the municipal and Site water distribution systems and confirmation of the anticipated maximum available fire flow to the building and its Site, including quantification of spare capacity to support further development on the NRC Campus;
- c) Calculation and compare of Site flows to building Site fire flows per watermain to the NRC Campus, Site, and to the building;
- d) Obtain approval from the municipality fire service (department) and NCR Campus operations for proposed isolation, removal or reconfiguration of water mains and temporary and permanent fire hydrants necessary for Project development; and
- e) In full coordination with the Design Team, propose design options for all below and above grade infrastructure and services within the Model, including sizing, materiel, and capacities. Each design option must:
 - i. Include Drawings and sections complete with backup data (calculations) to support each option;
 - ii. Fully support and integrate sustainability objectives and sustainability performance strategies, including but not limited to new storm water management and heat recovery systems;
 - iii. Coordinate all grading, paving, hardscape, and accessibility requirements for the Site;
 - iv. Provide for Connectivity and electrical infrastructure (duct banks, manholes, positive drainage, etc.) and infrastructure space management with growth capacity for all underground utilities; and

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- v. Include geometrical analysis to confirm optimal alignment of NCR campus roads to accommodate the traffic path of emergency and operational vehicles accessing the Site.

12.3.5 Architectural

12.3.5.1 Building and Functional Program

The Design Team must develop, Model, and submit in the SD report two distinct, viable architectural options that integrate sustainable design requirements, and all other design discipline SD options.

Each SD option and its related analysis must:

- a) Demonstrate the option meets the requirements of:
 - i. The functional program; and
 - ii. All Project objectives, with particular focus on:
 - 1. A holistic sustainable design strategy; and
 - 2. Universal design for accessibility;
- b) Demonstrate the option integrates the structural and seismic options, security, sustainability, and mechanical and electrical system options; and
- c) Confirm complete interdisciplinary coordination in the SD report and resolve interferences/clashes in the Model, confirming a comprehensive and fully coordinated design approach.

12.3.5.1.1 Design Details

The final functional program and SD options are interrelated processes while building systems and sustainability requirements are defined, requiring the Design Team to refine the functional program throughout the SD stage. The 50% functional program submission must adapt to and integrate the requirements of the structural/seismic, security, and sustainability performance strategies. The final functional program submission must accompany the 100% SD report, for formal approval by the TSTS occupants.

For each SD option, the Design Team must include within the SD report:

- a) The elements identified in the PD gap analysis;
- b) Lessons learned from similar projects;
- c) The updated functional program, including all room data sheets (RDS) incorporating:
 - i. Functional, operational, FF&E and Connectivity requirements known to date, a furniture/equipment storage and circulation requirements, and new or updated requirements in accordance with Project Brief section 12.3.5.2–Security; and
 - ii. Detailed LVA requirements for each science-space in accordance with Project Brief section 12.3.9–Mechanical;
- d) Options and extent possible for the application of antimicrobial coatings (i.e., films and layers), such as [organosilane](#) nanocoatings on surfaces such as doorknobs, countertops, wall surfaces, etc.;

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- e) A complete design with Model-generated graphics and a narrative description including, but not limited to:
- i. All works proposed with interior and exterior Model renderings and fly-bys of selected areas (e.g., building Site and exterior facades, high and mid bay laboratories, conference rooms, security screening; etc.);
 - ii. Colour-coded architectural floor Drawings for every floor level, confirming no conflict between the spatial layout and functional program;
 - iii. Interior and exterior building elevations and sections of the TSTS hub to detail the relevant aspects of the proposed option, including the composition of walls, floors, roofs, foundations, windows and doors, etc.;
 - iv. Compliance with the [Accessible Canada Act](#) , [CAN/CSA B651-18](#), other applicable policies and regulations and, if necessary, proposed exemptions from the Act, standard, policies and regulations. Identify the incremental accessibility requirements beyond those mandated by CSA B651;
 - v. Security requirements in accordance with Project Brief section 12.3.5.2–Security;
 - vi. Electromagnetic shielding requirements and locations, coordinated with building program, fit-up, FF&E, laboratory, and electrical plans;
 - vii. Circulation flow for building and for the Site, respecting/supporting security zones for the public, employees, and security and operations personnel, as well as furniture/equipment storage circulation routes between storage rooms and the space(s) they support;
 - viii. Room numbering options and Drawings;
 - ix. Wayfinding and signage options for interior spaces that complement exterior signage options and transitions (i.e., circulation paths from entering the grounds to exiting the building), including options for digital and e-signage/wayfinding to direct the public, vehicles, material handling, etc.;
 - x. Acoustic zones, ratings, and wall assembly details, including a summary of architectural implications of acoustic and speech security/privacy requirements;
 - xi. Services including vertical conveyancing, plumbing, HVAC, fire detection and suppression, electrical, Connectivity, building automation, etc. and requisite space requirements and vertical orientation/configuration;
 - xii. Food service/kitchenette requirements;
 - xiii. FF&E component definition and layouts;
 - xiv. Bird-friendly building design requirements;
 - xv. Connectivity equipment definition and layouts, including pathways and their connection with base building systems; and
 - xvi. Area calculations that include individual and summarized listings of each building space and all the area by the type of accommodation;
- f) Prepare a comparative analysis of each design option to the others and include in tabular format the advantages and disadvantages and indicate how Project objectives are met or partially met. Identify a preferred option that best balances all Project objectives integrates all other disciplines.

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12.3.5.2 Security

The majority of security-related Services and deliverables are protected B, with a few documents at the secret (level II) security classification. The Consultant must make sure Contract deliverables are organized such that protected B and classified information are duly segregated and securely stored separate from standard SD stage deliverables. Accordingly, to the extent possible and to the approval of the DR the Design Team must prepare 'sanitized' (non-classified) versions of classified documents with the PD stage deliverables (i.e., two security reports: classified and sanitized).

In prioritizing and accelerating the development of security requirements, which support and inform viable SD options development, the Design Team must:

- a) Develop:
 - i. The security space requirements and the functional program update as described in subsection 12.3.5.2.1 and 12.3.5.2.2; and
 - ii. Based on LC's TRA, the security options for input to the structural, architectural, and landscape architecture Design Team disciplines, as well as related analysis of the effects to pedestrian and vehicular circulation, as described in paragraph f) of Project Brief section 12.3.5.2.4– Physical Security Solutions; and
 - iii. The coordinated input and analysis of other Design Team disciplines and detailed Cost analysis of the Construction Cost Estimate of each security design option;
- b) Submit to the DR all elements in subparagraph a) with the 90% SD submission, including a substantiated recommendation for the Project security design option;
- c) Fine tune all security design requirements and submit to the DR with the 100% SD submission.

12.3.5.2.1 Security Space Requirements

The Design Team must:

- a) Incorporate elements identified in the PD gap analysis;
- b) Identify and describe and changes to the security space requirements for the Site and building;
- c) Inform building and functional programming with high level space descriptions by function and operational requirements, which include but are not limited to:
 - i. Site- related gates/access barriers, guard huts, parking, guard posts, external security storage;
 - ii. Public, vehicular, and employee entrances;
 - iii. Lobbies, security reception desks/visitor registration desks, screening and scanning areas, interview rooms; and
 - iv. Security administration areas (i.e., enclosed offices, workstations, personnel security processing areas, file rooms, storage rooms, fire alarm panel monitoring areas, loading docks, break rooms, security control centres, crisis management centres, security equipment rooms, special discussion areas, and any other spaces managed, operated or occupied by security personnel).

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12.3.5.2.2 Security Functional Program Update

The Design Team must incorporate Project-specific security requirements within the functional program, which includes integration of:

- a) Elements identified in the PD gap analysis;
- b) Updates, if any, to the PSR;
- c) Security zoning with graphic illustration (exterior and building interior – all floors), and zone definition and transition areas, taking into account the space types, blocking and stacking;
- d) Proposed security applications (mitigations) with narrative description, which may include but are not limited to:
 - i. Access control;
 - ii. Security video;
 - iii. Security intercom;
 - iv. Duress;
 - v. Speech privacy, in coordination with the acoustics design discipline;
 - vi. CBRN monitoring/HVAC;
 - vii. Metal detection;
 - viii. X-ray scanning;
 - ix. Electronic and other emissions; and
 - x. Counter technical intrusion considerations;
- e) A summary of proposed security requirements for the room data sheets, in tabular format, using a legend with non-descript ('sanitized') references, identify the:
 - i. Room number;
 - ii. Room name;
 - iii. Security zone designation and transitions areas;
 - iv. Security application(s); and
 - v. Additional informative notes, as applicable.

12.3.5.2.3 Security Design Brief

The Design Team must document changes to LC's Project-specific security design brief (SDB) as a result of SD option development or modified scope requirements, which could include SBD updates for:

- a) The physical security operational intent and design philosophy;
- b) Physical security options for the Project, adapted to each SD option;
- c) Proposed security applications (mitigation measures);
- d) The layout of security zones and transition areas developed in response to LC's TRA, building on the PSR and the security space requirements;
- e) A summary and general overview of security requirements and applications; and

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- f) Detailed information and analysis, incremental to each security design option as applicable.

12.3.5.2.4 Physical Security Solutions

The Design Team must develop Project-specific physical security options, fully coordinated and integrated all applicable Design Team SD options, which considers and integrates the requirements outlined in Project Brief APPENDIX F–CONNECTIVITY INTGRATION WITH DESIGN DELIVERABLES, APPENDIX G–FF&E AND CONNECTIVITY RESPONSIBILITIES MATRIX, and includes:

- a) Site Security, which includes descriptions and Drawings of all Site security elements, including but not limited to:
 - i. Fences, fence disturbance systems, gates, retractable and non-retractable crash-resistant barriers;
 - ii. Streetscape elements and security-related signage; and
 - iii. Technologically advanced radar, cameras, and sensors with biometric capabilities and point-to-point coverage;
- b) Building entrances and perimeter security, which includes:
 - i. Descriptions and circulation Drawings for all building pedestrian entrances, including but not limited to:
 - 1. Access control;
 - 2. Entrance oversight (e.g., video and visual line-of-sight from a guard desk);
 - 3. Security intercom;
 - 4. Day and after-hours access approach; and
 - 5. Vestibules, turnstiles, revolving doors and other devices necessary to support the design of secure entrances; and
 - ii. Descriptions and requirements related to building perimeter security including but not limited to:
 - 1. Window film;
 - 2. Window locations;
 - 3. Door locations;
 - 4. Electronic and other emission security;
 - 5. Exterior motion detection;
 - 6. Passive, thermal and biometric security video coverage; and
 - 7. Video and biometric analytics and identification (real-time and post-event);
- c) Security spaces, which includes:
 - i. Update of the security space requirements provided with the 50% SD submission taking into account the security operational needs of the Site and the advancement of all Design Team SD options, including but not limited to:
 - 1. Gates and guard huts, parking, guard posts, external security storage,
 - 2. Primary, employee, and vehicle entrances;

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3. Lobbies, security reception desks/visitor registration desks;
 4. Screening and scanning areas;
 5. Interview rooms;
 6. Security administration areas (e.g., enclosed offices, workstations, personnel security processing areas, file rooms, storage rooms, fire alarm panel monitoring areas, loading docks, break rooms, security control centre(s), crisis management centre(s), security equipment rooms, special discussion areas and any other spaces managed, operated or occupied by security personnel);
 7. For each space type, update the occupancy, function, its location, adjacencies, proximities, proposed space layout, and the security functions/equipment required for the space. Incorporate all updates within the final functional program.
- d) Screening and scanning, which includes development of a screening and scanning area Model for each area, complete with a detailed description of the space and purpose/function of space-specific equipment to substantiate all security design elements, which include but is not limited to:
- i. Number and type of x-ray machines and walk-through metal detectors;
 - ii. Circulation routes and patterns, including rejection lanes and secondary search areas;
 - iii. Mathematical analysis on circulation and flow rates;
 - iv. Locations of operators and security oversight personnel;
 - v. Adjacent guard posts;
 - vi. Technology support and equipment (e.g., cameras, duress, CBRN detectors and activators, people processing (e.g., visitors, contractors));
 - vii. Bag storage;
 - viii. Washrooms; and
 - ix. Adjacent security support spaces.
- e) CBRN considerations, which includes:
- i. Interpretation of design-based threats, levels of protection, and recommendations in LC's TRA for security mitigation measures;
 - ii. Analysis of proposed changes to the Site landscape and circulation of pedestrians and vehicles;
- f) Acoustic and speech security, which includes:
- i. In consultation with the acoustics design discipline, definition of Project-specific speech and emission security requirements for each space in the building; and
 - ii. Encroachment of wireless technology that jeopardizes the ability to detect electronic eavesdropping devices in sensitive areas thereby impacting the security of the spoken word. Through the DR, engage the RCMP's technical countermeasures personnel in their Technical Security Branch to recommendations on security during construction as well as on the proper installation of wireless devices in the TSTS hub;
- g) Security concept of operations, which includes:
- i. A detailed description of building operations and security personnel protection and response procedures taking into account:

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1. The overall security requirements and overarching security posture; and
2. A sufficient number of workshops and interviews with all security stakeholders; and
- ii. Building on the preliminary security requirements include, as a minimum:
 1. An overview of threats and vulnerabilities;
 2. A description of the zoning strategy;
 3. An approach to security equipment functionality and operations and screening/scanning as well as guard posts,
 4. A description of in-building circulations for the staff, contractors, visitors and the general public;
 5. Operation and monitoring of the integrated security system, special spaces (e.g., special discussion areas, safe rooms, secure storage areas), and life safety systems; and
 6. Sufficient background and rationale for any operational or procedural changes in the security posture;
- h) Interconnection with the existing NCR Campus security operations centre, which includes:
 - i. A description of the existing operations centre, including as a minimum:
 1. The purpose;
 2. Necessary operational changes and requirements (e.g., ergonomics, work positions, shift schedules, event/threat types, historical event data); and
 3. Necessary technical and technology changes and requirements (e.g., consoles, audio-visual and telecommunications requirements, monitored systems and applications, operator workstations, video wall, supporting business machines, audio logging and recording, isolated grounding systems, UPS and emergency power, mechanical systems, infrastructure and cable requirements, dedicated equipment room requirements); and
 - ii. Development and Modelling of the changes to the existing physical room layout, circulation, lighting, physical security requirements, consoles, operator workstations, video wall, supporting business machines, cabling (all types), power supply, mechanical systems, dedicated equipment room infrastructure); and
 - iii. Development and Modelling of inter-building Connectivity requirements indicating cabling routing and protection on the NCR Campus and within the building housing the existing operations centre;
- i) Security post design, which includes:
 - i. A description of each unique security post, including as a minimum
 1. The purpose;
 2. Design requirements (e.g., layout, lighting, physical security requirements, adjacencies, sightlines, ballistics/blast/CBRN protections, general space requirements);
 3. Operational requirements (e.g., ergonomics, work positions); and
 4. Technical and technology requirements (e.g., work positions, audio-visual requirements, monitored systems and applications, operator workstations, video monitors, door/turnstile/other equipment control equipment (e.g., button boxes,

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- isolated grounding systems, UPS and emergency power, mechanical systems, infrastructure and cable requirements, visitor and contractor management considerations)); and
- ii. Development and Modelling of the physical post layout, lighting, physical security requirements, adjacencies, sightlines, consoles, operator workstations, video monitors, door/turnstile/other equipment control equipment (e.g., button boxes, UPS and emergency power, mechanical systems, infrastructure and cable requirements, visitor and contractor management considerations);
- j) Loading dock design, which includes:
 - i. A description of the loading dock, including as a minimum:
 - 1. The purpose, including the nature of security services delivered at the loading dock in general and the security post in the loading dock;
 - 2. Design requirements (e.g., layout, lighting, physical security requirements including exterior approaches, vehicle and pedestrian access/approach, adjacencies, sightlines, as applicable CBRN protections, general space requirements, access verifications, shipment authentications, interlocks);
 - 3. Operational requirements (e.g., ergonomics, work positions, secure shipment processing, short-term storage, support for other material management functions in the load dock); and
 - 4. Technical and technology requirements (e.g., work positions, monitored systems and applications, operator workstations, video monitors, overhead door control, interlock control, records management, intercom communications to vehicle operators and pedestrians, isolated grounding systems, UPS and emergency power, mechanical systems, infrastructure and cable requirements, visitor, driver and contractor management); and
 - ii. Development and Modelling of the loading dock layout, lighting, physical security requirements including exterior approaches, vehicle and pedestrian access/approach, adjacencies, operator workstations, video monitors, sightlines, CBRN protections, general space requirements, interlocks, supporting business machines, cabling (all types), power supply, mechanical systems, dedicated infrastructure; and
- k) A fully developed security governance framework, which:
 - i. Reaffirms the overarching security governance principles;
 - ii. Reaffirms and, if necessary, updates the stakeholders involved in the Project, along with their respective roles and responsibilities;
 - iii. Completes the RACI matrix;
 - iv. Describes the means to classify, review, approve, and response to security-related issues based on their importance and impact, as determined by the Design Team and CM, on the Project design and construction, with:
 - 1. An agreed decision-making and response timeline (i.e., within 5 Working Days but never longer than 20 Working Days);

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2. A defined process of escalating issues for either information or for decision-making including, for decisions, a suitable timeline to obtain decisions (to be specified with each escalated issue based on criticality and design and construction impacts); and
 3. A mechanism to reclassify the importance of issues if and when requested by the Design Team, or CM, or DR; and
- v. Takes into account a sufficient number of workshops facilitated by the security Specialist Consultant(s) to document and gain agreement on a governance associated with the design, construction, and future operation of the TSTS hub;

12.3.5.2.5 Integrated Security Systems

The Design Team must develop Project-specific integrated security system (ISS) options, fully coordinated and integrated all applicable Design Team SD options, which considers and integrates the requirements outlined in Project Brief APPENDIX F–CONNECTIVITY INTEGRATION WITH DESIGN DELIVERABLES, APPENDIX G–FF&E AND CONNECTIVITY RESPONSIBILITIES MATRIX, and includes:

- a) Security zoning strategy, which includes:
 - i. A description of each security zone and transition area, including the rationale for the zone designations, authorized occupants of each zone, and the access control methods proposed at each transition; and
 - ii. Model-derived Drawings of security zones using colour coding and descriptions of each zone transition; and
- b) ISS component layouts within the building and on the Site, or adjacent buildings, which includes:
 - i. A description of each ISS component location, its purpose, and how these components integrate (e.g., affix to, pass through/under/above) within building and Site elements, including but not limited to:
 1. Card reader-controlled doors and portals, identifying door or portal number;
 2. Security video cameras, identifying camera number, type (e.g., fixed, pan-tilt-zoom, lens selection (i.e., mega-pixels, narrow, wide or 360-degree view), video/audio analytics, etc.), general direction by icon point, capture strategy (i.e., identification, recognition, or general observation), and mount details (e.g., wall, ceiling, pendant, etc.);
 3. Security video coverage and the field of view of each proposed camera;
 4. Motion detector coverage and the coverage of each motion detector;
 5. Security intercoms, including technical details (e.g., audio or audio/video, analytics) and mounting details (e.g., flush, surface, pendant);
 6. Alarm sensors and type (e.g., door position switch, motion detector, glass break detector)
 7. Panic/duress buttons, including whether they are wired or wireless;
 8. Elevator security, including card readers, cameras, sensors; and
 9. Other systems and components; and
 - ii. Model-derived Drawings of the location of each ISS component, which includes:
 1. A fully coordinated ISS design with all Design Team disciplines;

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2. As applicable to each design discipline, duly 'sanitized' ISS components within the design of each Design Team discipline without reference to the ISS (e.g., simple electrical conduit or mounting box without reference to a card reader, camera); and
 3. Separate, classified fully detailed ISS Drawings including:
 1. A security video coverage map showing the field of view of each proposed camera; and
 2. A motion detector coverage map showing the coverage of each motion detector;
- c) ISS infrastructure requirements, which includes:
- i. A description of the cable, conduit, cable tray, backbox, and power requirements for all ISS-related equipment, including but not limited to: reader-controlled portals, security panels/controllers, cameras, intercoms, alarm sensors, duress buttons, elevator controls and all equipment included in the ISS;
 - ii. Inter-building Connectivity between the TSTS hub and the existing security operations centre, including end-to-end Connectivity pathways and technology modifications in the existing operations centre; and
 - iii. Model-derived single-line Drawing of the ISS architecture, fully coordinated with the electrical design discipline and duly 'sanitized' within the electrical design without reference to the ISS;
- d) Door functional descriptions, which includes:
- i. Door functional descriptions detailing the operational requirements for each door and the security mitigation, including but not limited to:
 1. Door type;
 2. General description;
 3. Security components and their functions;
 4. Architectural hardware components;
 5. Operation from secure side of the door;
 6. Operation from unsecure side of the door,
 7. Functionality (e.g., door forced, door held, invalid card, central system); and
 8. Any other operational elements; and
 - ii. Model-derived Drawings showing door elevations and all infrastructure necessary at the door to support a door with electronic security treatments, fully coordinated with the architectural design, architectural door hardware schedule, and the electrical design;
- e) A device schedule, in tabular format, for every door, alarm sensor, camera, intercom, and other security end-of-line device in the ISS, properly cross-referenced to each floor plan, floor plan location, device number, purpose, and applicable notes, to be further refined in the DD stage;
- f) Preliminary integration matrices to describe the technical integration points and objectives at a device level for each ISS element integrated with another ISS subsystem, to be further developed in the DD stage and fully defined in the DP stage, including but not limited to:
- i. Camera views linked to discrete alarm points (e.g., door forced alarm on Door 1 causes camera 1 to display on monitor 1 and record pre-and-post video);

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- ii. Intercoms linked to events;
 - iii. Intercom switching and secondary calling;
 - iv. Building management and life-safety system devices linked to ISS event inputs; and
 - v. Other design and monitoring treatments based on threats, vulnerabilities, and recommendation in the approved Project-specific TRA and the SDB; and
- g) A preliminary equipment list for all ISS components to be further developed in the DD stage and fully defined in the DP stage, taking into account Project Brief APPENDIX A–GUIDE TO PREPARATION OF CONSTRUCTION DOCUMENTS, including, but not limited to:
- i. The ideal make and model of compliant equipment and at least 3 acceptable alternative manufacturers and their equivalent products (e.g., ABC Co., model X card reader, in accordance with section 4.6 of APPENDIX A); or
 - ii. For equipment which are not standard manufactured products, the requirement for detailed three-part Specifications.

12.3.5.3 Audio-Visual

The majority of AV-related Services and deliverables are protected B, with a few documents at the secret (level II) security classification. The Consultant must make sure Contract deliverables are organized such that protected B and classified information are duly segregated and securely stored separate from standard SD stage deliverables. Accordingly, to the extent possible and to the approval of the DR the Design Team must prepare ‘sanitized’ (non-classified) versions of classified documents with the design stage deliverables (i.e., two AV reports per submission: classified and sanitized).

The Design Team must develop viable AV requirements and submit in the SD report viable AV options that support the functional program, sustainability, and fit-up SD options as described in sub-sections 12.3.5.3.1 through 12.3.5.3.4.

12.3.5.3.1 AV Space Requirements

The Design Team must:

- a) Incorporate elements identified in the PD gap analysis;
- b) Identify and describe the AV space requirements for the Site and building; and
- c) Inform building and functional programming with high level space descriptions by function and operational requirements, which include but are not limited to:
 - i. Site-related AV connections points, operations, external storage (if applicable);
 - ii. Conference and meeting rooms, office areas, laboratories, public areas; and
 - iii. AV operation areas (i.e., laboratory spaces, enclosed and open offices, workstations, storage rooms, break rooms, AV equipment rooms, special discussion areas, and any other spaces managed, operated or occupied by AV personnel).

12.3.5.3.2 AV Functional Program Update

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The Design Team must incorporate Project-specific AV requirements within the functional program, which includes integration of:

- a) Elements identified in the PD gap analysis;
- b) Updates, if any, to the PAVR;
- c) AV space requirements with graphic illustration (exterior and interior – all floors), taking into account the space types, blocking and stacking;
- d) Proposed AV systems and components with narrative description, which may include but are not limited to:
 - i. Conference and meeting rooms, which includes:
 - 1. Unified communications audio video conferencing system;
 - 2. Video display; and
 - 3. Audio reinforcement where required by room size; and
 - ii. Other areas, which includes:
 - 1. Digital signage displays in select locations, if applicable;
 - 2. Television distribution network in select areas and to/from the building exterior; and
 - 3. Video displays in select offices or other areas; and
- e) A summary of proposed AV requirements for the room data sheets, in tabular format, using a legend to identify the:
 - i. Room number;
 - ii. Room name;
 - iii. AV applications and technologies (i.e., components, connections and equipment found in each space/room); and
 - iv. Additional informative notes, as applicable.

12.3.5.3.3 Audio-Visual Design Brief

The Design Team must develop a Project-specific audio-visual design brief (AVDB), which includes:

- a) The AV operational intent and design philosophy;
- b) AV options for the Project, adapted to each SD option;
- c) The layout of AV areas, building on the PAVR and the AV space requirements;
- d) A summary and general overview of AV requirements and systems, which includes but is not limited to:
 - i. A description of the Project, the TSTS hub on the NRC Campus, and the TSTS occupants; and
 - ii. Scalable AV design options which provide high-level descriptions of the AV architecture, technologies for the Site, building, and building systems. Indicate, when appropriate in tabular format, per option:
 - 1. A description the architectural, structural, Site, other disciplines and related implications;

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2. An overview of AV space requirements;
 3. A description of proposed AV technologies, acoustics and lighting per space;
 4. An overview of the AV personnel requirements for ongoing, post-construction operations;
 5. Building floor Drawings and Site Drawings of all AV requirements;
 6. Additional supporting documentation as may be required (e.g., technical Specifications, case studies, application notes);
 7. With the coordinated input and analysis of other Design Team disciplines and detailed Cost analysis by the CM, the Construction Cost Estimate of each AV design option, taking into account the full interdisciplinary scope and complexity of the AV option (i.e., all AV-related requirements for the building, Site, technologies and equipment, as well as the incremental Costs related to construction duration, and
 - i. Identify future AV personnel staff Costs and maintenance contracts separately and incorporate these requirements and their Costs within the Project Brief sections 4.1.4.1–Preliminary Building Management Plan and 4.1.4.3–Life-Cycle Cost Analysis; and
 8. The recommended AV design option with rationale;
- e) Detailed information and analysis, incremental to each AV design option as applicable, regarding:
- i. Site Conditions, which includes:
 1. An overview which includes the building location, Site topography, existing and proposed AV systems and their location; and
 2. Proposed power requirements and ancillary systems; and
 - ii. Building layout and features, which includes:
 1. A description of AV and ancillary support system requirements for defined AV spaces;
 2. A detailed review and description of all existing and proposed walls, doors, windows, ceilings, floors, and partitions to fully define AV requirements which includes, at a minimum, acoustics and lighting for spaces, laboratory spaces if applicable, cable routing and management, and related technical considerations;
 3. A review and description of ancillary support spaces/services including, but not limited to:
 - i. Proposed power requirements and ancillary systems per defined AV space;
 - ii. Utility spaces, equipment storage requirements, other special purpose spaces, etc.; and
 - iii. Telecom and data links/leases from third-party providers (e.g., Bell, Rogers, Zayo, Telus, others) and those interconnecting buildings/organizations;
 - iii. TSTS hub facility management, which includes:
 1. The nature of future AV services and, as applicable, third-party contracts; and
 2. The nature of future maintenance of AV systems, data management, audio-visual systems, etc., including a general overview of security requirements to be incorporated

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within a leasing contract (if applicable), along with the expected levels of service from each respective third-party service provider; and

- iv. AV personnel, which includes:
 - 1. All relevant assumptions and recommendations related to AV operations; and
 - 2. Definition of AV personnel workforce size, capabilities, redundancies, which include, at a minimum:
 - 1. Administration and organization of the AV workforce, from the perspective of the TSTS occupant(s) and the third-party organization(s) or contractor(s);
 - 2. Respective roles and responsibilities (both TSTS occupants and third-party organization(s) or contractor(s); and
 - 3. Special policies and procedures applicable to the building and its Site, including communication protocols/requirements.

12.3.5.3.4 AV Design Options

The Design Team must develop Project-specific AV options, fully coordinated and integrated all applicable Design Team SD options, which considers and integrates the requirements outlined in Project Brief APPENDIX F—CONNECTIVITY INTEGRATION WITH DESIGN DELIVERABLES, APPENDIX G—FF&E AND CONNECTIVITY RESPONSIBILITIES MATRIX, and includes:

- a) Descriptions and Drawings of all Site systems, components, connectivity;
- b) AV supported building spaces, which includes:
 - i. Update of the AV space requirements provided with the 50% SD submission taking into account the AV operational needs of the Site and the advancement of all Design Team SD options, including but not limited to:
 - 1. Conference and meeting rooms, office areas, laboratories, public areas, and
 - 2. For each space type, update the AV functions, its location, adjacencies, proximities, proposed space layout, and the AV equipment required for the space. Incorporate all updates within the final functional program;
- c) AV concept of operations, which includes:
 - i. A detailed description of AV operations and AV personnel taking into account:
 - 1. The overall AV requirements with graphic illustration (exterior and interior – all floors); and
 - 2. A sufficient number of workshops and interviews with all AV stakeholders; and
 - ii. Building on the preliminary AV requirements include, as a minimum:
 - 1. An overview of AV objectives, scope, assumptions, and limitations;
 - 2. A description of AV systems, components and applicable technologies;
 - 3. Operation, monitoring, and workforce requirements; and
 - 4. Sufficient background and rationale for any changes in AV operational or requirements;
- d) AV component layouts within the building and on the Site, which includes:

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- i. A description of each AV component location, its purpose, and how these components integrate (e.g., affix to, pass through/under/above, etc.) within building and Site elements and, including but not limited to:
 - 1. Conference and meeting rooms, which includes:
 - 1. Unified communications audio video conferencing system;
 - 2. Video display; and
 - 3. Audio reinforcement where required by room size;
 - 2. Other areas, which includes:
 - 1. Digital signage displays in select locations;
 - 2. Video displays in select offices; and
 - 3. Television distribution network in select areas and to/from the building exterior; and
 - ii. Model-derived Drawings of the location of each AV component, fully coordinated with all Design Team disciplines;
- e) AV infrastructure requirements for conference and meeting rooms, laboratories, AV control booths, etc., which includes:
- i. A description of the cable, conduit, cable tray, power requirements, etc. for all AV-related equipment, including but not limited to: AV panels/controllers, cameras, cabling, cable pathways and management, related systems; and
 - ii. Model-derived single-line Drawing of the AV architecture, component layout and elevations, fully coordinated with all Design Team disciplines;
- f) Preliminary integration matrices to describe the technical integration points and objectives at a device level for each AV element integrated with another AV subsystem, to be further developed in the DD stage and fully defined in the DP stage; and
- g) A preliminary equipment list for all AV components to be further developed in the DD stage and fully defined in the DP stage, taking into account Project Brief APPENDIX A–GUIDE TO PREPARATION OF CONSTRUCTION DOCUMENTS.

12.3.5.4 Information Technology

The majority of IT-related Services and deliverables are protected B, with a few documents at the secret (level II) security classification. The Consultant must make sure Contract deliverables are organized such that protected B and classified information are duly segregated and securely stored separate from standard SD stage deliverables. Accordingly, to the extent possible and to the approval of the DR the Design Team must prepare 'sanitized' (non-classified) versions of classified documents with the design stage deliverables (i.e., two IT reports per submission: classified and sanitized).

The Design Team must develop IT requirements and submit in the SD report viable IT options that support the functional program, sustainability, and fit-up SD options. The options and related analyses must include:

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The Design Team must develop viable IT requirements and submit in the SD report viable IT options that support the functional program, sustainability, and fit-up SD options as described in sub-sections 12.3.5.4.1 through 12.3.5.4.4.

12.3.5.4.1 Information Technology Space Requirements

The Design Team must:

- a) Incorporate elements identified in the PD gap analysis;
- b) Identify and describe the IT space requirements for the Site and building;
- c) Inform building and functional programming with high level space descriptions by function and operational requirements, which include but are not limited to:
 - i. Site-related IT connectivity points, integrated base building and user-level systems, operations, external storage (if applicable);
 - ii. Conference and meeting rooms, laboratories, office areas, security areas, public areas; and
 - iii. IT operation areas (i.e., enclosed and open offices, workstations, storage rooms, break rooms, IT equipment rooms, IT testing and workshop facilities, laboratory spaces, special discussion areas, and any other spaces managed, operated or occupied by IT and personnel requiring connectivity).

12.3.5.4.2 IT Functional Program Update

The Design Team must incorporate Project-specific IT requirements within the functional program, which includes integration of:

- a) Elements identified in the PD gap analysis;
- b) Updates, if any, to the Pitr;
- c) IT space and cabling pathway requirements with graphic illustration (exterior and interior—all floors), taking into account the space types, blocking and stacking;
- d) Proposed IT systems and components with narrative description, which may include but are not limited to:
 - i. Telephones and unified communications devices and systems;
 - ii. Sound masking;
 - iii. Paging, public address, and mass notification systems;
 - iv. Structured cabling for network connectivity, both backbone and horizontal;
 - v. Structured cabling for inter-building network connectivity;
 - vi. Building automation connectivity;
 - vii. Network equipment, including core and edge level switches and systems;
 - viii. Wireless internet (WIFI) components and systems;
 - ix. Distributed antenna systems (DAS) for cellular enhancement;

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- e) A summary of proposed IT requirements for the room data sheets, in tabular format, using a legend to identify the:
 - i. Room number;
 - ii. Room name;
 - iii. IT applications, sub-systems, and technologies (i.e., components, connections and equipment found in each space/room); and
 - iv. Additional informative notes, as applicable.

12.3.5.4.3 Information Technology Design Brief

The Design Team must develop a Project-specific information technology design brief (ITDB), which includes:

- a) The IT operational intent and design philosophy;
- b) IT options for the Project, adapted to each SD option;
- c) The layout of IT areas, Site and building on the Pitr and the IT space and cabling pathway requirements;
- d) A summary and general overview of IT requirements and systems, which includes but is not limited to:
 - i. A description of the Project, the TSTS hub, the NRC Campus, and the TSTS occupants;
 - ii. Scalable IT design options which provide high-level descriptions of the IT architecture, network topology with supporting Model-derived Drawings, technologies for the Site, building, and integrated building systems. Indicate, when appropriate in tabular format, per option:
 - 1. A description the architectural, structural, Site, and other discipline implications;
 - 2. An overview of IT space and cabling pathway requirements;
 - 3. A description of proposed IT technologies and their intended function per space;
 - 4. An overview of the IT requirements for ongoing, post-construction operations personnel, including laboratories, and security operations centres;
 - 5. Building floor Drawings and Site Drawings of all IT requirements;
 - 6. Additional supporting documentation as may be required (e.g., technical Specifications, case studies, application notes);
 - 7. With the coordinated input and analysis of other Design Team disciplines and detailed Cost analysis by the CM, the Construction Cost Estimate of each IT design option, taking into account the full interdisciplinary scope and complexity of the IT option (i.e., all IT-related and integrated connectivity requirements for the building, Site, technologies and equipment, as well as the incremental Costs related to construction duration), and
 - i. Identify future IT personnel staff Costs and maintenance contracts separately and incorporate these requirements and their Costs within the Project Brief sections 4.1.4.1–Preliminary Building Management Plan and 4.1.4.3–Life-Cycle Cost Analysis; and
 - 8. The recommended IT design option with rationale;
- e) Detailed information and analysis, incremental to each IT design option as applicable, regarding:

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- i. Site Conditions, which includes:
 - 1. An overview which includes the building location, Site topography, existing and proposed IT systems, space requirements, and their location; and
 - 2. Proposed power requirements, integrated systems, and ancillary systems; and
- ii. Building layout and features, which includes:
 - 1. A description of IT, integrated systems, and ancillary support system requirements for defined IT spaces;
 - 2. A detailed review and description of all existing and proposed walls, doors, windows, ceilings, floors, and partitions to fully define IT requirements which includes, at a minimum, space considerations, cable routing and management, and related technical considerations;
 - 3. A review and description of integrated systems and ancillary support spaces/services including, but not limited to:
 - 1. Proposed power requirements, integrated systems, and ancillary systems per defined IT space and connectivity requirements;
 - 2. Utility spaces, equipment storage requirements, other special purpose spaces, etc.; and
 - 3. Telecom and data links/leases from third-party providers (e.g., Bell, Rogers, Zayo, Telus, others) and those interconnecting buildings/organizations;
- iii. TSTS hub facility management, which includes:
 - 1. The nature of future IT services, connectivity requirements, integrated systems, and, as applicable, third-party contracts;
 - 2. The nature of future maintenance of IT systems, data management, applications, integrated systems, etc., including a general overview of security requirements to be incorporated within contracts (if applicable), along with the expected levels of service from each respective third-party service provider;
- iv. IT personnel, which includes:
 - 1. All relevant assumptions and recommendations related to IT operations; and
 - 2. Definition of IT personnel workforce size, capabilities, redundancies, which include, at a minimum:
 - 1. Administration and organization of the IT workforce, from the perspective of the TSTS occupant(s) and the third-party organization(s) or contractor(s);
 - 2. Respective roles and responsibilities (both TSTS occupant(s) and third-party organization(s) or contractor(s); and
 - 3. Special policies and procedures applicable to the building and its Site, including communication protocols/requirements.

12.3.5.4.4 Information Technology Design Options

The Design Team must develop Project-specific IT options, fully coordinated and integrated all applicable Design Team SD options, which considers and integrates the requirements outlined in Project Brief APPENDIX

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F–CONNECTIVITY INTEGRATION WITH DESIGN DELIVERABLES, APPENDIX G–FF&E AND CONNECTIVITY RESPONSIBILITIES MATRIX, and includes:

- a) Descriptions and Model-derived Drawings of all Site systems, integrated systems, components, and connectivity;
- b) IT supported building and Site spaces, which includes:
 - i. Update of the IT space and cabling pathway requirements provided with the 50% SD submission taking into account the IT operational and connectivity needs of the Site and the advancement of all Design Team SD options, including but not limited to:
 - 1. Conference and meeting rooms, laboratories, offices, support offices, break rooms, public spaces, collaborative working areas, Site requirements; and
 - 2. For each space type, update the IT functions, its location, pathway requirements, adjacencies, proximities, proposed space layout, and the IT equipment required for the space. Incorporate all updates within the final functional program;
- c) Telephony and unified communications devices and systems, which includes:
 - i. In consultation with the TSTS occupant's IT and facilities personnel, develop a schematic design of the unified communications strategy, which includes but is not limited to:
 - 1. Available platforms and technology options for implementation of unified communications;
 - 2. Proposed network topology with Model-derived Drawings and Specifications for each option;
 - 3. A unified communications roadmap per option for implementation and post-construction support; and
 - 4. User level and base building device requirements;
- d) Sound masking systems, which includes:
 - i. A detailed description of sound masking system options, taking into account:
 - 1. Areas throughout building that require sound masking systems;
 - 2. Available technology options for implementation of sound masking systems; and
 - 3. Proposed network topology with Model-derived Drawings and Specifications for each sound masking system option;
- e) Paging system, public address system, and/or mass notification systems, which includes:
 - i. A description of the paging system, public address system, and/or mass notification systems proposed to be implemented, including as a minimum:
 - 1. Detailed options for systems proposed, including design narrative outlining functional requirements for each system proposed;
 - 2. The purpose of the system being implemented, with applicable coverage areas;
 - 3. Available platforms and technology options for implementation of systems proposed;
 - 4. User level and base building device requirements;

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5. Speaker and device placement, complete with associated Model-derived Drawings per floor;
 6. Technical and technology requirements (e.g., consoles, telecommunications requirements, monitored systems and applications, operator workstations, volume controllers, mixers, amplifiers, inputs, UPS and emergency power, electrical and mechanical systems, isolated grounding systems, infrastructure and cable requirements, dedicated equipment room requirements); and
- f) Structured cabling for network connectivity, which includes:
- i. A description of the structured cabling system to support all in-building and Site network connectivity requirements, including as a minimum:
 1. Detailed options for systems proposed, including design narrative outlining functional requirements for each system proposed;
 2. The purpose of the system being implemented;
 3. Available platforms and technology options for implementation of systems proposed;
 4. User level, building automation, IOT, WIFI, and all other base building device requirements;
 5. Cabling pathway requirements and options, complete with associated Model-derived Drawings;
 6. Network equipment space requirements and options, complete with associated Model-derived Drawings;
 7. TR, server room, backup server room, and all other applicable IT space requirements and options, complete with layouts and associated Model-derived Drawings for each space;
 8. Technical and technology requirements (e.g., consoles, user level devices, telecommunications requirements, equipment racks, equipment cabinets, wall mounted equipment, isolated grounding systems, UPS and emergency power, lighting, electrical and mechanical systems, building automation systems, grounding systems, infrastructure and cable requirements, dedicated equipment room requirements); and
- g) Structured cabling for inter-building network connectivity, which includes:
- i. A description of the structured cabling system to support all inter-building network connectivity requirements, including as a minimum:
 1. Detailed options for systems proposed, including design narrative outlining functional requirements for each system proposed;
 2. The purpose of the system being implemented;
 3. Available platforms and technology options for implementation of systems proposed;
 4. Cabling pathway (both inside plant and outside plant) requirements and options, complete with associated Model-derived Drawings;
 5. Detailed permit planning and easement options regarding pathways, complete with associated Model-derived Drawings;

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6. Network equipment space requirements and options, complete with associated Model-derived Drawings;
 7. Entrance facility, main telecommunications room, TRs, server room, backup server room, and all other applicable IT space requirements and options, complete with layouts and associated Model-derived Drawings per space and between spaces;
 8. Technical and technology requirements (e.g., consoles, user level devices, telecommunications requirements, equipment racks, equipment cabinets, wall mounted equipment, UPS and emergency power, lighting, electrical and mechanical systems, building automation systems, grounding systems, infrastructure and cable requirements, dedicated equipment room requirements); and
- h) Building automation connectivity, which includes:
- i. A description of the building automation system connectivity requirements, including as a minimum:
 1. Detailed options for systems proposed, including design narrative outlining functional requirements for each system proposed;
 2. The purpose of the system being implemented;
 3. Available platforms and technology options for implementation of systems proposed;
 4. User level, and all other base building device requirements;
 5. Cabling pathway requirements and options, complete with associated Model-derived Drawings;
 6. Network equipment space requirements and options, complete with associated Model-derived Drawings;
 7. Technical and technology requirements (e.g., consoles, controllers, user level devices, telecommunications requirements, equipment racks, equipment cabinets, wall mounted equipment, UPS and emergency power, lighting, electrical and mechanical systems, building automation systems, grounding systems, infrastructure and cable requirements, dedicated equipment room requirements); and
- i) Network equipment, which includes:
- i. A description of the network equipment required to be implemented to support all in-building network connectivity requirements, including as a minimum:
 1. Detailed options for all network equipment proposed, including design narrative outlining functional requirements for the equipment proposed;
 2. The purpose of the equipment in relevance to the network connectivity requirements;
 3. Available platforms and technology options for implementation of integrated systems proposed;
 4. User level, building automation, IOT, WIFI, and all other base building device requirements;
 5. Core level and edge level network switch equipment, complete with associated typical Model-derived Drawings and Specifications;

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6. Network equipment space requirements and options, complete with associated Model-derived Drawings per space;
 7. Diagrams supporting the proposed network architecture including topology of connectivity requirements and functional outline;
 8. Technical and technology requirements (e.g., consoles, user level devices, telecommunications requirements, equipment racks, equipment cabinets, wall mounted equipment, UPS and emergency power, lighting, electrical and mechanical systems, building automation systems, grounding systems, infrastructure and cable requirements, dedicated equipment room requirements); and
- j) Wireless Internet (WIFI), which includes:
- i. A description of the Wireless Internet (WIFI) system required to be implemented to support all in-building wireless network connectivity and coverage requirements, including as a minimum:
 1. Detailed options for all network equipment proposed, including design narrative outlining functional requirements for the equipment proposed;
 2. The purpose of the equipment in relevance to the wireless network connectivity requirements;
 3. Available platforms and technology options for implementation of integrated wireless systems proposed;
 4. User level, building automation, IOT, WIFI, and all other base building device requirements to be integrated with the wireless technologies;
 5. Network switch equipment required to integrate with and support the function of the WIFI technologies, complete with associated Model-derived Drawings and Specifications;
 6. Network equipment space requirements and options, including placement of wireless devices such as access points, complete with associated Model-derived Drawings;
 7. Wireless access point equipment Specifications and associated Model-derived Drawings indicating placement of access points and associated equipment;
 8. Complete WIFI design assessment including heat map Model-derived Drawings outlining proposed coverage areas and level of coverage (i.e., expected quality of signal) throughout building and outside the building;
 9. Model-derived Drawing supporting the proposed wireless network architecture including topology of connectivity requirements and functional outline; and
 10. Technical and technology requirements (e.g., consoles, user level devices, telecommunications requirements, equipment racks, equipment cabinets, wall mounted equipment, UPS and emergency power, lighting, electrical and mechanical systems, building automation systems, grounding systems, infrastructure and cable requirements, dedicated equipment room requirements); and
- k) DAS for cellular enhancement, which includes:
- i. A description of the equipment required to be implemented to support all in-building DAS for cellular enhancement connectivity requirements, including as a minimum:

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1. Detailed options for all DAS equipment proposed, including design narrative outlining functional requirements for the equipment proposed;
 2. The purpose of the equipment in relevance to the DAS connectivity requirements;
 3. Available platforms and technology options for implementation of integrated systems proposed, including neutral host capabilities;
 4. DAS equipment space requirements and options, including placement of antenna devices, complete with associated Model-derived Drawings;
 5. DAS antenna equipment Specifications and associated Model-derived Drawings indicating placement of antennas and associated equipment;
 6. Complete DAS design assessment including heat map Model-derived Drawings outlining proposed coverage areas and level of cellular coverage (i.e., expected quality of signal) throughout the building and outside the building;
 7. Model-derived Drawings supporting the proposed DAS network architecture including topology of connectivity requirements and functional outline;
 8. Technical and technology requirements (e.g., consoles, user level devices, telecommunications requirements, equipment racks, equipment cabinets, wall mounted equipment, UPS and emergency power, lighting, electrical and mechanical systems, building automation systems, grounding systems, infrastructure and cable requirements, dedicated equipment room requirements); and
- ii. Development and Modeling of the physical equipment room layouts, circulation, lighting, physical security requirements, consoles, supporting workstations, supporting business machines, cabling (all types), power supply, electrical and mechanical systems (including cooling), grounding systems, dedicated equipment room infrastructure);
- l) IT component layouts within the building and on the Site, which includes:
- i. A description of each IT component location, its purpose, and how these components integrate (e.g., affix to, pass through/under/above) within building and Site elements; and
 - ii. Model-derived Drawings of the location of each IT component, fully coordinated with all Design Team disciplines;
- m) IT infrastructure requirements for conference and meeting rooms, break rooms, office areas, laboratories, collaborative work areas, public areas, which includes:
- i. A description of the cable, conduit, cable tray, power requirements, etc. for all IT-related equipment, including but not limited to: panels/controllers, building automation devices, unified communications devices, speakers, cameras, cabling, cable pathways and management; and
 - ii. Model-derived drawings of the IT architecture, network and device component layout and space elevations, fully coordinated with all Design Team disciplines;
- n) A schedule for all IT devices and equipment, in tabular format, properly cross-referenced to each floor Drawing, floor Drawing location, device number, purpose, applicable notes, to be further refined in the DD stage;
- o) Preliminary integration matrices to describe the technical integration points and objectives at a device level for each IT element integrated with another subsystem, to be further developed in the DD stage and fully defined in the DP stage; and

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- p) A preliminary equipment list for all IT components and network equipment to be further developed in the DD stage and fully defined in the DP stage, taking into account Project Brief APPENDIX A–GUIDE TO PREPARATION OF CONSTRUCTION DOCUMENTS, including, but not limited to Specifications of compliant network equipment which may include alternative manufacturers and their equivalent products (e.g., ABC Co, device type X, in accordance with section 4.6 of APPENDIX A).

12.3.5.5 Move Planning

The Design Team must develop a preliminary occupant and equipment move plan and submit in the SD the occupant-specific move plan, which includes but is not limited to:

- a) Review and confirmation with the DR and TSTS occupants of all office and laboratory goods and equipment to be relocated to the TSTS hub, including goods/equipment owned by another party or at locations. As required, update and refine the pre-design list of goods/equipment list;
- b) Confirm all pieces of equipment which:
 - i. Require highly sensitive calibration; and
 - ii. Require strict environmental and handling measures during relocation and installation;
- c) For each piece of equipment identified in paragraph b), identify:
 - i. Item-specific environmental and handling criteria; and
 - ii. Installation and, if required, recalibration and recommissioning criteria;
- d) With the DR, and TSTS occupants, outline preliminary move priorities and sequencing, timing, and seasonal or other constraints and limitations (e.g., which group/function moves first, are there interdependencies for user groups and laboratory functions);
- e) Identification of special handling and packing requirements; and
- f) Identification of preliminary tracking and Monitoring, placement/installation requirements.

12.3.5.6 FF&E

The Design Team must develop fit-up and FF&E requirements and submit in the SD report two distinct, viable fit-up and FF&E options, including:

- a) A preliminary FF&E and fit-up requirements chapter which includes, but is not limited to:
 - i. An evaluation of FF&E and fit-up requirements against the functional program for each space;
 - ii. Schematic options of FF&E furniture/equipment types and fit-up to accommodate within the overall design and functional program:
 - 1. Unique requirements of special purpose spaces (e.g., conference and meeting rooms, offices, laboratories, library); and
 - 2. A flexible and adaptable/reconfigurable fit-up for general purpose office space;
 - iii. An FF&E and fit-up analysis to describe, per option:
 - 1. The placement and integration of FF&E with the fit-up; and
 - 2. How the option will meet the Project objectives and TSTS occupants' requirements;

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- iv. An FF&E goods/equipment and fit-up analysis for the all spaces/functions, storage requirements, etc. to confirm and demonstrate integration of:
 - 1. All goods/equipment items being moved from existing accommodations; and
 - 2. All new goods/equipment,for long-term operational efficiency of the TSTS hub;
- b) A developed FF&E matrix (FF&EM):
 - i. As a listing and means of identifying FF&E existing (to be relocated) and new goods/items and further defining these items through the DD, DP, and construction stages, including information per item in the Model, and tracking goods through delivery and installation. Each FF&E item must be tagged with a code number, which is linked in the Model to an attributes list. The attributes list must identify the type, finish, dimensions, Connectivity requirements, and other characteristics of the item;
 - ii. Develop the format of the FF&EM and include, per item:
 - 1. Item room number and location;
 - 2. Dimensions;
 - 3. Sample manufacturer, make, and model number;
 - 4. Generic description including mandatory requirements and finishes;
 - 5. Work Breakdown Structure (WBS) category;
 - 6. Procurement group number;
 - 7. Delivery requirements; and
 - 8. Installation requirements;
 - 9. Confirmation if the FF&E good/item is a new procurement or existing inventory; and
 - 10. For existing inventory, include the original good/item location;
 - iii. Design dynamic CAD blocks for all non-standard commercially available or custom-made items, laboratory equipment and casework, and incorporate the blocks into the Model. Include good/item dimensions and link directly to the FF&EM. Update CAD blocks as changes are made to the block structure and item layout Drawings;
- c) FF&E plan(s) depicting, as applicable to each space, unique or flexible and adaptable configurations;
- d) Model updates which coordinate and integrate the fit-up and FF&E with Connectivity (IT, audio-visual and integrated security system) design requirements, mechanical and electrical design requirements, and with all the other elements of the Design Team's design.

12.3.5.7 Acoustics

The Design Team must, in consultation with the security design discipline, develop and submit in the SD report:

- a) Acoustic requirements per discipline to support the design options being prepared;

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- b) Consider and outline impacts to TSTS occupants' operations and the requirement for (degree of) speech security/privacy in conference and meeting rooms, offices, laboratories, and public or auditorium spaces. Identify speech security or acoustic specialty materials or installation requirements required;
- c) Develop Project-specific acoustic Models of specific spaces (e.g., laboratories, conference rooms, specific meeting rooms and offices, library, public spaces);
- d) Consider and if appropriate develop partial or complete mock-ups (Modelling, physical, or both) in order to determine the best integrated design approach;
- e) Assess potential constructability impacts;
- f) Identify construction components requiring inspection before and after concealment; and
- g) Identify performance verification testing criteria (e.g., during/after construction, on-Site conditions) and an overview of testing processes and frequencies, along with final testing requirements.

12.3.6 Sustainability

The Design Team must fully develop the sustainable development strategy by 90% SD which supports the TSTS occupants' functional program and the sustainability objectives in accordance with Project Brief section 3.3–Sustainability.

The Design Team must:

- a) Reaffirm the sustainability vision, objectives, priorities, and principles that govern all design disciplines;
- b) Not be limited by or only to credits/measures identified in the chosen sustainability rating tools, but excluding the use of carbon credits and off-sets available from other jurisdictions, which will be assessed in the DD stage;
- c) Explore innovative opportunities beyond those defined in the rating tools and credits where compliance proves too challenging but whose intent can be met anyway;
- d) Balance the requirements of chosen rating tools with other Project requirements including the functional program, LCA and LCCA, energy performance, and environmental life-cycle impacts, to confirm pragmatic recommendations supportive of a sustainable strategy that is best suited for this Project and its Site;
- e) Develop in detail design and construction sustainability strategies and explain:
 - i. The types of sustainable construction and design strategies to be pursued and the resulting sustainability scorecard for the chosen rating tool;
 - ii. The measures to address increased deterioration rates due to a changing climate and future conditions and extreme weather events;
 - iii. Ongoing operations and maintenance and reporting requirements in accordance with Project Brief sections 11.14 and 12.3.11–Commissioning and Property Management;
 - iv. How the strategy is to be re-evaluated/updated in subsequent Project stages; and
 - v. Through comparative analysis, the benefits, drawbacks, complexities of one sustainability approach over another, and:

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1. Provide the CM with detailed information and assumptions for each sustainability strategy for the Cost, schedule, and risk analysis and the Design Team's develop of sustainability-related estimates and timelines for construction; and
 2. Indicate the associated Cost and time implications per strategy;
- f) Per SD option, complete a whole building LCA using the Athena [Impact Estimator for Buildings](#) to support the development of an optimal and balanced strategy that can best support the sustainability performance requirements. Include in the assessment:
- i. Measurement and comparison of life-cycle environmental impacts and operational performance associated with the design option, its construction and material selection choices;
 - ii. Evaluation of opportunities to reduce environmental impacts, including:
 1. Embodied and operating energy;
 2. Embodied carbon; and
 3. Related emissions to air, water, and land;which will inform the selection of materials and building systems;
 - iii. Identification of recycled and lower carbon materials, such as mass timber use in whole or in part within the facility, low-carbon cement and concrete, material efficiency, etc., to reduce embodied carbon in new materials by 30% or more;
 - iv. Identification of the biggest contributors to the building environmental footprint over its life cycle to inform necessary design changes that have the most meaningful and efficient improvement to the overall environmental footprint;
 - v. Operational energy data resulting from the energy Models, as described in paragraph d); and
 - vi. Document all assessment inclusions, exclusions and assumptions;
- g) Per SD option, complete a whole building life-cycle energy Model to determine the impact climate change on the projected building energy use, which includes:
- i. Evaluating design options through multiple energy simulations/Modelling;
 - ii. Determining the best design options and operational sequences, or combination of options and sequences which best enable the Project to optimize energy performance and maximize GHG reduction. Include in energy simulations/Modelling:
 1. Generation of renewal energy on Site such as solar, heat recovery, passive technologies, and thermal storage, if pragmatic, but excluding geothermal or geo-exchange fuel-shifting which are considered at the DD stage;
 2. Robust, durable building components/systems which can withstand future environmental conditions and extreme weather events due to a changing climate;
 3. Use of alternative fuels for emergency power systems; and
 4. Use of battery technologies in lieu of traditional emergency power and UPS systems;
 - iii. Special Modelling runs and detailed energy Models of building components to support design decisions, such as maximizing the thermal performance of envelope assemblies, identifying any limitations including impact on durability of materials, environmental life-cycle impacts, and structural limitations;

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- iv. Determining GHG emissions per Model run using the conversion information/factors provided by the DR; and
- v. Document all energy Model inclusions, exclusions and assumptions;
- h) In conjunction with the DR and building occupants, identify whether full-time or part-time operating personnel are required to operate and maintain building systems and related equipment and if specialized personnel retained through maintenance contracts are required for on-going operations. Indicate the types and estimated annual Cost per maintenance contract;
- i) Per SD option, perform the LCCA to maximize net savings and best value to the Crown in accordance with Project Brief section 4.1.4.3–Life-Cycle Cost Analysis.
- j) Confirm that all SD design options, and the final approved option with adjustment/changes made during the SD phase, support the sustainability objectives and meet the minimum sustainability performance requirements for the Project; and
- k) Identify any incremental increase in the Construction Cost Estimate and the projected life-cycle operating Costs, as well as payback calculations to determine the return on investment for each design option recommendation. Document inclusions, exclusions and assumptions.

12.3.7 Building Envelope

The Design Team must develop building envelope design options to support sustainable design objectives, the building and functional program, structural and mechanical SD options, and submit in the SD report options for:

- a) Substructure and foundation and waterproof design, groundwater management, in coordination with PWGSC's geotechnical consultant, civil/municipal, and structural designs;
- b) Building envelope sections including walls, foundation, roofing, windows, doors, high and mid bay doors, skylights and light wells (if any), component assemblies between the interior and exterior, etc.;
- c) Roofing, roof edge, gutter system, and drainage system, to be undertaken in coordination with the sustainability, structural and mechanical designs;
- d) Skylights, if any, in coordination with the sustainability, structural and mechanical designs;
- e) Masonry assemblies if any, pinning, grouting, estimated quantities of stone/brick;
- f) Regulating the indoor environment impact (i.e., temperature, humidity, air pressure and flows and mitigation) in coordination with sustainability, structural and mechanical designs;
- g) Special construction; and
- h) In consultation with the CM, architectural and structural design disciplines, requirements for envelope quality control testing, whole building air tightness testing, and overall performance verification intent/requirements.

12.3.8 Structural and Seismic

The Design Team must:

- a) Develop:

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- i. A detailed structural assessment and evaluation of the building in accordance with the 2020 NBCC;
- ii. Computer analytical Modelling for all structural system options, including load cases and applied loading; and
- iii. Complete comprehensive analyses of seismic options;
- b) Recommend a seismic approach with the 100% structural submission based the comprehensive analyses and, in accordance with Project Brief section 4.1.4.3, the LCA and LCCA of each structural option; and
- c) Include all structural/seismic analysis and calculations to date with each interim submission and within the SD report.

12.3.8.1 Structural Analysis and Modelling

Upon the DR's approval of the structural Modelling framework, the Design Team must prepare and present to the DR and TSTS occupants the structural analysis and Modelling at each iteration (i.e., 50% 90% and 100%) with detailed reports and PowerPoint presentations. Continue to refine and test each of the analytical Models using information gathered from investigations by:

- a) Considering parametric analysis to calibrate the Model, based on proposed building exterior and interior finishes, which includes revising the Model as required and re-calibrate;
- b) Describe in sufficient detail the inter-relationships between the structural system and:
 - i. Building envelope;
 - ii. Architectural finishes;
 - iii. Building functions; and
 - iv. Building and laboratory systems;
- c) Describe the preliminary seismic options and the process(es) and methodology(ies) to undertake an 'apples-to-apples' comparative analysis of the structural options;
- d) Per structural option, analyze for the following to the high importance performance level of the 2020 NBCC for new buildings: dead, live, snow, wind, functional, seismic, and environmental loads, including climate change impact and progressive collapse:
- e) Complete a comparative analysis of the three design options which include:
 - i. Structural reinforcement;
 - ii. Resolution of spatial, functional and operational conflicts;
 - iii. Limitation of vibration and noise for excavation and construction adjacent to and within occupied buildings and infrastructure;
 - iv. Identification of components that would be at risk from excavation and options for mitigation;
 - v. Description of the inter-relationships and dependencies between the structural systems and building envelope, laboratory systems (e.g., crane systems, etc.), architectural finishes, and mechanical and electrical systems, including the location and size of vertical and horizontal sleeves and shafts;
 - vi. Model analysis per option, including:

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- i. A description of methodology and confirmation of seismic approach; and
 - ii. All calculations and Model details in support of preliminary conclusions presented in a format that is suitable for review that clearly outlines all calculation methods and assumptions made. At a minimum, the following calculations must be clearly presented; however, additional calculations may also be requested: calculation of building weight and seismic weight, equivalent static force procedure, dynamic scaling and modal information, distribution of lateral forces by storey, foundation loads and a preliminary gravity load summary, including design loads, load distributions, support conditions, and representative element capacities;
 - vii. Determination of the loading conditions based on the provisions identified in the regulatory analysis;
 - viii. Determination of the specific seismic loading conditions;
 - ix. Determination of allowable loads that can be imposed by the scaffold systems and/or any other key construction loads;
 - x. Comparative analysis of options including impact on building functions, impact on building and laboratory systems, design lifespan, life cycle Cost, constructability and maintainability;
 - xi. OFC analysis;
 - xii. Phasing approach to structural/seismic construction, include temporary bracing scope and sequencing;
 - xiii. Documentation of all major assumptions and describe how they were arrived at;
 - xiv. Limitations and uncertainties with respect to material properties and structural system construction and behavior;
 - xv. Identification of required information still outstanding;
 - xvi. Identification of a preferred option that resolves the structural and seismic requirements and those that best balance functionality with Project scope, time and Cost, constraints; and
 - xvii. Recommendations for immediate action, if required;
- f) Define the extent of construction involved in terms of both construction effort and materials, as well as effectiveness of each seismic option;
 - g) System and major component design life span;
 - h) Outline of system and major component maintenance/replacement scope and frequency with the 90% submission;
 - i) Preliminary component-based life-cycle Cost analysis with the 50% submission, in accordance with Project Brief section 4.1.4.3, with the Design Team's ongoing collaboration;
 - j) Identify the technical justification for each preliminary option and analysis with respect to Project objectives, including sustainability; and
 - k) Describe the past performance of the structural system, including identifying pertinent information gathered from the detailed investigations program, as applicable.

12.3.8.2 Detailed Structural Assessment

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The Design Team must perform and submit in the SD report a detailed assessment and comprehensive ‘apples-to-apples’ comparative analysis of each structural Model, which includes:

- a) Description of the structural system, its construction, components and materials;
- b) Description of the inter-relationships between the structural system and building envelope, laboratory systems (e.g., crane systems, sensitive equipment, process equipment), and architectural finishes, and a discussion of the impact of these relationships on both the structural system and the proposed building envelope and architectural finishes;
- c) Description of the framework developed for the structure Modelling and analysis;
- d) Description of the analytical Model including:
 - i. Method of calibration and comparison with actual behavior and other Models;
 - ii. Limitations of the Model; and
 - iii. Confirmation of target reliability level for the seismic design and strategies;
- e) Description and discussion of the results of the structural analysis, including:
 - i. Analysis results for gravity, functional, wind, environmental, seismic loading scenarios, including appropriate load combinations;
 - ii. Revised or changed mechanical system(s) risks and hazards; and,
 - iii. Identification of structural deficiencies based on analysis results;
- f) Appendices with analysis details, calculations and Modelling assumptions and summary output from computer runs including, but not limited to, a summary of the loads and masses, modal properties, force distribution and building displacements;
- g) Complete system and major component maintenance/replacement scope and frequency;
- l) Detailed LCA and LCCA in accordance with Project Brief section 4.1.4.3, with the Design Team’s ongoing collaboration; and
- m) Scope of options to address seismic requirements with technical justification for each.

12.3.8.3 Structural Monitoring Program

The Design Team must:

- a) Refine and update the scope and requirements of a structural Monitoring program;
- b) Identify all Monitoring equipment, techniques, and activities to be implemented by the CM (e.g., testing, calibration, installation, verification, operation, maintenance, data acquisition, management and storage) necessary to Monitor the safety of structural systems, assemblies, temporary systems, materials and environment, as well as the construction workforce. Take into account the following criteria:
 - i. Use a common platform for data acquisition, management and storage;
 - ii. Coordinate development of the Monitoring program with the ongoing investigations and geotechnical and building envelope analysis and design options; and
 - iii. Demonstrate coordination among the Design Team; and

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- c) Submit to the DR with the 100% structural submission.

12.3.9 Mechanical

The Design Team must develop, Model, and submit in the SD report viable distinct and viable mechanical options that support the functional program, structural, building envelope and sustainability design SD options. The options and related analyses must include:

- a) In close coordination with all Design Team disciplines, an evaluation of:
 - i. TSTS occupants' redundancy and expandability requirements;
 - ii. High-performance, low-energy HVAC systems (e.g., heating and cooling systems, air distribution, controls, etc.);
 - iii. Passive strategies such as solar walls, optimized seasonal shading, earth tubes;
 - iv. Dedicated outdoor air systems, displacement ventilation, cascade ventilation, natural and hybrid natural ventilation, variable refrigerant flow, low temperature heating and medium temperature cooling, active chilled beams, radiant cooling and heating, heat reclamation from ventilation, plumbing, waste and other systems;
 - v. Benefits related to thermal energy storage systems and the potential energy recovery from science-based activities;
 - vi. High-efficiency and high-performance plumbing systems for such items as domestic water, sanitation, rainwater discharge, rain/storm/grey water recycling/reuse strategies, and fire protection such as sprinklers and standpipes; and
 - vii. Requirements and Cost-benefit of high-efficiency back-up heating systems with natural gas versus all-electric emergency power generators;
- b) Building services, including vertical transportation, plumbing, HVAC and heating and chill water systems, fire protection, building automation, security and CBRN protection, noise/acoustic control/isolation for speech privacy and intelligibility, physical protection of outdoor air intake and exhaust components/systems, and distribution and laboratory delivery and interconnection systems/components for:
 - i. Hydraulic fluids;
 - ii. All laboratory gases;
 - iii. Compressed air;
 - iv. Chill water loop for electron microscopy equipment; and
 - v. Jet fuel storage and distribution;
- c) Undertaking computational fluid dynamics analysis for dispersion modeling from laboratory exhaust stacks and safety related laboratory air movement within each science space;
- d) Capacity and capability for enhanced microparticulate filtration (i.e., 2.5 microns and smaller);
- e) Capacity to overcome the effects of climate change, including slow onset changes regarding increased heating/cooling demand and effects from changes in local climate conditions and extreme weather events (e.g., heavy rains/flooding, increased snow load/melting, heatwaves, cold snaps);

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- f) SD for mechanical components and systems for Site and building services including vertical transportation, plumbing, HVAC, fire suppression, ancillary emergency generator systems, energy management and controls, metering and sub-metering, security, all distribution and laboratory delivery and interconnection systems/components outlined in paragraph b) above, and:
 - i. Identify size and location of vertical and horizontal sleeves and shafts, in coordination with the structural design and architectural design disciplines;
 - ii. Identify fire suppression options for jet fuel storage and distribution systems, as other unique laboratory systems (e.g., hydraulic fluid storage and pumping, gas storage and distribution); and
 - iii. Provide recommendations complete with supporting justification, implications and indicate the extent of component and systems interoperability for the as-built Model;
- g) Thermal energy recovery, storage, and redistribution systems;
- h) Update the PD risk and hazard assessment and develop outline procedures related to each identified risk;
- i) Update the preliminary LVA and incorporate detailed requirements for each science-space in the functional program room sheets;
- j) Per option, both systems and whole-building energy analysis, and energy Models meeting the ASHRAE 140 Standard, to determine best-value measures for optimal energy performance, as well as overall Project design and post-construction building performance
- k) Per option, analysis in accordance with Project Brief section 12.3.6–Sustainability, including alternative fuel supply for emergency power systems, and LCA and LCCA in accordance with Project Brief sections 4.1.4.3–Life-Cycle Cost Analysis;
- l) Detailed analysis and design options/methods for infrastructure tie-in, Model tie-in locations for temporary and permanent services, including metering as required. Identify in the Model the interim and final underground utility relocations, replacements and upgrades confirming other connected building remain in continuous operation;
- m) A narrative and Drawings derived from the Model which indicate each of the proposed mechanical system/component options, the related sustainability analysis per option, as well as how/where they tie into systems in connected buildings, including:
 - i. The advantages, disadvantages and recommendations for each mechanical system and components, including embodied carbon analysis and energy Modelling;
 - ii. System schematics describing each mechanical system and component, including metering/sub-metering requirements and locations and extent of component/systems interoperability;
 - iii. Building and laboratory-specific control strategies for each system, including:
 - 1. High-level intelligent building infrastructure narrative and network schematic describing:
 - 1. The general configuration, communication protocols, and approach to designing network infrastructure;
 - 2. Drawings showing all systems connected to the intelligent building infrastructure including but not limited to building automation system, lighting, and metering; and

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3. Operator work station functionality and interoperability;
 2. Proposed zones and individual space and system controls, air flow analysis, gas and fluid mechanics analysis, and heat transfer analysis, and Modelling of each of the preceding elements, with supporting analysis; and
 3. Mechanical control interconnection with other building systems and proposed interoperability requirements for the as-built Model; and
- ii. Telecom closet, computer room, and carrier room cooling requirements, including options for mechanical equipment placement;
- n) The per capita supply of outdoor air for each option, per building space or fire compartment, and all design assumptions, exclusions, and all calculations and Model details in support of preliminary conclusions presented in a format that is suitable for review that clearly outlines all calculation methods and assumptions made;
 - o) The air delivery rate to each space including all design assumptions, exclusions, and all calculations and Model details in support of preliminary conclusions presented in a format that is suitable for review that clearly outlines all calculation methods and assumptions made;
 - p) With respect to paragraphs m) and n) and o) above, in the analysis directly link and indicate how the hazard and risk and seasonal thermal requirements (i.e., solar loading) are appropriately considered and integrated;
 - q) The location of each entry point for mechanical services in the building and for each space;
 - r) Total water supply requirements for the TSTS hub, including faucets, lavatories, fire protection systems, each special purpose space requirement, estimated annual water consumption and Cost including associated sewer and other surcharges;
 - s) The area and location required for major mechanical components and identify all mechanical spaces;
 - t) Ancillary support requirements for all mechanical rooms;
 - u) Incorporate into the Model all major systems, showing all pipes, ducts, controls, sensors, ancillary equipment;
 - v) List of all equipment/excel spread sheet (i.e., minimum information for each item: equipment number, location, service);
 - w) Temporary mechanical requirements during construction; and
 - x) In conjunction with the DR and building occupants, identify whether full-time or part-time operating personnel are required to operate and maintain mechanical equipment and if specialized personnel retained through maintenance contracts are required for on-going operations. Indicate the types and estimated annual Cost per maintenance contract. Identify whether personnel are required because of code requirements or because of the nature of the future operations.

12.3.10 Electrical

The Design Team must develop, Model and submit in the SD report viable electrical options that support the functional program, structural, sustainability, mechanical and fit-up SD options. The options and related analyses must include:

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- a) The proposed design options in sufficient detail for the DR's assessment, including the feasibility of each proposed system complete with energy Modelling, metering, and design loads, with full consideration of sustainability and commissioning and property management requirements;
- b) Per option, both systems and whole-building energy analysis, and energy Models meeting the ASHRAE 140 Standard, to determine best-value measures for optimal energy performance, as well as overall Project design and post-construction building performance;
- c) Per option, analysis in accordance with Project Brief section 12.3.6–Sustainability and LCA and LCCA in accordance with Project Brief sections 4.1.4.3–Life-Cycle Cost Analysis;
- d) Incorporate into the Model all options for each electrical system/subsystem, identify proposed electrical pathways and penetrations through architectural and structural assemblies, and provide single line sketches derived from the Model with block diagram configuration of the system and equipment capacity, and metering and sub-metering requirements;
- e) Intelligent building sensors, equipment, and proposed control logic;
- f) Normal, Emergency and UPS electrical distribution:
 - i. Provide a narrative explanation and description of each option;
 - ii. For each option, include the major and minor pros/cons in tabular format;
 - iii. Provide a detailed explanation for theoretical load calculations for normal, emergency and UPS power needs. Include major load groups, their associated load management priorities, and their connected, demand loads and final loads;
 - iv. Provide a detailed explanation of Site, building, and laboratory-specific grounding systems;
 - v. Provide a detailed explanation of transient voltage surge suppression systems;
 - vi. Provide a narrative on existing supply authority lines and supply network versus the projected normal power loads and confirm:
 - 1. If the projected loads can be met with the existing supply lines;
 - 2. Vault size and optimal location within the building;
 - 3. Transformation capacity to meet projected loads;
 - 4. Requirements for ancillary system(s) (e.g., CBRN if applicable, ventilation, drainage); and
 - 5. Ongoing vault equipment ownership and ideal, long-term maintenance responsibility;
 - vii. Provide a narrative emergency and UPS power options including:
 - 1. Emergency power load management strategy and prioritization of load shedding, maintaining building and asset integrity at all times;
 - 2. UPS system configuration (e.g., centralized, distributed, or combination of both);
 - 3. Generator fuel supply options, along with pros/cons for each fuel type;
 - 4. Battery technologies in lieu of traditional emergency power and UPS systems, with analysis of along with pros/cons of this approach and the incremental increase/decrease in space demand; and

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- viii. Outline equipment labeling requirements, in accordance with CSA Z462, for all panel boards, motor control centres, switchgear, and major electrical equipment;
- g) Lighting and Lighting Controls:
 - i. Incorporate into the Model building, Site lighting, lighting control options, including all accent lighting;
 - ii. Provide a detailed narrative of options for lighting technologies and control systems as well as pros/cons and recommendations and pay particular attention to sustainability objectives/requirements;
 - iii. Provide tables of intended lighting levels associated to assembly spaces, offices, conference and meeting rooms, specific laboratory requirements, public spaces, library; and
 - iv. Provide a detailed narrative of the lighting control strategies;
- h) Fire Alarm System:
 - i. Provide options for a new system and, as appropriate, subsystems specific to each laboratory and fuel storage and distribution systems;
 - ii. Provide detailed narrative of system with indication of the type and stages. Explain functionality of system and its interrelation with security and remote command centres;
 - iii. Provide narrative on code requirements; and
 - iv. In consultation with the CM, provide a narrative and strategy for temporary fire alarm system during construction;
- i) Public Address System:
 - i. Provide a narrative and recommended best options for a new system; and
 - ii. Provide a narrative for public address requirements, use, and means of control;
- j) Lightning Protection System:
 - i. Define lightning protection system options for the building and the Site. Provide complete risk analysis and calculations for each option final; and
 - ii. Provide narrative for lightning protection system, grounding requirements and impact, if any, on fuel storage, laboratory, or other building systems. Indicate constraints, interconnection between system components and best option approach;
- k) IT, Audio-Visual, and Integrated Security System:
 - i. Provide a narrative explanation and description of IT, audio-visual, and integrated security system design, architectural layout and zoning options, and telecom closet, audio-visual rooms, security command centre, server room, carrier entrance room configurations and isolated grounding systems/requirements, including options for the placement of electrical and mechanical equipment. Per space, indicate the proposed mechanical cooling requirement;
 - ii. For each option, include the major and minor pros/cons in tabular format;
 - v. Provide narrative on applicable codes and document applicable IT standards (e.g., such as bend radius, number of bends, accessibility, maximum security junction box height, junction box sizes);

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- iii. Provide explanations for emergency and UPS (back-up) power needs. Discuss operations and maintenance requirements, need for specialized contracts, and estimated annual maintenance Costs;
 - iv. Derive from the Model design options and provide single line diagrams with block configuration of each system, grounding (isolated or otherwise), equipment location, and capacity; and
 - v. Derive from the Model floor plans identifying telecom closets, IT risers and raceways, location of and interconnection with carrier entrance room, and carrier network pathway and requirements on the Site;
- l) For all systems, indicate how much spare and future expansion capacity is incorporated into each proposed system; and
 - m) In conjunction with the DR and building occupants, identify whether full-time or part-time operating personnel are required to operate and maintain electrical equipment and if specialized personnel retained through maintenance contracts are required for on-going operations. Indicate the types and estimated annual Cost per maintenance contract. Identify whether personnel are required because of code requirements or because of the nature of the future operations.

12.3.11 Commissioning and Property Management

The Design Team must develop and submit in the SD report preliminary commissioning and property management requirements, in accordance with Project Brief section 4.1.4–Operating Requirements, which include:

- a) Full details, per building system, of the owners Project requirements (OPR), in accordance with ASHRAE 202-18, linked to the final functional program and design requirements;
- b) An assessment of internal occupant staffing and staff skills, and necessary and recommended third-party contracts, to operate and sustainably maintain the building and its Site, as well as a compilation of estimated annual labour and third-party contract Costs;
- c) Scope and frequency for all operations and maintenance requirements in accordance with building code, fire code and regulatory obligations, security, and ongoing operations and maintenance requirements, per design discipline, for specialty services, equipment and materials;
- d) Compilation of all utility Costs, including water and sewer and IT carriers' fibre/connection;
- e) Estimate of annual municipal property and other taxes;
- f) An outline BMP summarizing all annualized Costs identified in the proceeding articles and as stipulated in Project Brief section 4.1.4.1;
- g) Per applicable Design Team discipline, confirmation of future maintenance management nomenclature per building system/components (i.e., the extent of device/component identification) for integration in the DD subsections, and DP Specifications and Drawings;
- h) A design intent brief outline, to be prepared by each design discipline, containing simple non-technical language and graphics for use as an ongoing property management and building operations reference document, to be refined and submitted with subsequent design stages, which summarizes:

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- i. The operational intent, sustainability features, and design life-cycle for each building system, indicating how the operational and sustainability requirements were translated into the design intent for the Project;
 - ii. An explanation of what a system or component does, the areas it serves, why the system or components were selected and, in general terms, how the design, sustainability, and operating and maintenance concepts of the systems and components are accomplished, including:
 - 1. Enhancement/alterations for future climate change;
 - 2. 'Greening' features and new changes/obligations for ongoing 'green' operations and maintenance;
 - 3. General zoning and control strategies, sequences and reset schedules;
 - 4. Outline of seasonal (switch-over/isolation) procedures;
 - 5. Emergency procedures during a fire event, power or equipment failure;
 - 6. Reduced and simplified Drawings illustrating system configurations, including single line and plan Drawings of each system;
 - 7. Interfaces between building systems; and
 - 8. Long-term monitoring programs to collect information (e.g., energy consumption, water usage, GHG emissions, waste, environmental conditions, seismic activity) and monitoring system maintenance and recalibration requirements and frequency; and
 - iii. A record of, and rationale for, design decisions made throughout the Project and how these design decisions impact or change the operational intent for the building and its Site;
- i) The design intent report will provide the basis for standard operating procedures (SOPs) as prescribed by the *Canadian Labour Code*, which the Design Team must prepare prior to Substantial Performance of the Project, and revise during the warranty period to reflect the as-commissioned and as-adjusted components and systems, including their control sequences. Include requirements for all sustainable design features and strategies;
 - j) A draft, multi-disciplinary commissioning plan for all building and Site components, systems and integrated systems. Include a system-by-system overview for testing and performance verification, dynamic systems testing, and integrated life-safety systems testing; and
 - k) An outline of future minor recapitalization projects associated with proper cyclical maintenance (e.g., envelope caulking/repointing, building and laboratory system upgrade). Identify the frequency and brief scope statement for each recapitalization project. Link the frequency with assumptions taken in Project Brief section 4.1.4.3–Life-Cycle Cost Analysis. Integrate new/enhanced information from the Design Team's sustainable design requirements.

12.3.12 Cost

The Design Team must develop iterative [ASTM E1557, UNIFORMAT II](#) class C (+/- 15%) Cost estimates per option, with the 50% and 100% SD submission, and with a detailed option-specific basis of estimate that builds on earlier versions, along with Cost estimates and basis of estimates for each enabling project and a

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whole-Project sustainability budget. The SD Cost estimates and related Cost analysis includes, but is not limited to:

- a) Refinement of the WBS for each of the Project's two major Cost centres;
- b) Full quantity survey of the functional program and Project scope defined at the time of estimate, with annual cash flows as per the Project schedule, incorporating Cost information from the GEICs to present total Project construction estimate. Code the estimates to the detailed WBS for each scope element, sub-element and Work activity;
- c) Updated rationale for all contingencies and allowances and their percentages/values;
- d) Reconciling each estimate with independent estimate from PWGSC's 3rd party cost consultant;
- e) Per estimate, preparing a reconciliation report which identifies the necessary follow-up activities, the person(s) responsible, and timelines to complete said activities;
- f) Value engineering workshop participation and related Cost analysis and recommendations;
- g) Complete LCA and LCCA per submission, per option, as described Project Brief sections 12.3.6–Sustainability and 4.1.4.3–Life-Cycle Cost Analysis;
- h) BMP budget for all annualized operational Costs as described in Project Brief sections 4.1.4.1–Preliminary Building Management Plan and 12.3.6–Sustainability;
- i) Update of the whole-Project sustainability budget;
- j) Input and analysis to support the Design Team in the development of a Project benefit register and benefit plan, as described in Project Brief sections 4.1.4–Benefits Realization and 12.4–Benefit Register and Benefit Plan; and
- k) Determining and monthly reporting on the percentage complete of Design Team activities through all Project stages, linking this information (resource demand) with the Consultant's monthly resource-loaded schedule.

12.4 Benefit Register and Benefit Plan

The Design Team, with the input of the CM and DR, must:

- a) Develop a draft Project-specific benefit register and benefits plan complete with proposed metrics for measurement, as described in Project Brief section 4.1.6, based on the 90% SD options; and
- b) Revise and update the draft register and plan, based on feedback from the DR, CM, and the Design Team's recommended 100% SD option, to serve as the detailed, Baseline benefit register and benefits plan.

12.5 Approvals

The Design Team must:

- a) Prepare and deliver 50% and 100% SD presentations as described in Project Brief section 10.1.1.4–Design Submission Presentations and subsection c) of APPENDIX D–PROCESS MAPS;
- b) Recommend an option that best balances all Project objectives;

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- c) Identify the advantages and disadvantages of each option based on:
 - i. Construction schedule and implementation plan;
 - ii. Construction Cost;
 - iii. Functional, operational and security requirements;
 - iv. Impact and benefits on the environment and sustainability objectives;
 - v. Impact on the rest of the Project;
 - vi. Impact on future building operations; and
 - vii. Impact on other buildings, the underground utilities, and Site operations;
- d) With DR's support, prepare and submit NCC FLUDA documentation and obtain NCC FLUDA approval; and
- e) Integrate recommendations and feedback from submissions and presentations into subsequent design submissions and presentations.

12.6 Schematic Design Deliverables

At a minimum, the Consultant must:

- a) Coordinate and integrate all Services of the Design Team and with the input of the GEICs;
- b) Through ongoing investigation findings, ongoing research and analysis, update the PD gap analysis monthly until the end of the SD stage and integrate findings, within each SD sub-phase;
- c) As described in this Project Brief section 12, develop SD options, sub-options, analysis and recommendations;
- d) Submit 50%, 90%, and 100% SD submissions according to requirements described in this Project Brief section 12, as well as the including the completed, federated Model and all supporting information, as per key intermediate dates defined in Project Brief section 1.3.3–Milestones;
- e) Submit with the 90% SD submission a draft Project-specific benefits register and benefits plan;
- f) Submit with the 100% SD submission a detailed Project-specific benefits register and benefits plan based on the recommended SD option;
- g) Prepare and deliver SD presentations as described in Project Brief section 10.1.1.4–Design Submission Presentations and subsection c) of APPENDIX D–PROCESS MAPS;
- h) Update NCC FLUDA documentation and obtain NCC FLUDA approval, or approval in principle;
- i) Prepare and submit presentation materials associated with approval processes;
- j) Maintain full production during the submission review processes;
- k) Confirm draft and final SD reports contain integrated and viable SD options that:
 - i. Comply with the requirements of the functional program and all applicable plans, policies, practices, standards and guidelines;
 - ii. Include Model-generated Drawings that illustrate the functional relationships of the Project, its scale and character, and include scope narratives, with consideration of impacts to construction planning and scheduling, construction Cost, and construction risk;

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- iii. Present graphic and narrative options without design conflicts, anomalies and other issues and present the advantages and disadvantages of each option; and
- iv. Consolidate the SD proposals, findings, analysis and recommendations;
- l) Update the final design review response of the compiled review comments within 20 Working Days of receipt of comments and submit a final submission to the DR for acceptance;
- m) Prepare and submit concise SD report chapters for each design discipline, consolidating information gathered, to illustrate an integrated analysis of the Design Team's SD options. Place supporting information and reports (e.g., investigations) as appendices. Include as a minimum:
 - i. Executive summary;
 - ii. Glossary of terms;
 - iii. Summary of information gathered and documentation reviewed, with an annotated bibliography;
 - iv. Summary of investigations;
 - v. Regulatory requirements;
 - vi. Site requirements and options which include:
 - 1. Landscape architecture and urban design requirements, options, and as-built Model interoperability requirements; and
 - 2. Civil/municipal requirements, options, and as-built Model interoperability requirements;
 - vii. Architectural requirements and options which include:
 - 1. Building program requirements and options;
 - 2. Functional program requirements, options, and as-built Model interoperability requirements;
 - 3. Security requirements, options, and as-built Model interoperability requirements;
 - 4. AV requirements, options, and as-built Model interoperability requirements;
 - 5. IT requirements, options, and as-built Model interoperability requirements;
 - 6. Move planning;
 - 7. FF&E requirements, options, and as-built Model interoperability requirements; and
 - 8. Acoustic requirements, options, and as-built Model interoperability requirements;
 - viii. Sustainability requirements and options including, among other requirements, whole-building LCA, whole-building energy analysis and Modelling, and complete LCCA in accordance with Project Brief section 4.1.4.3;
 - ix. Building envelope requirements, options, and as-built Model interoperability requirements;
 - x. Structural and seismic requirements, options, and as-built Model interoperability requirements;
 - xi. Mechanical requirements, options, and as-built Model interoperability requirements;
 - xii. Electrical requirements, options, and as-built Model interoperability requirements;

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- xiii. Commissioning and property management requirements including, among other things, an outline BMP, and outline design intent report, and an outline commissioning plan;
- xiv. [ASTM E1557, UNIFORMAT II](#) Cost estimates per option, per SD submission, with an option-specific basis of estimate, including an estimate and basis of estimate per enabling project, and:
 - 1. A reconciliation report with each estimate;
 - 2. Complete LCA and LCCA per submission, per option;
 - 3. BMP budget for all annualized operational Costs; and
 - 4. Updated Project sustainability budget by 90% SD, refined with the 100% SD submission; and
- xv. Monthly reporting of Design Team resources progress percentage complete against each WBS element, integrated with the Consultant's monthly schedule submission.

12.7 Response to Schematic Design Report

The Consultant must:

- a) Review and analyse all the comments provided by the Project Team;
- b) Prepare and submit a written response to the DR within 20 Working Days to all the submission comments, taking into account the submission and review processes defined in subsection b) of Project Brief APPENDIX D – PROCESS MAPS; and
- c) Integrate comments into the subsequent submissions as directed by the DR.

13 DESIGN DEVELOPMENT SERVICES

13.1 Intent

The objective of the DD stage is to further refine and develop the selected SD option, which may be a combination of elements from each SD option. The Design Team must address and resolve all design conflicts and anomalies and confirm full coordination and optimal design iteration and work flow of the Design Team, integrating the design requirements of the GEICs as applicable to design disciplines.

Two additional sustainability options will be developed by 50% DD on the selected SD option to maximize every possible 'greening' aspect of the Project, meeting or possibly exceeding sustainability objectives, to determine the optimal value-for-money while balancing all Project objectives and PWGSC's sustainability investment.

The Design Team must obtain written authorization from the DR before proceeding with DD Services. The DD stage will follow the same process as the SD (i.e., 50%, 90%, and 100% submissions) and must be a continuous process supporting the DPs stage as the Project evolves. Each DD submission is to provide more detail and refinement than the previous submission. All DD stage deliverables will be reviewed by the DR. DD Services do not apply for enabling and temporary works. Instead, these sub-projects will move from their SD directly to the DP stage.

To respond to the schedule, the Consultant must prioritize the Project design, review those design activities completed during PD and SD stages, and identify additional or new design activities or priorities, including sustainable design sub-options described in Project Brief section 13.2.6. The Consultant must revise and optimize the individual work flow of each Design Team member to meet production milestones and, if possible, shorten durations.

The CM is expected to be hired just before or at the start of the DD stage. Ongoing consultation is required with the CM and DR to identify and understand the Design Team's design activities and for the CM to clarify DP scope and timing with the Design Team. The CM will continually participate in the design process, providing Cost and schedule analysis and support Project decision-making.

The Design Team must confirm design interferences within the Model are identified and resolved weekly, or as defined in the up-to-date BXP.

13.2 Main Rehabilitation Design Services

13.2.1 Regulatory

The Design Team must refine, Model, and submit in the DD report:

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- a) Fully defined Site and building code analysis and requirements;
- b) Fully defined fire and life safety strategy;
- c) Fully defined universal design for accessibility Site and building strategy; and
- d) Fully defined design standards and laboratory regulations.

13.2.2 Geotechnical

The Design Team must coordinate their DD design and requirements with PWGSC's geotechnical consultant and incorporate relevant geotechnical requirements into their design planning and DD reports.

13.2.3 Environmental

The Design Team must coordinate their DD design and requirements with PWGSC's environmental consultants and incorporate relevant environmental and industrial hygiene requirements into their design planning and DD reports.

13.2.4 Site

The Design Team must refine, Model, further develop Model-based Site requirements and, for each Site design discipline, submit in the DD report the developed Site designs, which include:

- a) For sustainability sub-options A and B, as described in Project Brief section 13.2.6–Sustainability, complete revised whole building LCA using the Athena [Impact Estimator for Buildings](#) to update/verify the development of an optimal and balanced strategy that best supports the sustainability performance requirements;
- b) For sustainability sub-options A and B, complete revised whole building life-cycle energy Model to update/verify the impact climate change on the projected building energy use;
- c) For sustainability sub-options A and B, perform the LCCA to maximize net savings and best value to the Crown in accordance with Project Brief section 4.1.4.3–Life-Cycle Cost Analysis;

13.2.4.1 Landscape Architecture and Urban Design

The Design Team must refine, Model, develop Model-based special sketches, Drawings, and landscape architecture and urban design requirements based on the selected SD option and submit in the DD report landscape and urban design solutions, which includes:

- a) Reconfirmation, and if necessary, update of the landscape and urban design vision;
- b) Detailed graphic and narrative description of the recommended SD option, including:
 - i. Complete explanation of the inter-relationships between the landscape and the TSTS hub, adjacent buildings, and built infrastructure, which includes, but is not limited to:
 - 1. Pedestrian and vehicular circulation to meet security requirements; and

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- 2. Universal design for accessibility requirements and exceptions, including transition zones to adjacent lands, parking areas, access points to the TSTS hub delivery and loading areas, gathering places, state and public events, staging areas, etc.;
- ii. All season maintenance requirements, include snow storage and no/low salt treatments; and
- iii. Surface drainage solutions, coordination with the civil/municipal design;
- c) Modelling of all aspects of the design, with particular attention to and coordination with the Site and security lighting, security requirements for the Site (e.g., bollards, controlled entry points for the TSTS), which include but are not limited to:
 - i. Fully developed Model renderings;
 - ii. Colour-coded landscape Drawings of the approved program, accessibility requirements and transition zones, final materiel selection;
 - iii. Grading Drawings, sections and elevations;
 - iv. Planting Drawings and listings, including tree protection Drawings and overview of landscape maintenance during construction;
 - v. Furniture Drawings, per type, including sections, elevations, materials, and fabrication overview;
 - vi. Integration of all landscape features and infrastructure existing and new wayfinding and signage, Site and security lighting, security features (e.g., surveillance cameras, bollards, lockable pull-boxes), landscape furniture, Site amenities, vegetation, grading, soil and soil structure condition, drainage, storm water management, irrigation, and mechanical, electrical and fire protection infrastructure; and
 - vii. Details for exterior signage and way-finding, linked with interior wayfinding and signage; and
- d) A long-term, post-construction landscape management plan to protect, restore, and enhance environment and human health, with includes:
 - i. Integrated pest management techniques;
 - ii. Alternative, no or low salt snow and ice removal methods/requirements;
 - iii. Eliminating use of toxic pesticides;
 - iv. Recycling of organics;
 - v. Reduction of outdoor energy consumption/ low-carbon ground maintenance equipment; and
 - vi. Adaptive site maintenance plans and non-toxic invasive species control.

13.2.4.2 Civil/Municipal

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The Design Team must refine, Model, develop Model-based special sketches, Drawings, and landscape civil/municipal design requirements based on the approved SD option and submit in the DD report civil/municipal design solutions, which includes:

- a) Site and building service connections with references to building outlines, Site parking, access roads and sidewalks, including existing and proposed grades and existing and proposed drainage;
- b) All manholes with invert elevations and drainage details, valves, hydrant locations, proposed pipe sizes and slopes, and pipe invert elevations at building foundations and at connection of municipal, water, storm and sewer systems;
- c) All trench and duct bank details including profiles and elevations of below grade services and drainage requirements;
- d) All pipe capacities and estimated storm and sanitary flows, sized to accommodate future effects from climate change. Where the proposed system connects to existing sewers describe the impact of the connection on the existing system. Create a summary sheet and for each connection identify issues/challenges/specific requirements;
- e) As part of the two sustainability sub-options by the 50% DD stage, due consideration of high-performance integrated water and waste management systems, integrated building and laboratory process cooling and heating systems, waste to energy systems, as well as passive or renewable systems; and
- f) In coordination with landscape architecture, all grading, paving, hardscape, and accessibility requirements for the Site.

13.2.5 Architectural

The Design Team must refine, Model, develop Model-based special sketches, Drawings, and architectural design requirements, for each architectural design discipline and based on the approved SD option, and submit in the DD report a fully detailed architectural design.

13.2.5.1 Building and Functional Program

The Design Team must advance and submit in the DD report the building and functional program update which:

- a) Identifies changes to the approved functional program and:
 - i. Advise the DR and CM of all proposed changes;
 - ii. Inform the DR of potential opportunities or risk related to the proposed change;
 - iii. Review potential Cost impacts with the CM and the DR;
 - iv. Obtain the approval of the DR before incorporating any proposed change; and
 - v. Update and track functional program changes within individual room data sheets, with a summary of changes;
- b) Refines in detail and incorporate into the Model programmatic layouts, including;
 - i. Detailed listing and numbering requirements for all rooms/spaces;

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- ii. Update spatial relationship diagrams;
- iii. Update area calculations and analysis to quantify operational equipment requirements;
- iv. Updated storage analysis; and
- v. Update functional program room data sheets as required, including all mechanical LVA requirements and interoperability requirements for the as-built Model.

13.2.5.1.1 Design Details

The Design Team must include within the DD report:

- a) For sustainability sub-options A and B, as described in Project Brief section 13.2.6–Sustainability, complete revised whole building LCA using the Athena [Impact Estimator for Buildings](#) to update/verify the development of an optimal and balanced strategy that best supports the sustainability performance requirements;
- b) For sustainability sub-options A and B, complete revised whole building life-cycle energy Model to update/verify the impact climate change on the projected building energy use;
- c) For sustainability sub-options A and B, perform the LCCA to maximize net savings and best value to the Crown in accordance with Project Brief section 4.1.4.3–Life-Cycle Cost Analysis;
- d) Detailed and coordinated design narratives for all members of the Design Team;
- e) Functional program updates (e.g., changes to room data sheets and requirements for FF&E, IT, AV, physical security and ISS, furniture and equipment storage, LVA for each science-space), including a summary of all changes with explanation of why the change was necessary, who and when each change was requested, and who and when each change was authorized;
- f) A complete design with Model-generated graphics and a narrative description including, but not limited to:
 - i. All works proposed with detailed interior and exterior Model renderings and fly-bys of selected areas (e.g., Site, laboratories, security screening);
 - ii. Colour-coded architectural floor Drawings for every floor level, confirming no conflict between the spatial layout and functional program. Include building grid lines and indicate key dimensions;
 - iii. Interior and exterior building elevations and sections of the TSTS hub to detail floor levels, room heights, corridor elevations, interior elevations of significant spaces including high and mid bay laboratories, meeting rooms and other spaces, including the composition of walls, floors, roofs, foundations, windows and doors, etc. Include building grid lines and indicate key dimensions;
 - iv. Reflected ceiling Drawings for all floors, including detailed ceiling requirements for specialize laboratory lighting;
 - v. Confirmation of compliance with the [Accessible Canada Act](#) , [CAN/CSA B651-18](#), other applicable polices and regulations and, if necessary, proposed exemptions from the Act, standard, polices and regulations. Identify the incremental accessibility requirements beyond those mandated by CSA B651;
 - vi. Architectural features, including materials, millwork, finishing details and samples sufficient to permit choice of materials and finishes;

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- vii. Materials sample boards for all finishes including, but not limited to, walls, floors, and carpet colour options;
- viii. Security zones and transition areas, detailed security applications per area, and related security requirements;
- ix. Electromagnetic shielding materials, requirements and locations, coordinated with building program, fit-up, FF&E, laboratory, and electrical plans;
- x. Circulation flow for building and for the Site, respecting/supporting security zones for the public, employees, security and operations personnel, as well as furniture and equipment storage circulation routes between storage rooms and the space(s) they support;
- xi. Room numbering Drawings;
- xii. Signage and way finding for interior spaces, digital and e-signage;
- xiii. Acoustic zones, ratings for walls, doors, transfer ducts, conduits and other assemblies, and wall, door and other relevant design details, including a summary of architectural implications of acoustic and speech security/privacy requirements;
- xiv. Drawings, elevations, sections, and related details for built in furniture, fit-up, FF&E, laboratory, kitchen and other speciality equipment, and complete schedules (e.g., room, door, window, kitchen, janitorial, loading dock and other speciality equipment);
- xv. Bird-friendly building design sections, details, attachment Drawings, etc. per location;
- xvi. Services including vertical conveyancing, plumbing, HVAC, laboratory piping, fire detection and suppression, electrical, Connectivity, building automation, etc.;
- xvii. Connectivity equipment layouts, including pathways and their connection with base building systems, laboratory equipment and placement/installation details (e.g., in ceilings, walls, speciality rooms, special mounting requirements);
- xviii. Lighting and speciality lighting requirements and details;
- xix. Special construction and deconstruction requirements; and
- xx. Area calculations that include individual and summarized listings of each building space and all the area by the type of accommodation.

13.2.5.2 Security

The majority of security-related Services and deliverables are protected B, with a few documents at the secret (level II) security classification. The Consultant must make sure Contract deliverables are organized such that protected B and classified information are duly segregated and securely stored separate from standard DD stage deliverables. Accordingly, to the extent possible and to the approval of the DR the Design Team must prepare 'sanitized' (non-classified) versions of classified documents with the PD stage deliverables (i.e., two security reports: classified and sanitized).

The Design Team must advance the security design, Model and further describe in detail all security requirements/applications, and submit in the DD reports:

- a) Reconfirmation of or, if necessary, refinement of the security governance framework;

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- b) Any change to/refinement of the functional program and its room data sheets, including a summary of all changes with explanation of why the change was necessary, who and when each change was requested, and who and when each change was authorized;
- c) A refined SDB, including a summary of all changes with explanation of why the change was necessary and who asked for and who authorized each change;
- d) Fully developed physical security solutions and ISS as outlined in the following two subsections;
- e) Develop a vulnerability gap analysis, in tabular format, to:
 - i. List and describe any security vulnerabilities introduced through the design process; or
 - ii. Result from requirements previously documented (e.g., PSR, TRA, SDB, other design documents) that have not already been addressed,

For the security governance to determine how, when, or if each vulnerability gap is to be addressed, taking into account the design and construction Cost, time, and risk impacts defined by the Design Team and CM; and

- f) With the coordinated input and analysis of other Design Team disciplines and detailed Cost analysis by the CM, the Construction Cost Estimate of the complete security design, taking into account the full interdisciplinary design scope and complexity (i.e., all security-related requirements for the building, Site, technologies and equipment), and
 - i. Update future security personnel staff Costs and maintenance contracts separately and incorporate these requirements and their Costs within the Project Brief sections 4.1.4.1–Preliminary Building Management Plan and 4.1.4.3–Life-Cycle Cost Analysis;

13.2.5.2.1 Physical Security Solutions

The Design Team must, for each security system, subsystem, and their individual components, refine, Model, develop Model-based special sketches, Drawings and provide updated descriptions, functions, and operational, technical and technology requirements, based on the approved SD option and submit in the DD report the developed security design solutions, which considers and integrates the requirements outlined in Project Brief APPENDIX F–CONNECTIVITY INTGRATION WITH DESIGN DELIVERABLES, APPENDIX G–FF&E AND CONNECTIVITY RESPONSIBILITIES MATRIX, and includes:

- a) Site security systems and components;
- b) Building perimeter and entrance layouts, systems and components;
- c) Security spaces and their layouts and integrated systems and components;
- d) Screening and scanning area layouts, systems and components and updated circulation routes and mathematical analysis on circulation and flow;
- e) Integrated CBRN systems and components;
- f) Acoustic, speech, and emission security classification/requirements, per space, per building system, and supporting criteria;
- g) A fully developed security concept of operations;
- h) Changes to the existing security operations centre layout, systems and components;

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- i) Security post layouts, systems and components;
- j) Loading dock layouts, systems and components;
- k) With the 90% DD submission, a listing of physical security systems and components, in a tabular format, defining the Design Team discipline responsible for the development of subsequent DPs (i.e., who develops which DPs or parts thereof), as well as the quality assurance process (e.g., providing requirements, timing of reviews, feedback) by the security design discipline in verifying physical security requirements are completely and accurately detailed within DPs; and
- l) With the 90% DD submission, for those subsequent DPs to be developed by the security design discipline, an outline, three-part NMS Specification for each physical security-related procurement, describing the general information (i.e., Specification part 1), products (i.e., Specification part 2), and execution (i.e., Specification part 3, implementation approach, performance expectations, and performance verification prerequisites (criteria), procedures, and related requirements).

13.2.5.2.2 Integrated Security Systems

The Design Team must, for the ISS and each ISS subsystem and their individual components, refine, Model, develop Model-based special sketches, Drawings and provide updated descriptions, functions, and operational, technical and technology requirements, based on the approved SD option and submit in the DD report the developed security design solutions, which considers and integrates the requirements outlined in Project Brief APPENDIX F—CONNECTIVITY INTEGRATION WITH DESIGN DELIVERABLES, APPENDIX G—FF&E AND CONNECTIVITY RESPONSIBILITIES MATRIX, and includes:

- a) Security component layouts;
- b) ISS infrastructure requirements, including inter-building Connectivity with the existing security operations centre;
- c) Door functional descriptions, door schedule with door numbers;
- d) Door hardware/device schedule (for ISS electronics) including a description, per door, demonstrating how each security door is fully coordinated with the corresponding architectural door hardware schedule;
- e) ISS single-line Drawing of the entire ISS and all subsystem and device components, including ISS servers and workstations, network switches, security panels, doors and alarm devices, relay output devices, cameras, NVRs, intercom stations, and any other security internet protocol or signal-connected security device that forms part of the ISS;
- f) Typical device Modelling, with applicable notes, which fully detail all power and signal connectivity to the device, mounting and infrastructure details necessary to support the installation, operation, and integration of the device in the ISS, fully coordinated with all other Design Team disciplines, including but not limited to security Panels, door controllers, card readers, access control power supplies, cameras, intercom substations, button control boxes, key boxes, x-ray machines, walk-through-metal-detectors, etc.;
- g) Complete integration designs and matrices at all device levels for each ISS component integrated with another ISS subsystem;
- h) Complete and detailed equipment listing of all ISS components including, as appropriate, the ideal make and model of compliant equipment and at least 3 acceptable alternative manufacturers and their equivalent products;

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- i) With the 90% DD submission, an outline, three-part Division 28 NMS Specification for each ISS-related procurement, describing the general information (i.e., Specification part 1), products (i.e., Specification part 2, software, hardware, components), and execution (i.e., Specification part 3, implementation approach, performance expectations, and performance verification prerequisites (criteria), procedures, and related requirements); and
- j) With the 90% DD submission, a listing of ISS systems and components, in a tabular format, to be incorporated by other Design Team disciplines in their development of subsequent DPs (i.e., who develops which DPs or parts thereof), as well as the quality assurance process (e.g., providing requirements, timing of reviews, feedback) by the security design discipline in verifying physical security requirements are completely and accurately detailed within DPs, and:
 - i. Confirm with the DR and the Consultant and identify the required security classification requirement of each subsequent DP.

13.2.5.3 Audio-Visual

The majority of AV-related Services and deliverables are protected B, with a few documents at the secret (level II) security classification. The Consultant must make sure Contract deliverables are organized such that protected B and classified information are duly segregated and securely stored separate from standard DD stage deliverables. Accordingly, to the extent possible and to the approval of the DR the Design Team must prepare 'sanitized' (non-classified) versions of classified documents with the design stage deliverables (i.e., two AV reports per submission: classified and sanitized).

The Design Team must advance the AV design, Model and further describe in detail all AV requirements/applications, and submit in the DD reports:

- a) Any change to/refinement of the functional program and its room data sheets, including a summary of all changes with explanation of why the change was necessary, who and when each change was requested, and who and when each change was authorized;
- b) A refined AVDB, including a summary of all changes with explanation of why the change was necessary and who asked for and who authorized each change;
- c) Fully developed AV design as outlined in the following subsection;
- d) With the coordinated input and analysis of other Design Team disciplines and detailed Cost analysis by the CM, the Construction Cost Estimate of the complete AV design, taking into account the full interdisciplinary design scope and complexity (i.e., all AV-related requirements for the building, Site, technologies and equipment), and
 - i. Update future AV personnel staff Costs and maintenance contracts separately and incorporate these requirements and their Costs within the Project Brief sections 4.1.4.1–Preliminary Building Management Plan and 4.1.4.3–Life-Cycle Cost Analysis;

13.2.5.3.1 Design Details

The Design Team must, for each AV system, subsystem, and their individual components, refine, Model, develop Model-based special sketches, Drawings and provide updated descriptions, functions, and operational, technical and technology requirements, based on the approved SD option and submit in the DD report the developed AV design solutions, which considers and integrates the requirements outlined in

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Project Brief APPENDIX F—CONNECTIVITY INTEGRATION WITH DESIGN DELIVERABLES, APPENDIX G—FF&E AND CONNECTIVITY RESPONSIBILITIES MATRIX, and includes:

- a) Site AV systems and components their layouts and building connectivity connections;
- b) Building AV spaces, components, and their layouts;
- c) Acoustics, lighting and related requirements, per space, per AV system, and supporting criteria;
- d) A fully developed AV concept of operations;
- e) If applicable, a detail AV control booth layouts, systems and components;
- f) An AV single-line Drawing of the complete AV systems and all subsystems, including all device connections and AV network connections;
- g) Typical device Modelling, with applicable notes, which fully detail all power and signal connectivity to the device, mounting and infrastructure details necessary to support the installation, operation, and integration of all devices in the AV system, fully coordinated with all other Design Team disciplines;
- h) Complete integration designs and matrices at all device levels for each AV systems components;
- i) Complete and detailed equipment listing of all AV system components;
- j) With the 90% DD submission, a listing of AV systems and components, in a tabular format, defining the Design Team discipline responsible for the development of subsequent DPs (i.e., who develops which DPs or parts thereof), as well as the quality assurance process (e.g., providing requirements, timing of reviews, feedback) by the AV design discipline in verifying ancillary or supporting system requirements are completely and accurately detailed within DPs; and
- k) With the 90% DD submission, for those subsequent DPs to be developed by the AV design discipline, an outline Specification for each IT-related procurement describing the relevant general information (i.e., Specification part 1), products (i.e., Specification part 2), and execution (i.e., Specification part 3, implementation approach, performance expectations, and performance verification prerequisites (criteria), procedures, and related requirements); and:
 - i. Confirm with the DR and the Consultant and identify the required security classification requirement of each subsequent DP.

13.2.5.4 Information Technology

The majority of AV-related Services and deliverables are protected B, with a few documents at the secret (level II) security classification. The Consultant must make sure Contract deliverables are organized such that protected B and classified information are duly segregated and securely stored separate from standard DD stage deliverables. Accordingly, to the extent possible and to the approval of the DR the Design Team must prepare 'sanitized' (non-classified) versions of classified documents with the design stage deliverables (i.e., two IT reports per submission: classified and sanitized).

The Design Team must advance the IT design, Model and further describe in detail all IT and network requirements/applications, and submit in the DD reports:

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- a) Any change to/refinement of the functional program and its room data sheets, including a summary of all changes with explanation of why the change was necessary, who and when each change was requested, and who and when each change was authorized;
- b) A refined ITDB, including a summary of all changes with explanation of why the change was necessary and who asked for and who authorized each change;
- c) Fully developed IT design as outlined in the following subsection;
- d) With the coordinated input and analysis of other Design Team disciplines and detailed Cost analysis by the CM, the Construction Cost Estimate of the complete IT design, taking into account the full interdisciplinary design scope and complexity (i.e., all IT and Network related requirements for the building, Site, integrated technologies and equipment), and
 - i. Update future IT personnel staff Costs and maintenance contracts separately and incorporate these requirements and their Costs within the Project Brief sections 4.1.4.1–Preliminary Building Management Plan and 4.1.4.3–Life-Cycle Cost Analysis;

13.2.5.4.1 Design Details

The Design Team must, for each IT system, subsystem, and their individual components, refine, Model, develop Model-based special sketches, Drawings and provide updated descriptions, functions, and operational, technical and technology requirements, based on the approved SD option and submit in the DD report the developed IT design solutions, which considers and integrates the requirements outlined in Project Brief APPENDIX F–CONNECTIVITY INTEGRATION WITH DESIGN DELIVERABLES, APPENDIX G–FF&E AND CONNECTIVITY RESPONSIBILITIES MATRIX, and includes:

- a) Site IT and network systems, devices, and components, including their layouts and in-building or inter-building connectivity connections;
- b) Building IT spaces, components, and their layouts;
- c) A detailed narrative including all integrated systems requiring network connectivity, and supporting criteria;
- d) A fully developed IT narrative concept outlining the functional intent of all operational IT requirements for ongoing, post-construction operations personnel, including all laboratories, security centres, and all applicable integrated systems;
- e) Detailed drawings of the TR(s), main telecommunications room, entrance facility, server room, backup server room, and all other applicable IT spaces, systems and components;
- f) Detailed supporting Model-derived Drawings of the entire IT system including integration of all subsystem and device components including, as defined by the LC, network switches, panels, devices, and any other device that forms part of the IT system;
- g) Typical device Modelling, with applicable notes, which fully detail all power and signal connectivity to the device, mounting and infrastructure details necessary to support the installation, operation, and integration of the device in the IT system, fully coordinated with all other Design Team disciplines, including but not limited to antennas, wireless access points, speakers, controllers, equipment layouts, etc.;
- h) Complete integration designs and matrices at all device levels for each IT system component integrated with another subsystem;

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- i) Complete and detailed equipment listing of all IT system components including, as appropriate, performance or other Specifications of the IT system components;
- j) With the 90% DD submission, a listing of IT systems, devices, equipment, and components, in a tabular format, defining the Design Team discipline responsible for the development of subsequent DPs (i.e., who develops which DPs or parts thereof), as well as the quality assurance process (e.g., providing requirements, timing of reviews, feedback) by the IT design discipline in verifying ancillary, integrated, or supporting system requirements are completely and accurately detailed within DPs; and
- k) With the 90% DD submission, for those subsequent DPs to be developed by the IT design discipline, an outline Specification for each IT-related procurement describing the relevant general information (i.e., Specification part 1), products (i.e., Specification part 2), and execution (i.e., Specification part 3, implementation approach, performance expectations, and performance verification prerequisites (criteria), procedures, and related requirements), and:
 - i. Confirm with the DR and the Consultant and identify the required security classification requirement of each subsequent DP.

13.2.5.5 Move Requirements

The Design Team must develop detailed occupant and equipment move requirements and sequencing and submit in the SD the occupant-specific move plan, which includes but is not limited to:

- a) Reviewing and confirming with the DR and TSTS occupants of all office and laboratory goods and equipment to be relocated to the TSTS hub, including goods/equipment owned by another party or at locations. As required, update and refine the Schematic Design list of goods/equipment list;
- b) Per good/equipment piece to be moved, with the CM and TSTS occupants, identify all packing and handling requirements including who is responsible for packing/handling what, and when;
- c) Reconfirm all pieces of equipment which:
 - i. Require highly sensitive calibration; and
 - ii. Require strict environmental and handling measures during relocation and installation;
- d) For each piece of equipment identified in paragraph c), detail all:
 - i. Item-specific environmental and handling requirements; and
 - ii. Installation and, if required, recalibration and recommissioning requirements;
- e) With the CM, DR, and TSTS occupants, confirming move priorities and sequencing, timing, and seasonal or other constraints and limitations, etc. (e.g., which group/function moves first, are there interdependencies for user groups and laboratory functions); and
- f) With the CM, identifying preliminary volumetric information and outline move Costs;

13.2.5.6 FF&E

The Design Team must advance the FF&E design requirements, Model built-in furniture, FF&E, and submit in the DD report:

- a) A final evaluation and narrative of the millwork and FF&E requirements, and how the design will complement Project objectives and the TSTS occupants' vision;

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- b) Final FF&E and fit-up design details which includes, but not be limited to:
 - i. Refinement of FF&E furniture/equipment types and fit-up to accommodate within the overall design and functional program:
 - 1. Unique requirements of special purpose spaces (e.g., laboratories, workshops library.); and
 - 2. A flexible and adaptable/reconfigurable fit-up for general purpose office space;
 - ii. Custom furniture requirements;
 - iii. Commercially available furniture and case goods and their finishes. Provide presentation board(s) and catalogue cut sheets for all;
 - iv. Seasonal floor coverings/protection, stanchions, similar elements, including their storage;
 - v. A narrative and graphic representation of all fit-up and furniture finishes, including samples and Specifications for all built-in furniture, FF&E, window coverings, accessory requirements;
 - vi. Window treatment design and control requirements, coordinated with the reflect ceiling and electrical designs;
 - vii. Detailed integration and coordination of Connectivity equipment, including security features/devices with built in furniture and the fit-up;
 - viii. Elevations of all special purpose areas to reflect locations of electrical end devices including plugs, controls, switches based on final fit-up and FF&E Drawings;
 - ix. The location and number of outlets for phones, data and video conferencing;
 - x. Final fit-up and FF&E Drawings, fully coordination with all other design disciplines, using dynamic CAD blocks to locate and identify built-in furniture and FF&E;
 - xi. Mock-up and material testing requirements for commercially available, custom furniture, laboratory casework, and case goods;
- c) Confirmation of mechanical and electrical spaces and location requirements on the fit-up and FF&E Drawings. Confirm the mechanical and electrical design Drawings accurately reflect the fit-up and FF&E Drawings including:
 - i. Final lighting plans;
 - ii. Final location of light switches and controls;
 - iii. Final location of HVAC controls;
 - iv. Final location of IT, audio-visual, and security system equipment/devices;
 - v. Plumbing components and rise locations and space requirements; and
 - vi. Supplemental cooling, exhaust, and laboratory equipment locations and space requirements;
- d) Update and confirm the FF&EM reflects the entire FF&E and fit-up design; and
- e) From the FF&EM, develop a specific FF&E listing for each unique type of good/equipment which summarizes the:
 - i. Quantity;
 - ii. Unit rate;

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- iii. Total estimate per unique good/equipment type;
- iv. Dimensions;
- v. Sample manufacturer, make, and model number;
- vi. Generic description including mandatory requirements and finishes;
- vii. WBS category;
- viii. Procurement group number;
- ix. Delivery requirements;
- x. Installation requirements; and
- xi. For existing inventory, include original location of the good/equipment.

13.2.5.7 Acoustics

The Design Team must refine, Model, develop Model-based special Drawings and Specifications, and submit in the DD report acoustic design solutions which:

- a) Reflect investigations and testing to finalize the design approach;
- b) Incorporate lessons learned from acoustic Models and, if applicable mock-ups, into the acoustic design;
- c) Confirm acoustic design requirements reflect the approved functional program;
- d) Finalize acoustic testing and inspection requirements for all disciplines;
- e) Validate all disciplines understand acoustic requirements as they apply to them; and
- f) Confirm the design of all disciplines incorporates acoustic requirements into their designs and into the Model before the 100% DD submission.

13.2.6 Sustainability

The Design Team must further develop and Model sustainable design requirements based on the approved SD sustainability strategy and submit in the DD report enhanced sustainable design requirements, which:

- a) Reaffirm the sustainability vision. Refine the sustainability principles that govern all design disciplines based on the approved SD sustainability strategy and SD design option, if necessary;
- b) Develop two sustainability sub-options by the 50% DD stage to further analyse the requirements of and changes to the approved SD design option. Each sustainability sub-option must:
 - i. Demonstrate incremental improvements in the approved SD sustainability strategy, which:
 - 1. Optimize the building envelope;
 - 2. Reduce internal loads;
 - 3. Leverage high-efficiency systems; and
 - 4. Generate renewable energy; and

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- ii. Actively contribute to the regeneration of people and have a positive impact on social liveability and ecological health;
 - iii. Integrate results from energy Modelling and life cycle assessment and LCCA to inform and evaluate strategies.
- c) Develop sub-option A, an enhanced variant of the approved SD sustainability strategy which:
- i. Exceeds overall SD sustainability performance;
 - ii. Integrates additional measures from industry recognized health and wellness standards, such as Fitwel or WELL; and
 - iii. Further analyzes individual design strategies to improve energy performance, with detailed energy Modelling and simulations on bundled design strategies, to identify the best enhanced design option;
 - iv. Identifies and describes:
 - 1. Incremental risks and their impact to the building complex;
 - 2. Changes in building operations and maintenance requirements and frequency; and
 - 3. Improvements to energy, water, waste, air quality and overall environmental performance;
 - 4. Improvements to health and wellness and ecological integrity;
 - v. Evaluates design strategies for improved energy performance, further enhancing water and waste management strategies, reducing chemical use, and increasing the use of green chemistry to reduce GHG emissions in terms of Cost to GHG reduction impact; and
 - vi. With the support and input of the CM, identifies incremental increases in the Construction Cost Estimate and the projected life-cycle operating Costs, as well as payback calculations to determine the return on investment for each design strategy. Document inclusions, exclusions and assumptions;
- d) Develop sub-option B, an enriched variant of sub-option A, which:
- i. Exceeds overall sub-option A sustainability performance;
 - ii. Evaluates possible design strategies to reduce the Project energy use intensity and improve passive/renewable strategies to achieve net zero carbon, including the use of carbon credits and offsets available from other jurisdictions or renewable energy credits, as well as further enhancement of health and wellness standards;
 - iii. Evaluates the generation of on-Site carbon-free renewable energy, including geothermal and geo-exchange technologies and passive heating and cooling strategies;
 - iv. Demonstrates the greatest sustainability potential for adaptive, restorative and regenerative design solutions that improve social liveability and ecological integrity;
 - v. Further analyzes individual design strategies to improve energy performance, with detailed energy Modelling and simulations on bundled design strategies, to identify the best enriched design option;
 - vi. Identifies and describes further:
 - 1. Incremental risks and their impact to the building complex and science processes;

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2. Changes in building operations and maintenance requirements and frequency; and
 3. Improvements to energy, water, waste, air quality and overall environmental performance;
 4. Improvements to health and wellness and ecological integrity;
- vii. Evaluates design strategies for improved energy performance and reduced GHG emissions in terms of Cost to GHG reduction impact; and
- viii. With the support and input of the CM, identifies incremental increases in the Construction Cost Estimate and the projected life-cycle operating Costs, as well as payback calculations to determine the return on investment for each design strategy. Document inclusions, exclusions and assumptions;
- e) For sub-options A and B, complete revised whole building LCA using the Athena [Impact Estimator for Buildings](#) to update/verify the development of an optimal and balanced strategy that best supports the sustainability performance requirements;
- f) For sub-options A and B, complete revised whole building life-cycle energy Model to update/verify the impact climate change on the projected building energy use;
- g) For sub-options A and B, perform the LCA and LCCA to maximize net savings and best value to the Crown in accordance with Project Brief section 4.1.4.3–Life-Cycle Cost Analysis;
- h) Based on the detailed analysis of sustainability sub-option A and B and with due consideration of the Construction Cost Estimate and the projected long-term building operating Costs, evaluate and recommend to the DR an optimized option based on the above analysis that provides the best-value sustainable design approach for the Project with or before the 50% DD submission, balancing overall functionality and all Project objectives;
- i) With the approval of the DR, integrate the approved design strategies into the 90% DD submission, updating the sustainable development strategy accordingly;
- j) Define the guidance and education requirements for all building occupants (e.g., occupant employees and managers, operations and maintenance staff, third-party contractors) related to all sustainability features within the building and Site;
- k) Provide an overview of post-construction requirements/instructions for:
- i. ‘Green’ purchasing of materials and products (e.g., floor finishes, disinfectants, janitorial paper products, trash bags, hand soaps/sanitizers) that meet relevant product standards including Green Seal, UL EcoLogo, EPA Standards, and FSC certification;
 - ii. Operations and maintenance guidance, including cleaning materials and methods, landscape and integrated pest management practices within the building and on the Site;
 - iii. Performance expectations/requirements for energy, water, and waste;
 - iv. The use of:
 1. Powered cleaning equipment that includes safeguards, ergonomic design and environmentally preferable batteries as applicable; and
 2. Vacuum cleaners that meet relevant certifications such as the Carpet and Rug Institute Seal of Approval/Green Label Vacuum Program and operate with a maximum sound level of 70 dBA or less in accordance with ISO 11201;

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- v. Waste collection, storage and pick-up requirements, including recycling and composting, and the following operational waste reduction targets:
 - 1. Divert 75% by weight of all non-hazardous operation waste, including 75% of plastic waste and 95% of paper materials; and
 - 2. Eliminate the use of unnecessary single-use plastics in operations, events and meetings; and
- l) Apply for, on behalf of PWGSC, Project sustainability certification(s) under the industry recognized environmental performance rating systems. Prepare and include all documentation necessary and all submissions required for said certification(s). Provide a copy of the certification application(s) to the DR with the 90% DD submission.

13.2.7 Building Envelope

The Design Team must refine, Model, develop Model-based special sketches, Drawings, and building envelope design requirements based on the approved SD option and submit in the DD report building envelope design solutions, which includes:

- a) For sustainability sub-options A and B, as described in Project Brief section 13.2.6–Sustainability, complete revised whole building LCA using the Athena [Impact Estimator for Buildings](#) to update/verify the development of an optimal and balanced strategy that best supports the sustainability performance requirements;
- b) For sustainability sub-options A and B, complete revised whole building life-cycle energy Model to update/verify the impact climate change on the projected building energy use;
- c) For sustainability sub-options A and B, perform the LCCA to maximize net savings and best value to the Crown in accordance with Project Brief section 4.1.4.3–Life-Cycle Cost Analysis;
- d) Detailed building envelope Drawings with elevations, sections and details of all building envelope components, including walls, roofing, gutters, windows, doors, high and mid bay doors, stonework if any, architectural lighting, lightning protection attachment, damp proofing, waterproofing, flashing, building insulation, caulking and sealants, finishes, and structural members;
- e) Substructure Drawings, including foundations and basement, below grade work;
- f) Special construction requirements;
- g) Indicate the limits of and requirements for temporary support, scaffolding, and permanent attachments;
- h) Indicate envelope cleaning and water management requirements; and
- i) Terms of reference for envelope quality control testing and whole building air tightness testing.

13.2.8 Structural and Seismic

The Design Team must refine, Model, develop Model-based special sketches, Drawings, and building structural and seismic design requirements based on the approved SD option and submit in the DD report structural and seismic design solutions, which includes:

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- a) For sustainability sub-options A and B, as described in Project Brief section 13.2.6–Sustainability, complete revised whole building LCA using the Athena [Impact Estimator for Buildings](#) to update/verify the development of an optimal and balanced strategy that best supports the sustainability performance requirements;
- b) For sustainability sub-options A and B, complete revised whole building life-cycle energy Model to update/verify the impact climate change on the projected building energy use;
- c) For sustainability sub-options A and B, perform the LCCA to maximize net savings and best value to the Crown in accordance with Project Brief section 4.1.4.3–Life-Cycle Cost Analysis;
- d) Compliance with the high importance performance level of the 2020 NBCC for new buildings;
- e) Model-based Drawings, sections, elevations, and connection or other details for all systems and materials, components, cladding and load-bearing details, wind loading requirements, fireproofing methods and any significant or unusual details or components and operational functional components;
- f) Sleeve and shaft size, locations, and details for all mechanical, electrical and IT systems, including mechanical, electrical and IT system loads and required assemblies and hangers, with connect details, per system;
- g) Coordination of the design for all architectural and engineering components and systems below grade, in floors, walls and ceilings and detail their relationships with the building structure. Identify and resolve all clashes and interferences in the Model;
- h) Identification of all Model Elements, in ground and near by, vulnerable to vibrations, including:
 - i. Loading, bracing, and support requirements for scaffolding as it relates to the structure and building envelope;
- i) Development of construction phasing and details necessary for the implementation of structural work, including the sequencing of temporary bracing, shoring or stabilization;
- j) Details for all equipment, processes, etc. for the approval structural Monitoring program, fully coordinated with geotechnical and building envelope Monitoring programs, both during construction and for long-term post-construction period, after handover to Canada;
- k) Explanation of the inter-relationships between the structural systems, building envelope, laboratory systems (e.g., crane systems, sensitive equipment, process equipment) and architectural finishes;
- l) Assessment of changes in mechanical system(s) risks and hazards;
- m) Identification of necessary changes or modifications to the Model and analysis and the rationale for said changes and their impact(s);
- n) Definition of the scope and approaches for mock-ups, testing and investigations to validate the feasibility, constructability and effectiveness of the proposed work with the CM and DR and obtain approval from the DR;
- o) Review of testing requirements with the CM and confirm the roles and responsibilities of the Design Team and the CM as described in paragraph f) of Project Brief section 10.2.1.1–Design Management Planning; and
- p) Information pertaining to all dead and live loads, seismic loads, wind loads and any atypical loads and all detailed calculations with the DD report. All calculations must be presented in a format that is suitable for review that clearly outlines all calculation methods and assumptions made. At a minimum, the following calculations must be clearly presented; however, additional calculations may

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also be requested: calculation of building weight and seismic weight, equivalent static force procedure, dynamic scaling and modal information, distribution of lateral forces by storey and by element, foundation loads and detailed gravity run downs including design loads, load distributions, support conditions, live load reduction factors, if applicable, and representative element capacities compared to minimum detailing requirements.

13.2.9 Mechanical

The Design Team must refine, Model, develop Model-based special sketches, Drawings, and mechanical design requirements based on the approved SD option and submit in the DD report mechanical design solutions, which includes:

- a) For sustainability sub-options A and B, as described in Project Brief section 13.2.6–Sustainability, complete revised whole building LCA using the Athena [Impact Estimator for Buildings](#) to update/verify the development of an optimal and balanced strategy that best supports the sustainability performance requirements;
- b) For sustainability sub-options A and B, complete revised whole building life-cycle energy Model to update/verify the impact climate change on the projected building energy use;
- c) For sustainability sub-options A and B, perform the LCCA to maximize net savings and best value to the Crown in accordance with Project Brief section 4.1.4.3–Life-Cycle Cost Analysis;
- d) Service entrances for domestic water, sanitary and storm drainage, natural gas, and connections to utility services including all invert elevations, coordinated with building program and landscape plans;
- e) Sizing and materials of ventilation, cooling and heating systems, all fluid, gas, fire suppression, ancillary emergency generator systems, and air distribution systems, with sleeve and shaft locations and layouts of all major equipment and showing security protection of outdoor air intakes/stacks and exhaust grills/stacks, coordinated with building program and landscape plans;
- f) Thermal energy recovery/storage systems;
- g) As applicable, CBRN systems;
- h) Update the SD hazard risk assessment and complete detail procedures related to each identified risk;
- i) Update the LVA for each science-space and update the functional program room data sheets;
- j) Primary and secondary and sub-metering requirements and locations, coordinated with security, fit-up, FF&E, and laboratory Drawings and interoperability requirements for the as-built Model;
- k) Plumbing, HVAC, ancillary emergency generator systems, and laboratory-related piping systems in both isometric line and plan view showing routing and sizing of lines and location of pumps, system components, and other equipment, coordinated with building and Site program, security, fit-up, FF&E, and laboratory Drawings and interoperability requirements for the as-built Model;
- l) Fire suppression systems indicating major components and piping layout, coordinated with building and Site program, security, fit-up, laboratory, and FF&E Drawings and interoperability requirements for the as-built Model;
- m) Acoustic control measures for the mechanical design;
- n) The per capita supply of outdoor air for each option, per building space or fire compartment, and all design assumptions, exclusions, and all calculations and Model details in support of conclusions

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presented in a format that is suitable for review that clearly outlines all calculation methods and assumptions made;

- o) The air delivery rate to each space including all design assumptions, exclusions, and all calculations and Model details in support of conclusions presented in a format that is suitable for review that clearly outlines all calculation methods and assumptions made;
- p) In consultation with the CM, update energy consumption per system and the overall consumption and estimated annual Cost by utility, including all design assumptions, exclusions, and all calculations and Model details in support of conclusions presented in a format that is suitable for review that clearly outlines all calculation methods and assumptions made;
- q) Include equipment list of all equipment with equipment number and location, coordinated with building program, security, fit-up and FF&E plans;
- r) Include ancillary systems/components needed to support emergency power systems, coordinated with building program plans and interoperability requirements for the as-built Model;
- s) Include building automation system design including:
 - i. The full network architecture including cabling and network devices;
 - ii. Mechanical control schematics for all connected systems;
 - iii. A complete input/output control point listing with, as applicable, alarm point thresholds, and interoperability requirements for the as-built Model;
 - iv. The sequence of operation for each building system, including laboratory ventilation according to the space-specific LVA and demand-based control strategies for any system that would benefit from said strategies;
- t) Include intelligent building infrastructure/system(s) requirements for interconnection with other building systems and interoperability requirements for the as-built Model; and
- u) With respect to paragraphs n) and o) and s) and t) above, directly link and indicate how the hazard and risk and seasonal thermal requirements (e.g., solar loading) are appropriately considered and integrated.

13.2.10 Electrical

The Design Team must refine, Model, develop Model-based special sketches, Drawings, and electrical design requirements based on the approved SD option and submit in the DD report electrical design solutions, which includes:

- a) For sustainability sub-options A and B, as described in Project Brief section 13.2.6–Sustainability, complete revised whole building LCA using the Athena [Impact Estimator for Buildings](#) to update/verify the development of an optimal and balanced strategy that best supports the sustainability performance requirements;
- b) For sustainability sub-options A and B, complete revised whole building life-cycle energy Model to update/verify the impact climate change on the projected building energy use;
- c) For sustainability sub-options A and B, perform the LCCA to maximize net savings and best value to the Crown in accordance with Project Brief section 4.1.4.3–Life-Cycle Cost Analysis;

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- d) For all electrical systems, intelligent building infrastructure/system(s) requirements for interconnection with other building systems and interoperability requirements for the as-built Model;
- e) Normal, Emergency and UPS Electrical Distribution:
 - i. Projected load calculations for normal, emergency and UPS power requirements. Refine load tables for every piece of equipment and divide in their particular load management priority;
 - ii. Electrical equipment sizing along with sleeve size and location per penetration through architectural and structural assemblies;
 - iii. Grounding requirements per system and subsystem, including fuel storage and distribution systems, gas and hydraulic fluid storage and distribution systems, and other laboratory-specific systems;
 - iv. Distribution Single Line Diagram with nomenclature, capacities;
 - v. Distribution Drawings with identified equipment location, coordinated with building program, security, fit-up and FF&E plans;
 - vi. Emergency power load management system sequence of operation;
 - vii. Floor Drawings of every floor with tables associated to each room indicating every type of power, coordinated with building program, security, fit-up and FF&E plans;
 - viii. Intelligent building infrastructure and primary and sub-metering sensor and equipment locations and space requirements, coordinated with security, fit-up, FF&E, and laboratory plans;
 - ix. Indicate the short circuit information;
 - x. Single line sketches derived from the Model with block diagram configuration of the system and equipment capacity, and metering and sub-metering locations; and
 - xi. Include safety label information, in accordance with CSA Z462, for all panel boards, motor control centres, switchgear, and major electrical equipment. Confirm with DR requirement for bilingual labelling in DPs;
- f) Lighting and Lighting Controls:
 - i. Floor Drawings with layout, coordinated with security, fit-up, FF&E, and laboratory plans;
 - ii. Lighting fixture schedule;
 - iii. Intelligent building systems control details and control logic, associated light fixture zones, switch (control) location, coordinated with security, fit-up, FF&E, and laboratory plans;
 - iv. Specific rooms which contain room-specific lighting control systems, such as laboratory lighting, jet fuel storage, lighting, coordinated with security, fit-up and FF&E plans; and
 - v. Provide Drawings and details for Site, building, architectural, and security lighting, including proposed typical fixtures per subsystem, coordinated with building program, security, and landscape plans;
- g) Fire Alarm System:
 - i. Floor Drawings for new fire alarm system to show end of line device location, coordinated with security, fit-up, FF&E, and laboratory plans;

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- ii. Table identifying all fire alarm equipment, coordinated with building program, security, fit-up, FF&E, and laboratory plans; and
 - iii. Single line diagrams with main equipment and approximate amount of end of line devices;
 - iv. Temporary construction fire alarm system;
- h) Public Address System:
 - i. Floor Drawing to indicate locations of main equipment and end of line devices, coordinated with Site and building program, security, fit-up, FF&E, and laboratory plans; and
 - ii. Single line diagram with main equipment, risers and raceways;
- i) Lightning Protection System:
 - i. Site, roof and building envelope Drawings with device location and interconnection between system components/wiring, coordinated with Site and building program, and building envelope and landscape designs; and
 - ii. Single Line Diagram of system with main equipment and interconnection of components; and
- j) IT, Audio-visual, and Security:
 - i. Distribution Drawings with telecom closet, IT riser and raceway locations, equipment requirements (e.g., equipment racks, special isolation transformers), grounding requirements (isolated or otherwise), coordinated with building program, security, fit-up FF&E, laboratory, and mechanical plans;
 - ii. Carrier entrance room, and carrier network pathway and requirements on the Site, coordinated with building program, landscape, and mechanical plans;
 - iii. Floor Drawing of every floor with tables associated to each room indicating every type and location end of line devices, coordinated with building program, security, fit-up, FF&E, and laboratory plans;
 - iv. Single line diagram per systems with main equipment, risers and raceways, grounding requirements (isolated or otherwise), etc.; and
 - v. Electromagnetic shielding materials, requirements and locations, coordinated with building program, fit-up, FF&E, and laboratory plans;

13.2.11 Commissioning and Property Management

The Design Team must refine, compile and submit in the DD report commissioning and property management requirements, in accordance with Project Brief section 4.1.4–Operating Requirements, which include:

- a) Confirmation of compliance with the owners Project requirements (OPR), in accordance with ASHRAE 202-18, linked to the final functional program and design requirements;
- b) Detailed commissioning and training plans for all components, systems and integrated systems, including sustainable design features and operations, in accordance with Project Brief section 13.2.6. Indicate requirements for full load dynamic testing of building systems. Include in the training plan:
 - i. User/operator skills training requirements and prerequisites (e.g., knowledge, experience, etc.);

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- ii. An outline schedule for all Design Team-training, including
 - 1. At least at least one follow-up training session per design discipline after handover to Canada;
 - 2. At least 5 training sessions regarding navigating and using the as-built/commissioned Model;
- iii. An outline schedule of all training to be provided by contractors, suppliers and manufacturers. Includes at least two separate follow-up training sessions, per training session, after handover to Canada; and
- iv. Limit training sessions to a maximum of 2-3 hours per day. Stagger training so personnel can attend without major disruption to ongoing operations;
- c) Per applicable Design Team discipline, identification of all future maintenance management nomenclature per building system/components for integration in DP Specifications and Drawings;
- d) A listing and details of all post-construction requirements for NRC's planning and execution after handover to Canada, such as but not limited to:
 - i. The post-construction landscape monitoring plan; and
 - ii. Ongoing Monitoring programs and their unique requirements (e.g., geotechnical, envelope, structure, temperature, humidity, air quality);
- e) Refine and update of the design intent brief for all design disciplines (i.e., architecture, interior design, accessibility, security, sustainability, acoustics, landscape, civil/municipal, sustainability, building envelope, structural, mechanical, electrical, and Connectivity) and include:
 - i. Specific rationale for all sustainable features and strategies;
 - ii. The updated LCA, LCCA, and the whole-building energy Model, as described in Project Brief section 13.2.6–Sustainability;
 - iii. The resulting implications for building performance and on building occupants (i.e., what are the changes for occupants from their previous accommodation); and
 - iv. Lessons learned to date; and
- f) Update and compile all elements of the preliminary building management plan, in accordance with Project Brief section 4.1.4.1 and explain in detail:
 - i. Each post-construction operations and maintenance contract intent, basic scope, and annualized Cost;
 - ii. Implications from new/enhanced sustainability requirements for 'green' operations;
 - iii. Specialized and regular operations and maintenance requirements;
 - iv. Idealized operational staff requirements, per system/operation (e.g., janitorial, security, base building, laboratory-specific systems);
 - v. The list of future minor recapitalization projects associated with proper cyclical maintenance (e.g., building envelope caulking/repainting, building and laboratory system upgrade); and
 - vi. The frequency and a brief scope statement for each recapitalization project, linking the frequency with assumptions for LCCA, in accordance with Project Brief section 4.1.4.3.

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13.2.12 Cost

The Design Team must develop iterative [ASTM E1557, UNIFORMAT II](#) class B (+/- 10%) Cost estimates for DD submissions, which includes the two DD sustainability options, with a detailed option-specific basis of estimate that builds on earlier versions, along with refined Cost estimates and basis of estimates for each enabling project. The DD Cost estimates and related Cost analysis with the 50% and 100% DD submission includes, but is not limited to:

- a) Refinement of the WBS for each of the Project's two major Cost centres;
- b) Quantity survey of any revisions to the final functional program and the Project scope defined at the time of estimate, with annual cash flows as per the Project schedule, incorporating Cost information from the GEICs to present total Project construction estimate. Code the estimates to the detailed WBS for each scope element, sub-element and Work activity;
- c) Updated rationale for all contingencies and allowances and their percentages/values;
- d) Reconciling each estimate with independent estimate from PWGSC's 3rd party cost consultant and the CM;
- e) Preparing a reconciliation report which identifies the necessary follow-up activities, the person(s) responsible, and timelines to complete said activities;
- f) Value engineering workshop participation and related Cost analysis and recommendations;
- g) Complete LCA and LCCA per sustainability option, as described Project Brief sections 13.2.6–Sustainability and 4.1.4.3–Life-Cycle Cost Analysis;
- h) An updated of the BMP budget for all annualized operational Costs as described in Project Brief sections 4.1.4.1–Preliminary Building Management Plan and 13.2.11–Commissioning and Property Management;
- i) Update of the whole-Project sustainability budget based on the selected DD sustainability strategy;
- j) Input and analysis to support the Design Team in the development of a Project benefit register and benefit plan, as described in Project Brief sections 4.1.4–Benefits Realization and 13.3–Benefit Register and Benefit Plan;
- k) Determining and monthly reporting on the percentage complete of Design Team activities through all Project stages, linking this information (resource demand) with the Consultant's monthly resource-loaded schedule; and
- l) Input, analysis and support as requested by the DR for PWGSC's TB funding submission.

13.3 Benefit Register and Benefit Plan

The Design Team must:

- a) Validate, and if necessary, update the Baseline benefits register and benefits plan with the input of the CM and DR, which includes and compares current benefit status/projection(s) with 100% SD Baseline information / targets and metrics on preferred SD design option; and
- b) Describe all rationale for any change(s) to the Baseline benefits and metrics for measurement.

13.4 Approvals

The Consultant must:

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- a) Prepare and deliver DD presentations as described in Project Brief section 10.1.1.4–Design Submission Presentations and subsection c) of APPENDIX D–PROCESS MAPS;
- b) With DR’s support, if required, update NCC FLUDA documentation and obtain NCC FLUDA approval; and
- c) Integrate recommendations and feedback from submissions and presentations into subsequent design submissions.

13.5 Design Development Deliverables

At a minimum, the Consultant must:

- a) Coordinate and integrate all Services of the Design Team and with the input of the CM and the GEICs;
- b) As described in this Project Brief section 13, develop the approved SD and sustainability sub-options, complete with analysis and recommendations;
- c) Through ongoing investigations, if any, integrate findings within the design and itemize in each DD sub-phase report;
- d) Submit 50%, 90%, and 100% DD submissions according to requirements described in this Project Brief section 13, as well as the including the completed, federated Model and all supporting information, as per key intermediate dates defined in Project Brief section 1.3.3–Milestones;
- e) Submit with the 50% DD submission two fully-developed sustainable design sub-options, A and B, with the Design Team’s recommendations;
- f) Submit with the 90% DD submission an up-to-date benefit register and benefits plan including rationale for changes;
- g) Prepare and deliver DD presentations as described in Project Brief section 10.1.1.4–Design Submission Presentations and subsection c) of APPENDIX D–PROCESS MAPS;
- h) Update NCC FLUDA documentation and obtain NCC FLUDA approval;
- i) Maintain full production during the submission review processes;
- j) Confirm draft and final reports contain integrated and coordinated designs that:
 - i. Comply with the requirements of the functional program and all applicable plans, policies, practices, standards and guidelines;
 - ii. Include Model-generated Drawings that illustrate the functional and detailed design relationships of the Project, its scale and character, and include scope narratives, with consideration of impacts to design and construction planning and scheduling, Cost, and risk;
 - iii. Present Model-based fly-by renderings, presentations, graphics, and narrative design solutions free of conflicts, anomalies and other issues; and
 - iv. Consolidate the fully developed design and all findings, analysis and recommendations;
- k) Update the final design review response of the compiled review comments and submit a final submission to the DR for acceptance;
- l) Based on the prioritized construction planning and scheduling by the CM, proceed with DP stage activities and the preparation of identified DPs before acceptance of the 100% DD submission, as approved by the DR;

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- m) Prepare and submit concise reports for each discipline consolidating information gathered to illustrate an integrated analysis of the Design Team's design. Place supporting information and reports (e.g., investigations) as appendices. Include as a minimum:
- i. Executive summary;
 - ii. Glossary of terms;
 - iii. Summary of information gathered and documentation reviewed, with an annotated bibliography;
 - iv. Summary of investigations;
 - v. Regulatory requirements;
 - vi. Site requirements;
 - 1. Landscape architecture and urban design requirements and fully developed design;
 - 2. Civil/municipal requirements and fully developed design; and
 - vii. Architectural requirements including:
 - 1. Building program requirements and fully developed design;
 - 2. Functional program and room data sheet updates, if any;
 - 3. Security requirements and fully developed design;
 - 4. AV requirements and fully developed design;
 - 5. IT requirements and fully developed design;
 - 6. Move requirements and fully developed design;
 - 7. FF&E requirements and fully developed design;
 - 8. Acoustic design requirements and fully developed design;
 - viii. Sustainable design requirements including, among other requirements, highly details enhanced and enriched sustainable design sub-options, whole-building LCA, whole-building energy analysis and Modelling, and complete LCCA in accordance with Project Brief section 4.1.4.3;
 - ix. Building envelope requirements and fully developed design;
 - x. Structural and seismic requirements and fully developed design;
 - xi. Mechanical requirements and fully developed design;
 - xii. Electrical requirements and fully developed design; and
 - xiii. Commissioning and property management requirements including, among other requirements, a detailed commissioning and training plan, detailed BMP requirements, and a refined and updated design intent brief; and
 - xiv. [ASTM E1557, UNIFORMAT II](#) Cost estimates per DD submission, with an updated WBS and basis of estimate, including an updated estimate and basis of estimate per enabling project, and:
 - 1. A reconciliation report with each estimate;

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2. Complete LCA and LCCA per submission;
 3. BMP budget for all annualized operational Costs; and
 4. Updated Project sustainability budget by 50% SD, refined with the 90% and 100% DD submission; and
- xv. Monthly reporting of Design Team resources progress percentage complete against each WBS element, integrated with the Consultant's monthly schedule submission.

13.6 Response to Design Development Report

The Consultant must:

- a) Review and analyse all the comments provided by the Project Team;
- b) Prepare and submit a written response to the DR within 20 working days to all the submission comments, taking into account the submission and review processes defined in subsection b) of Project Brief APPENDIX D – PROCESS MAPS; and
- c) Integrate comments into the subsequent submissions as directed by the DR.

14 DESIGN PACKAGE SERVICES

14.1 Intent

The Services required of the Design Team in this section apply to each DP. All deliverables are to be reviewed and approved by the DR at each 50%, 90% and 100% DP submission unless otherwise indicated.

The CM will take the lead role to define the scope and sequencing of each DP to optimize the construction schedule, in consultation with the Design Team and DR. The Design Team must revise and optimize the individual work flow of each Design Team member to meet the CM's defined schedule and, where possible, shorten DP production time.

The DPs are to include comprehensive, coherent, and fully coordinated sets of Drawings and Specifications (tender documents) compliant with Project requirements in sufficient and fully dimensioned detail to allow competitive tendering by the CM, to guide and direct the CM's sub-contractors in the successful delivery of each DP. The Design Team must update each DP modified by addenda and issue post-tender DPs as "Issued for Construction".

The CM will review each DP submission to review completeness and provide comments and suggestions for revision by the Design Team. The CM could split DPs into separate tender packages to secure the sub-contractors necessary to undertake each stage and sub-stage of the Project.

The Design Team must produce DPs:

- a) In accordance with Project Brief APPENDIX A–GUIDE TO PREPARATION OF CONSTRUCTION DOCUMENTS;
- b) Which describe the products, materials, standards, equipment, construction systems, methods, processes, level of workmanship required to execute the DP; and
- c) Which include Drawings generated from the Model with coordinated, interference-free relationships:
 - i. Between design elements;
 - ii. In the location of design elements;
 - iii. In the name or identity of design elements;
 - iv. In the full dimensioning of design elements;
 - v. In the shape and form of design elements; and
 - vi. With the complete information required to execute and achieve the design intent and operational performance.
- d) Which include Specifications that completely:

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- i. List all other related Specification subsections,
- ii. Identify all products required,
- iii. Describe the physical and environmental conditions to be created and maintained in work areas, both on-Site and in adjacent work areas or off-Site;
- iv. Detail the procedures for DP administration to control and Monitor the quality of the work;
- v. Describe the intended operation and, as applicable, dynamic control sequence(s);
- vi. Describe all performance verification processes, requirements, and documentation;
- vii. Detail operations and maintenance provisions as prescribed by the component/system manufacturer until handover to Canada, and as appropriate to the Specification (e.g., those with proprietary technologies such as elevators, fire alarm system, building automation system, and others as determined by the DR and TSTS occupants), include an ongoing maintenance contract requirement, to be novated to Canada for funding and ongoing management at handover to Canada.

The translation of Design Packages is dependent on the language of the CM's prequalified subcontractors. If required, translation Services will be treated as a disbursement to the Consultant's Contract.

14.1.1 Enabling Projects

The DP requirements and Services in this Project Brief section 14 apply to each of the enabling projects identified in Project Brief section 4.2, but adapted and streamlined to the extent possible, as agreed by the Design Team, CM, and DR.

The number of interim submissions and review periods will be reduced to optimize the schedule as agreed by the Design Team, CM, and DR.

14.2 Design Services

The Design Team must confirm congruency and coordination between all DPs and:

- a) Confirm the content and timing of each DP with the CM and DR as well as the timing of each intermediate DP submission;
- b) If necessary, update the Design Team's design production schedule and confirm coordination with the CM's construction schedule;
- c) If functional program or program scope changes be approved by the DR after the 50% DP submission, analyze the change inform the DR and CM of the impact of said change on DP production and Cost;
- d) Coordinate and integrate the Design Team's DP submissions;
- e) Define commissioning procedures, construction Monitoring requirements, performance verification intent, procedures and documentation, Design Team-led and contractor-led training sessions, requirements for operating and technical maintenance manuals, post-construction Monitoring and seasonal commissioning requirements, and record Drawings/Model requirements;

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- f) Integrate detailed scope and requirements for operations and maintenance and services call-backs after Substantial Performance, as well as for undertaking maintenance contracts after handover to Canada;
- g) Submit DPs, conduct design charettes (i.e., constructability workshops) and respond to DP comments in accordance with subsection b) of Project Brief Appendix D–PROCESS MAPS;
- h) Coordinate and integrate all DP submission review comments into the next DP iteration, or as applicable addenda;
- i) Confirm the format of the Model, Drawings and Specifications and comply with the stipulated requirements for the Project;
- j) Confirm with the CM the Drawing and Specification format requirements for paperless, Site-wide distribution and use by subcontractors and the overall Project Team; and
- k) Provide the necessary technical support to the CM should the CM split DPs into multiple tender packages.

14.3 Design Package Content

The Design Team must, for each DP, use graphical information from the Model to generate discipline-specific Drawings complete with elevations, sections, details and schedules. The Design Team must create Project-specific Specifications for each DP, including operations and maintenance requirements for all components and systems until handover to Canada, or as identified in paragraph d) vii) of Project Brief section 14.1, beyond handover to Canada at Canada's ongoing expense.

14.3.1 Investigations

The Design Team must prepare complete DP Drawings and Specifications for:

- a) All investigations; and
- b) All temporary work, temporary protection, and temporary systems, including alterations and maintenance requirements, as applicable.

14.3.2 Regulatory Requirements

The Design Team must complete DP Drawings and Specifications based on current and accurate Model information and include:

- a) A final code data summary for NBCC, OBC, CSA, environmental and other applicable codes, standards and regulations;
- b) A table of equivalent codes when conflicting requirements exist;
- c) Relevant Authorities having jurisdiction reports, recommendations and approvals; and
- d) An update of the design intent brief based with all regulatory information.

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14.3.3 Geotechnical Design

The Design Team must coordinate their design with PWGSC's geotechnical consultant and incorporate relevant geotechnical requirements into Design Team discipline DP planning and submissions.

14.3.4 Environmental Design

The Design Team must coordinate their design with PWGSC's environmental and incorporate relevant environmental and industrial hygiene requirements into Design Team discipline DP planning and submissions.

14.3.5 Site Design

The Design Team must complete the DP Drawings and Specifications, based on updated information in the Model, to include:

- a) Existing conditions Site Drawings and Specifications;
- b) Site Drawings and Specifications including property line with dimensions, benchmarks, existing structures, new structures, Site improvements, fencing, roads, streets, drainage, rights of way, etc.;
- c) Civil/Municipal Drawings and Specifications including water main, storm and sanitary sewer infrastructure, subsurface and above grade components/systems, connection points and methods, with capacities and limitations;
- d) Underground utilities relocation and reconfiguration Drawings and Specifications;
- e) Archeology requirements, if any;
- f) Deconstruction Drawings and Specifications;
- g) Landscaping Drawings and Specifications, including tree protection requirements;
- h) Layout Drawings and Specifications;
- i) Grading and drainage Drawings and Specifications;
- j) Site signage Drawings and Specifications, include those required for temporary works;
- k) Planting Drawings and Specifications;
- l) Per design discipline, cross sections, elevations, sections, schedules, details of critical areas for all of the above Drawings, fully dimensioned;
- m) Details to show type of materials, size, layout pattern (e.g., hardscape), railings, tactile markers for accessibility, and other related elements on the Site;
- n) Reconfirming those materials and equipment specified reflect the sustainability analysis and energy Model established at DD;
- o) Input to update the overall Project commissioning plan to confirm all sustainability requirements related to the Site design and performance verification measures are fully integrated;
- p) The applicable operations and maintenance provisions as prescribed by the component/system manufacturer until handover to Canada, and as appropriate beyond handover to Canada;

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- q) Per design discipline, after completion of the 50% DP, re-running the building LCA tool using the Athena [Impact Estimator for Buildings](#) to optimize the reduction of environmental impacts related to embodied and operating energy, embodied carbon, GHG emissions to air, water, and land; and
- r) Per design discipline, update the design intent brief with all current all Site information.

14.3.6 Architectural Design

14.3.6.1 Building Program

The Design Team must complete the DP Drawings and Specifications, based on updated information in the Model, to include:

- a) Programmatic accommodation, including horizontal and vertical zoning diagrams;
- b) Spatial relationship diagrams;
- c) Final storage analysis;
- d) Area calculations and analysis;
- e) Reconfirming those materials and equipment specified reflect the sustainability analysis and energy Model established at DD;
- f) Input to update the overall Project commissioning plan to confirm all sustainability requirements related to the building program design and performance verification measures are fully integrated;
- g) The applicable operations and maintenance provisions as prescribed by the component/system manufacturer until handover to Canada, and as appropriate beyond handover to Canada;
- h) After completion of the 50% DP, re-running the building LCA tool using the Athena [Impact Estimator for Buildings](#) to optimize the reduction of environmental impacts related to embodied and operating energy, embodied carbon, GHG emissions to air, water, and land; and
- i) An update of the design intent brief based with all current building program information.

14.3.6.2 Building Design

The Design Team must complete the DP Drawings and Specifications, based on updated information in the Model, to include:

- a) Floor Drawings including walls, floor elevations and grade elevations at building line, construction to remain, references to other details and elevations, room names (subject to security requirements), room numbers, door swings and numbers, window numbers, floor materials, plumbing fixtures, built-in fixtures, kitchen, janitorial, and loading dock equipment, stairs, cameras and equipment, security screening and related equipment, special equipment, vertical transportation, dimensions, legend, and related elements;
- b) Roof Drawings including roof outline, overall dimensions, setbacks, slopes, drainage, reference to other Drawings and details, roof materials, penetrations and roof mounted equipment, window washing equipment, and related elements;
- c) Reflected ceiling Drawings including partitions extending to and through the ceiling, ceiling material and grid lines, ceiling heights, location of all lights and exit lights, diffusers, access panels, speakers, sprinklers, all other equipment and ceiling penetrations, expansion joints, and related elements;

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- d) Exterior elevations including structural grid centre lines, vertical dimensions, floor-to-floor heights, opening heights, references to other Drawings and details, floor lines, elevations of major elements, grade lines, foundation lines, materials, windows, doors and all other openings, symbols for window/door schedule, gutters, signs, and related elements;
- e) Building sections including dimensions to grid centre lines, face of wall dimensions to other components, vertical dimensions from foundations to roof top relating all elements to top of structural members, materials, all connection methods, mechanical and electrical elements shown schematically, roof construction, floor construction, foundation construction, and related elements;
- f) Interior elevations including vertical dimensions to critical elements, reference to other Drawings and details, openings in walls, wall finishes, built-in fixtures, location of switches, and all wall mounted equipment such as cameras, speakers, and other devices;
- g) Schedules including room schedule, door schedule, window schedule, kitchen, janitorial, and loading dock equipment, security screening and related equipment, door hardware schedule, and schedules for all architectural work, louvers and other equipment;
- h) Detailed Drawings of all signage, including electronic messaging, palette, materials, mounting and locations for all interior and exterior signage;
- i) Temporary structures, partitions, physical, dust and water protection, mechanical and electrical systems, construction constraints and sequencing;
- j) DP documents for mock-ups;
- k) Temporary maintenance requirements for building components and systems during construction and for 11-months after achieving of overall substantial performance for the Project;
- l) Requirement for service call-back with stipulated response times;
- m) Construction and post construction building component and system monitoring systems including all details and Specifications;
- n) Reconfirm those materials and equipment specified reflect the sustainability analysis and energy Model established at DD;
- o) Input to update the overall Project commissioning plan to confirm all sustainability requirements related to the building design and performance verification measures are fully integrated;
- p) After completion of the 50% DP, re-running the building LCA tool using the Athena [Impact Estimator for Buildings](#) to optimize the reduction of environmental impacts related to embodied and operating energy, embodied carbon, GHG emissions to air, water, and land; and
- q) An update of the design intent brief based with all current building design information.

14.3.6.3 Security Design

The majority of security-related Services and deliverables are protected B, with a few documents at the secret (level II) security classification. The Consultant must make sure Contract deliverables are organized such that protected B and classified information are duly segregated and securely stored separate from standard DP stage deliverables. Accordingly, the Design Team must prepare 'sanitized' (non-classified) DPs,

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to the maximum extent possible and to the approval of the DR, as well as DPS clearly identified as either protected B or classified information.

The Design Team must:

- a) Reconfirm or, if necessary, refine the security governance framework;
- b) Update the vulnerability gap analysis, to:
 - i. List and describe any new security vulnerabilities introduced through the design process; or
 - ii. Result from requirements previously documented that have not already been addressed,For the security governance to determine how, when, or if each vulnerability gap is to be addressed, taking into account the design and construction Cost, time, and risk impacts defined by the Design Team and CM;
- c) Considers and integrates the requirements outlined in Project Brief APPENDIX F–CONNECTIVITY INTEGRATION WITH DESIGN DELIVERABLES, APPENDIX G–FF&E AND CONNECTIVITY RESPONSIBILITIES MATRIX;
- d) For security-related DPs developed by other Design Team disciplines, confirm all Specifications parts 1, 2 and 3 and all Drawings meet and comply with all security requirements including, as applicable, the segregation of classified and ‘sanitized’ information;
- e) For security-related DPs developed by the security design discipline, complete physical security and ISS Drawings and Specifications, based on updated information in the Model or otherwise and:
 - i. Complete and detailed update of all DD deliverables;
 - ii. Integrate electrical, mechanical, architectural, and other design discipline requirements in DPs;
 - iii. Follow and incorporate in DPs the requirements outlined in Project Brief section 14.3.6.7–FF&E and Connectivity DPs;
 - iv. Confirm the segregation of classified and ‘sanitized’ information;
 - v. Consider and, if required, integrate delegated design or design-assist requirements related to performance-type Specifications, supplier-provided services, and material testing and inspection (e.g., components, systems) responsibilities, as approved by the DR, in accordance with paragraph e) and paragraph f) of Project Brief section 10.2.2.1–Design Management Planning;
 - vi. Reconfirm those materials and equipment specified reflect the sustainability analysis and energy Model established at DD;
 - vii. Provide input to update the overall Project commissioning plan to confirm all security requirements related to the building design and performance verification measures are fully integrated; and
 - viii. After completion of the, or as applicable each, 50% DP, re-running the building LCA tool using the Athena [Impact Estimator for Buildings](#) to optimize the reduction of environmental impacts related to embodied and operating energy, embodied carbon, GHG emissions to air, water, and land; and
- f) Update the SDB and security concept of operations with all current security-related information.

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14.3.6.4 Audio-Visual Design

The majority of AV-related Services and deliverables are protected B, with a few documents at the secret (level II) security classification. The Consultant must make sure Contract deliverables are organized such that protected B and classified information are duly segregated and securely stored separate from standard DP stage deliverables. Accordingly, the Design Team must prepare 'sanitized' (non-classified) DPs, to the maximum extent possible and to the approval of the DR, as well as DPS clearly identified as either protected B or classified information.

The Design Team must:

- a) Consider and integrates the requirements outlined in Project Brief APPENDIX F–CONNECTIVITY INTGRATION WITH DESIGN DELIVERABLES, APPENDIX G–FF&E AND CONNECTIVITY RESPONSIBILITIES MATRIX;
- b) For AV-related DPs developed by other Design Team disciplines, confirm all Specifications parts 1, 2 and 3 and all Drawings meet and comply with all AV requirements;
- c) For AV-related DPs developed by the AV design discipline, complete AV Drawings and Specifications, based on updated information in the Model or otherwise and:
 - i. Complete and detailed update of all DD deliverables;
 - ii. Integrate electrical, mechanical, architectural, and other design discipline requirements in DPs;
 - iii. Integrate warranty and maintenance service requirement up to handover to Canada and post-handover, for ongoing administration by the NRC;
 - iv. Follow and incorporate in DPs the requirements outlined in Project Brief section 14.3.6.7–FF&E and Connectivity DPs;
 - v. Consider and, if required, integrate delegated design or design-assist requirements related to performance-type Specifications, supplier-provided services, and material testing and inspection (i.e., components, systems, etc.) responsibilities, as approved by the DR, in accordance with paragraph e) and paragraph f) of Project Brief section 10.2.2.1–Design Management Planning;
 - vi. Reconfirm those materials and equipment specified reflect the sustainability analysis and energy Model established at DD;
 - vii. Provide input to update the overall Project commissioning plan to confirm all security requirements related to the building design and performance verification measures are fully integrated; and
 - viii. After completion of the, or as applicable each, 50% DP, re-running the building LCA tool using the Athena [Impact Estimator for Buildings](#) to optimize the reduction of environmental impacts related to embodied and operating energy, embodied carbon, GHG emissions to air, water, and land; and
- d) Update the AVDB and AV narrative concept outlining the functional intent of all operational AV requirements with all current AV-related information.

14.3.6.5 Information Technology Design

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The majority of IT-related Services and deliverables are protected B, with a few documents at the secret (level II) security classification. The Consultant must make sure Contract deliverables are organized such that protected B and classified information are duly segregated and securely stored separate from standard DP stage deliverables. Accordingly, the Design Team must prepare ‘sanitized’ (non-classified) DPs, to the maximum extent possible and to the approval of the DR, as well as DPS clearly identified as either protected B or classified information.

The Design Team must:

- a) Consider and integrates the requirements outlined in Project Brief APPENDIX F–CONNECTIVITY INTGRATION WITH DESIGN DELIVERABLES, APPENDIX G–FF&E AND CONNECTIVITY RESPONSIBILITIES MATRIX;
- b) For IT-related DPs developed by other Design Team disciplines, confirm all Specifications parts 1, 2 and 3 and all Drawings meet and comply with all AV requirements;
- c) For IT-related DPs developed by the AV design discipline, complete AV Drawings and Specifications, based on updated information in the Model or otherwise and:
 - i. Complete and detailed update of all DD deliverables;
 - ii. Integrate electrical, mechanical, architectural, and other design discipline requirements in DPs;
 - iii. Integrate warranty and maintenance service requirement up to handover to Canada and post-handover, for ongoing administration by the NRC;
 - iv. Follow and incorporate in DPs the requirements outlined in Project Brief section 14.3.6.7–FF&E and Connectivity DPs;
 - v. Consider and, if required, integrate delegated design or design-assist requirements related to performance-type Specifications, supplier-provided services, and material testing and inspection (e.g., components, systems) responsibilities, as approved by the DR, in accordance with paragraph e) and paragraph f) of Project Brief section 10.2.2.1–Design Management Planning;
 - vi. Reconfirm those materials and equipment specified reflect the sustainability analysis and energy Model established at DD;
 - vii. Provide input to update the overall Project commissioning plan to confirm all security requirements related to the building design and performance verification measures are fully integrated; and
 - viii. After completion of the, or as applicable each, 50% DP, re-running the building LCA tool using the Athena [Impact Estimator for Buildings](#) to optimize the reduction of environmental impacts related to embodied and operating energy, embodied carbon, GHG emissions to air, water, and land; and
- d) Update the ITDB and IT narrative concept outlining the functional intent of all operational IT requirements with all current IT-related information.

14.3.6.6FF&E Design

The Design Team must complete the millwork and FF&E DP Drawings and Specifications, based on updated information in the Model, to include:

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- a) Final layout of all built-in furniture, furniture, case goods, workstations, support and special purpose spaces;
- b) Final location and identification of all equipment;
- c) Final window treatments cross-references as required to electrical Drawing, if electrical fed;
- d) For colour schemes approved at DD, prepare and submit a final finishes presentation board(s) for all millwork and furniture;
- e) Confirmation of all FF&E counts, fittings and all accessories;
- f) Confirmation, location and number of all electrical, telephone, data and video layouts;
- g) A summary with narrative and graphic representation of all millwork and furniture finishes, including samples and Specifications for all millwork, furniture, fittings, window coverings and accessories requirements;

Detailed integration and coordination of Connectivity equipment, including security features built in furniture and fit-up, which includes

- h) Millwork, furniture and equipment Drawings based on final layout coordinated with architectural, mechanical and electrical disciplines;
- i) Mechanical and electrical space and location requirements on the final equipment, millwork and furniture Drawings. Confirm the mechanical and electrical Drawings accurately reflect the FF&E layout including:
 - i. Final lighting layout;
 - ii. Final location of light switches and controls;
 - iii. Final location of HVAC controls;
 - iv. IT, audio-visual and ISS devices and wiring attachments;
 - v. Plumbing location and space requirements; and
 - vi. Additional cooling and exhaust location requirements;
- j) Elevations of all special purposed areas to reflect locations of electrical end devices including plugs, controls, switches based on final equipment, and furniture layout Drawings;
 - b) A final FF&EM generated from the Model, which reflect the entire FF&E and fit-up design; and
 - c) From the final FF&EM, a complete, detailed FF&E listing for each unique type of good/equipment which includes the:
 - i. Quantity;
 - ii. Unit rate;
 - iii. Total estimate per unique good/equipment type;
 - iv. Dimensions;
 - v. Sample manufacturer, make, and model number;
 - vi. Generic description including mandatory requirements and finishes;
 - vii. WBS category;
 - viii. Procurement group number;

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- ix. Delivery requirements;
- x. Installation requirements;
- xi. Confirmation of if the good/equipment is a new product or from existing inventory (e.g., move from existing NRC and TSB facilities, etc.); and
- xii. For existing inventory, include original location of the good/equipment;
- k) Reconfirm those materials and equipment specified reflect the sustainability analysis and energy Model established at DD;
- l) Input to update the overall Project commissioning plan to confirm all sustainability requirements related to the FF&E design and performance verification measures are fully integrated;
- m) After completion of the 50% DP, re-running the building LCA tool using the Athena [Impact Estimator for Buildings](#) to optimize the reduction of environmental impacts related to embodied and operating energy, embodied carbon, GHG emissions to air, water, and land; and
- n) An update of the design intent brief with all current FF&E design information.

14.3.6.7 FF&E and Connectivity DPs

The Design Team must:

- a) Minimize the number of DPs and DPs and group goods into logical lots;
- b) Confirm DPs are prepared as agreed by the DR;
- c) List sample goods and equivalent mandatory technical criteria for evaluation;
- d) Produce millwork, case goods, FF&E, and Connectivity lists and provide to and review with the CM:
 - i. DP-specific installation requirements and Drawings indicating delivery point at the Site, path of travel, and final installation locations. Review and discuss any special installation and handling requirements; and
 - ii. Revise installation requirements and Drawings based on the CM's feedback;
- e) Review and obtain approval by the DR of CM for delivery and installation requirements and Drawings. The CM will coordinate delivery, access and installation of millwork, case goods, FF&E and Connectivity; and
- f) Review the procurement schedule with the CM and DR and adjust DPs as required to optimize construction operations.

14.3.6.8 Move Requirements

The Design Team must:

- a) Develop approved move DPs for all office and laboratory goods and equipment identifying existing location, disconnection requirements if applicable, new TSTS hub location, connection, start-up and commissioning requirements and processes as applicable to each good or equipment piece;
- b) Reconfirm all pieces of equipment which:
 - i. Require highly sensitive calibration; and
 - ii. Require strict environmental and handling measures during relocation and installation;

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- c) For each piece of equipment identified in paragraph b):
 - i. Develop items-specific step-by-step move-out, move in, and installation Drawings and move Specifications indicating all environmental and handling requirements; and
 - ii. Identify step-by-step recalibration and recommissioning requirements with all performance criteria; and
- d) With the CM, DR and TSTS occupants, reconfirm and define the move schedule withing DPs.

14.3.6.9 Acoustic Design

The Design Team must confirm acoustic criteria and design requirements are coordinated and detailed in individual design discipline Drawings and Specifications, based on updated information in the Model, and include:

- a) All acoustic design criteria, assumptions and calculations for all primary spaces (conference and meeting rooms, offices, etc.). Index and provide in a format suitable to the DR;
- b) Acoustic criteria and requirements for materiel and equipment selection;
- c) Acoustic construction requirements for all applicable disciplines (i.e., Drawings, sections, details, Specifications) and performance verification requirements, criteria and testing processes;
- d) Reconfirm those materials and equipment specified reflect the sustainability analysis and energy Model established at DD;
- e) Input to update the overall Project commissioning plan to confirm all sustainability requirements related to the acoustic design are fully integrated;
- f) After completion of the 50% DP, re-running the building LCA tool using the Athena [Impact Estimator for Buildings](#) to optimize the reduction of environmental impacts related to embodied and operating energy, embodied carbon, GHG emissions to air, water, and land; and
- g) An update of the design intent brief with all current acoustic design information.

14.3.7 Sustainable Design

The Design Team must further develop and Model sustainable design requirements based on the approved SD sustainability strategy and submit in a sustainability-specific DP report a detailed listing of all enhanced sustainable design performance requirements, which include:

- a) Complete and detailed all sustainable design requirements and confirm all sustainable requirements and Project-specific performance verification measures are 100% coordinated and fully detailed in individual design discipline Drawings and Specifications and based on up-to-date sustainability information in the energy Model;
- b) Reconfirming those materials and equipment specified reflect the sustainability analysis and energy Model established at DD;
- c) Providing input to update the overall Project commissioning plan to confirm all sustainability requirements and performance verification measures are fully integrated;

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- d) The applicable operations and maintenance provisions as prescribed by the component/system manufacturer until handover to Canada, and as appropriate beyond handover to Canada;
- e) After completion of each 50% building and fit-up DP, re-running the building LCA tool using the Athena [Impact Estimator for Buildings](#) to optimize the reduction of environmental impacts related to embodied and operating energy, embodied carbon, GHG emissions to air, water, and land;
- f) Confirmation to the DR and CM that the issuance of each DP does not compromise the approval sustainability performance strategies;
- g) After the completion of all building and fit-up DPs, run a whole-building energy Model to confirm expected post-construction energy performance and GHG emissions;
- h) After the completion of all building and fit-up DPs, and subject to a change in the 100% DD approved Project parameters requiring revised DD funding or building program approval (i.e., change in scope, or Cost, or time, or sustainability requirements), update the LCA and the LCCA to reconfirm maximized net savings and best value to the Crown in accordance with Project Brief section 4.1.4.3–Life-Cycle Cost Analysis;
- i) Development of Project-specific guidance and education requirements for all building occupants (i.e., occupant employees and managers, operations and maintenance staff, third-party contractors) related to all sustainability features within the building and Site;
- j) Development of Project-specific post-construction requirements/instructions for:
 - i. ‘Green’ purchasing of materials and products (e.g., floor finishes, disinfectants, janitorial paper products, trash bags, hand soaps/sanitizers) that meet relevant product standards including Green Seal, UL EcoLogo, EPA Standards, and FSC certification;
 - ii. Operations and maintenance guidance, including cleaning materials and methods, landscape and integrated pest management practices within the building and on the Site;
 - iii. Performance expectations/requirements for energy, water, and waste;
 - iv. The use of:
 - 1. Powered cleaning equipment that includes safeguards, ergonomic design and environmentally preferable batteries as applicable; and
 - 2. Vacuum cleaners that meet relevant certifications such as the Carpet and Rug Institute Seal of Approval/Green Label Vacuum Program and operate with a maximum sound level of 70 dBA or less in accordance with ISO 11201;
 - v. Waste collection, storage and pick-up requirements, including recycling and composting, and the following operational waste reduction targets:
 - 1. Divert 75% by weight of all non-hazardous operation waste, including 75% of plastic waste and 95% of paper materials; and
 - 2. Eliminate the use of unnecessary single-use plastics in operations, events and meetings; and

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- k) An update of the design intent brief to document the overall Project sustainability strategy illustrating the design strategies, design decisions required/taken, recommendations proposed and the resulting sustainability scorecard of the chosen rating tool and, with the input and support of the CM, the overall sustainability Cost.

14.3.8 Building Envelope Design

The Design Team must complete the DP Drawings and Specifications, based on updated information in the Model, to include:

- a) Substructure Drawings, including foundations and below grade work;
- b) Interiors, including interior construction, protection;
- c) Building systems, including, fire protection, electrical and mechanical, intelligent building sensors/systems, coordinated with structural and other disciplines;
- d) Building envelope Drawings and sections including walls, roofing, gutters, windows, doors, stonework if applicable, damp proofing, waterproofing, flashing, building insulation, caulking and sealants, finishes, etc., and showing structural members;
- e) As necessary, performance Specification for scaffolding and enclosure system, and temporary support requirements;
- f) Exterior lighting Drawings with components, connection details, envelope penetration details and Specifications cross-references as required to electrical Drawings;
- g) Detailed Drawings and directions on mock-ups, if any;
- h) Thermographic scan of the entire envelope in winter conditions and whole building air tightness testing at least 6 months after reaching Substantial Performance but before handover to Canada;
- i) Detail directions on unit price, fixed price, work and measurements for payment;
- j) Special construction and dismantling requirements;
- k) All design information, studies, and calculations for building science design and equipment selection with the 100% submission. Index and provide calculations in a format suitable to the DR;
- l) Reconfirming those materials and equipment specified reflect the sustainability analysis and energy Model established at DD;
- m) Input to update the overall Project commissioning plan to confirm all sustainability requirements related to the building envelope design and performance verification measures are fully integrated;
- n) The applicable operations and maintenance provisions as prescribed by the component/system manufacturer until handover to Canada, and as appropriate beyond handover to Canada;
- o) After completion of the 50% DP, re-running the building LCA tool using the Athena [Impact Estimator for Buildings](#) to optimize the reduction of environmental impacts related to embodied and operating energy, embodied carbon, GHG emissions to air, water, and land; and
- p) An update of the design intent brief with all current building envelope design information.

14.3.9 Structural Design

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The Design Team must complete the DP Drawings and Specifications, based on updated information in the Model, to include:

- a) Substructure and superstructure Drawings, rebar layout, framing Drawings, structural sections, details, seismic reinforcing schedules and connection details, sleeve and shaft locations, size and installation details for mechanical and electrical systems, laboratory crane attachment/installation details;
- b) Component/assembly Drawings, schedules and connection details, all temporary structural bracing/shoring requirements complete with timing and sequencing of bracing/shoring associated and acceptable loads;
- c) Special construction and, if necessary, deconstruction details;
- d) As a separate DP, the structural Monitoring program to clearly define the scope of work details, instrumentation requirements, information to complete the installations, and operation, maintenance and data collection/management of Monitoring systems, all fully coordinated with geotechnical and building envelope Monitoring systems;
- e) Updated load calculations and include all calculations for structural with the 90% submission. Index and provide calculations in a format suitable to the DR;
- f) As a separate DP, the structural health Monitoring program to clearly define the scope of work details, instrumentation requirements, information to complete the installations, and operation, maintenance and data collection/management of Monitoring systems, all fully coordinated with geotechnical and building envelope Monitoring systems;
- g) Reconfirm those structural materials and equipment specified reflect the sustainability analysis and energy Model established at DD;
- h) Input to update the overall Project commissioning plan to confirm all sustainability requirements related to the structural design and performance verification measures are fully integrated;
- i) After completion of the 50% DP, re-running the building LCA tool using the Athena [Impact Estimator for Buildings](#) to optimize the reduction of environmental impacts related to embodied and operating energy, embodied carbon, GHG emissions to air, water, and land; and
- j) An update of the design intent brief with all current structural design information.

14.3.10 Mechanical Design

The Design Team must complete the DP Drawings and Specifications, based on updated information in the Model, to include:

- a) Plumbing, HVAC, vertical transportation, laboratory piping, ancillary emergency generator systems, fire protection Drawings including location of equipment, layout of all ductwork, piping (both building and laboratory-specific), insulation, hangers and supports, etc., location and size of all sleeves and shafts coordinated with the structural design, pipes, fixtures, sensors, and all other components, including plumbing and laboratory piping isometric and plan Drawings, fire protection components, layout and details for all mechanical rooms and laboratories, details all piping and ductwork connections, manifolds, laboratory service/in-field connection points, support apparatus, equipment schedules, and related elements ;
- b) DP documents for mock ups;

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- c) Updated building load calculations, energy Modelling per system, whole building energy Modelling, and totalized for each utility with the 50% and 90% submissions, confirming the analysis is reflective of the mechanical sequences of operation per system;
- d) Updated building load calculations, energy consumption per system and totalized for each utility for 50% and 90% submissions confirming analysis reflects the sequence(s) of operation per system;
- e) All calculations and equipment selection with the 90% submission. The calculations will be indexed and provided in a format suitable to the DR, provide in pdf format;
- f) Intelligent building infrastructure network architecture including integration and interoperability of other building control systems including but not limited to building automation system, lighting, and ISS;
- g) For each system and zone connected to the building automation system, mechanical control schematics, full input and output points listing and alarm thresholds, and the detailed sequence of operation;
- h) Reconfirming those materials and equipment specified reflect the sustainability analysis and energy Model established at DD;
- i) Input to update the overall Project commissioning plan to confirm all sustainability requirements related to the mechanical design and performance verification measures are fully integrated, and:
 - i. Detail system-by-system performance criteria and operating tolerances, for a minimum of 30 Working Days, within NMS Specification Section 25 01 11 EMSC: START-UP, VERIFICATION AND COMMISSIONING;
- k) The applicable operations and maintenance provisions as prescribed by the component/system manufacturer until handover to Canada, and as appropriate beyond handover to Canada;
- l) After completion of the 50% DP, re-running the building LCA tool using the Athena [Impact Estimator for Buildings](#) to optimize the reduction of environmental impacts related to embodied and operating energy, embodied carbon, GHG emissions to air, water, and land; and
- m) An update of the design intent brief with all current mechanical design information.

14.3.11 Electrical Design

The Design Team must complete the DP Drawings and Specifications, based on updated information in the Model, to include:

- a) Electrical Drawings including: power Drawings; lighting Drawings; IT, audio-visual, and security system Drawings; single-line diagrams per system; transformer, grounding (isolated or otherwise), equipment and fixture schedules; location and size of all sleeves and shafts coordinated with the structural design; building automation Drawings per system and zone; pathways and service infrastructure Drawings; electrical and telecommunications room Drawings with equipment layout, elevations, and details;
- b) Safety label information, in accordance with CSA Z462, for all panel boards, motor control centres, switchgear, and major electrical equipment;
- c) DP documents for all mock ups;
- d) Updated building load calculations, energy consumption per system and totalized for each utility for 50% and 90% submissions confirming analysis reflects the sequence(s) of operation per system;

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- e) All calculations and equipment selection with the 90% submission. The calculations will be indexed and provided in a format suitable to the DR, provide in pdf format;
- f) Intelligent building network architecture, control schematics per system and zone, sequence of operation per system and zone, alarm thresholds, input and output control point schedules for each electrical system;
- g) Reconfirming those materials and equipment specified reflect the sustainability analysis and energy Model established at DD;
- h) Input to update the overall Project commissioning plan to confirm all sustainability requirements related to the electrical design and performance verification measures are fully integrated;
- i) The applicable operations and maintenance provisions as prescribed by the component/system manufacturer until handover to Canada, and as appropriate beyond handover to Canada;
- j) After completion of the 50% DP, re-running the building LCA tool using the Athena [Impact Estimator for Buildings](#) to optimize the reduction of environmental impacts related to embodied and operating energy, embodied carbon, GHG emissions to air, water, and land; and
- k) An update of the design intent brief with all current electrical design information.

14.3.12 Commissioning and Property Management

The Design Team must complete the DP Drawings and Specifications, based on updated information in the Model, to include:

- a) Confirmation of compliance with the owners Project requirements (OPR), in accordance with ASHRAE 202-18, linked to the final functional program and design requirements;
- b) Final, comprehensive commissioning plan and training plan, all performance verification expectations (i.e., intended testing results) and step-by-step procedures for components, systems and integrated systems within each Specification subsection and include:
 - i. Materiel and construction process(es) Specifications to meet sustainable development objectives;
 - ii. Maintenance management information for each building component, and each system, and for integrated systems; and
 - iii. Seasonal commissioning testing, adjusting and reporting requirements;
- c) Per applicable Design Team discipline, a complete listing of building system and component-specific maintenance management nomenclature on Drawings, including Specifications for the fabrication and installation maintenance management identification tags and, after system/component start-up, reporting of relevant maintenance management information;
- d) Timing and prerequisite imperatives for integrated systems (life safety compliance) tests before Substantial Performance of the Project and again before handover to Canada;
- e) Specific tests/inspections to be conducted:
 - i. At manufacturer's plants;
 - ii. on-Site during construction, installation, and commissioning; and
 - iii. on-Site after handover to Canada;

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- f) Thermographic scanning of the building envelope in winter conditions and whole building air tightness testing before Substantial Performance;
- g) Infra-red scans of the entire electrical system under full load condition after occupant move-in;
- h) Final Building Management Plan and operating requirement annual Costs, labour requirements for ongoing operations, operations and maintenance contract type and requirements; utility and property tax Costs, including a list and requirements for each operation and maintenance contract to be novated to and funded by Canada (e.g., TSTS occupants) at handover to Canada; and
- i) Full update of the design intent brief reflecting:
 - i. All changes per discipline throughout the DP stage;
 - ii. Full explanation and rationale of all sustainable features and strategies;
 - iii. The updated whole building energy Model,
 - iv. The update of resulting implications for building performance and on building occupants (i.e., what are the changes for occupants); and
 - v. Updated lessons learned to date.

14.3.13 Cost

The Design Team must develop iterative [ASTM E1557, UNIFORMAT II](#) class A (+/- 5%) Cost estimates for each DP, with a detailed option-specific basis of estimate that builds on earlier versions, along with refined Cost estimates and basis of estimates for each enabling project. The DP Cost estimates and related Cost analysis per DP submission includes, but is not limited to:

- a) Refinement of the WBS for each of the Project's two major Cost centres;
- b) Quantity survey of any revisions to the final functional program and the DP scope defined at the time of estimate. Code the estimates to the detailed WBS for each scope element, sub-element and Work activity;
- c) Updated rationale for all contingencies and allowances and their percentages/values;
- d) Identifying and differentiating anticipated ongoing annual operations and maintenance contract Costs, beyond handover to Canada, from the class A estimates for the capital Cost to supply and install components and systems;
- e) Incorporating class A DP estimates into the overall Cost estimate, identifying and Cost overruns or underruns per DP and for the overall Project, and updated DP and Project cash flows as per the Project milestones and CM's schedule;
- f) Reconciling each estimate with independent estimate from PWGSC's 3rd party cost consultant and the CM, including a cross-walk of [ASTM E1557, UNIFORMAT II](#) estimates and the CM's trade-format estimates;
- g) Preparing a reconciliation report which identifies the necessary follow-up activities, the person(s) responsible, and timelines to complete said activities;
- h) After completion of each 50% building and fit-up DP, LCA as described per Design Team discipline in the proceeding Project Brief 14.3 subsections;
- i) After the completion of all building and fit-up DPs, and subject to a change in the 100% DD approved Project parameters requiring revised DD funding or building program approval (i.e., change in scope,

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or Cost, or time, or sustainability requirements), update the LCA and the LCCA to reconfirm maximized net savings and best value to the Crown in accordance with Project Brief section 4.1.4.3– Life-Cycle Cost Analysis; and

- j) Determining and monthly reporting on the percentage complete of Design Team activities through all Project stages, linking this information (resource demand) with the Consultant’s monthly resource-loaded schedule.

14.4 Design Package Submission Requirements

14.4.1 50% Complete Design Package Documentation

The Design Team must confirm to the DR all sustainability requirements are fully coordinated between design disciplines, and provide for each DP:

- a) An updated design coordinated and BIM clash detection identified and resolved;
- b) Drawings: plans, elevations, perspectives, cross-sections with coordinated details, device identification and information, etc.;
- c) Preliminary sustainability and performance requirements per Specification sub-section with, as applicable, independent testing and verification requirements;
- d) Preliminary listing of goods and materiel;
- e) Preliminary unit rate tables, as applicable;
- f) Draft Division 01 Specifications, coordinated with the CM’s front-end solicitation package;
- g) Preliminary code summary including an equivalent matrix for each applicable code. Where codes differ, include a comparison table to highlight the differences/equivalencies;
- h) Preliminary Drawings and Specifications for all deconstruction, temporary protection, bracing, supports, etc., including installation sequencing;
- i) Preliminary requirements for operations and maintenance and services call-backs after Substantial Performance, as well as for undertaking maintenance contracts after handover to Canada;
- j) Updated Critical Path and milestone schedules for design production activities;
- k) Reconfirm those materials and equipment specified reflect the sustainability analysis and energy Model established at DD;
- l) Input to update the overall Project commissioning plan to confirm all sustainability requirements related to the design and performance verification measures are integrated;
- m) After completion of each building and fit-up 50% DP, LCA using the Athena [Impact Estimator for Buildings](#) to optimize the reduction of environmental impacts related to embodied and operating energy, embodied carbon, GHG emissions to air, water, and land; and
- n) An updated WBS, class A estimate, reconciliation report, LCA, and updated overall Project estimate.

14.4.2 90% Complete Design Package Documentation

The Design Team must finalize all exemptions related to codes, standards, etc. and permitting requirements and document the exemption/permitting rationale, applicable approval body and their decisions in a report to the DR.

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The Design Team must confirm to the DR all sustainability and performance verification requirements are completely integrated into the 90% DP submission, which includes:

- a) An updated and coordinated design based on the Model with all interdisciplinary design clashes resolved;
- b) Extensively detailed Drawings (e.g., plans, elevations, perspectives, detailed cross-sections, device identification and information) and Specifications with the majority of dimensioning incorporated;
- c) Detailed sustainability and performance verification requirements per Specification sub-section with, as applicable, independent testing and verification requirements;
- d) Extensively detailed schedules and materiel requirements;
- e) Extensively detailed unit rate tables, as applicable;
- f) Extensively detailed Division 01 Specifications;
- g) Detailed code summary including an equivalent matrix for each applicable code. Where codes differ, include a comparison table to highlight the differences/equivalencies;
- h) Extensively detailed Drawings for all deconstruction, temporary protection, bracing, supports,, Monitoring, installation sequencing, delivery restrictions/timing, and related requirements;
- i) Extensively details requirements for operations and maintenance and services call-backs after Substantial Performance, as well as for undertaking maintenance contracts after handover to Canada;
- j) Provide input to update the overall Project commissioning plan to confirm all sustainability requirements related to the design and performance verification measures are fully integrated;
- k) Updated Critical Path and milestone schedules for design production activities; and
- l) An updated WBS, revised class A estimate, reconciliation report, and updated overall Project estimate.

14.4.3 100% Complete Design Package Documentation

The Design Team must provide the DR, for each design discipline, all Project-related data, studies, detailed calculations, etc. in a fully indexed format.

The Design Team must submit each 100% DP that is fully coordinated between all design disciplines and includes:

- a) An updated and coordinated design based on the Model with all interdisciplinary design clashes resolved;
- b) Final signed and sealed original Drawings (e.g., plans, elevations, perspectives, detailed cross-sections, device identification and information) that are fully dimensioned and Specifications;
- c) Final sustainability and performance verification requirements per Specification sub-section with, as applicable, independent testing and verification requirements;
- d) Final schedules and materiel requirements;
- e) Final unit rate tables, as applicable;

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- f) Final Division 01 Specifications;
- g) Final Drawings and Specifications for all deconstruction, temporary protection, bracing, supports, Monitoring, including installation sequencing, performance requirements, and related requirements;
- h) Final requirements for operations and maintenance and services call-backs after Substantial Performance, as well as for undertaking maintenance contracts after handover to Canada;
- i) An update of the design intent brief, SDB, AVDB, and ITDB based with all design information;
- j) An update of the Critical Path and milestone schedules for design activities;
- k) An updated WBS, revised class A estimate, reconciliation report, and updated overall Project estimate; and
- l) If required, after the completion of all building and fit-up DPs, update of the LCA and the LCCA.

14.5 Approvals

The Design Team must:

- a) Conduct subject matter and DP workshops per DP submission to discuss and obtain approval of DP scope with the DR, CM and TSTS occupants;
- b) If necessary, prepare, submit for DR review and approval, and deliver presentations to Authorities having jurisdiction, the NCC and TSTS occupant representatives to obtain specific approvals necessary to advance and finalize DP production;
- c) Through the CM, provide clarification to and, if required deliver presentations to, municipal officials and other Authorities having jurisdiction to obtain required approvals and permits; and
- d) Integrate recommendations and feedback in DP production.

14.6 Design Package Deliverables

At a minimum, the Design Team must:

- a) Per DP, coordinate and integrate all Services of the Design Team and with the input of the CM;
- b) Per DP, submit 50%, 90%, and 100% DP submissions and class A estimates according to requirements described in this Project Brief section 14, with the scope and according to the schedule provided by the CM;
- c) After completion of all DPs, submit to the DR a complete listing of all sustainability performance requirements for each Design Team discipline, whole-building energy Model, if required whole building LCCA, and related sustainability information; and
- d) Monthly reporting of Design Team resources progress percentage complete against each WBS element, integrated with the Consultant's monthly schedule submission.

14.7 Response to Design Package Reviews

The Design Team must, per DP submission:

- a) Review and analyse all the comments provided by the Project Team;

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- b) Prepare and submit a written response to the DR within 20 working days to all the submission comments, taking into account the submission and review processes defined in subsection b) of Project Brief APPENDIX D–PROCESS MAPS; and
- c) Integrate comments into the subsequent submissions as directed by the DR.

15 TENDERING SERVICES

15.1 General

The Design Team must, for all DPs:

- a) Prepare pre-qualification requirements in collaboration with and as required by the CM and DR;
- b) Attend bidders' briefing meetings for pre-qualification, as required by CM;
- c) Analyze and respond to questions during the pre-qualification of suppliers and during DP tendering;
- d) Update the Model, Drawings, and Specifications based on bidders' questions. Provide the DR and CM with addenda inclusive of all information required by bidders to fully interpret the tender documents. CM will issue addenda to bidders;
- e) Per DP, maintain a record of all inquiries directed to DR and CM during the bidding period for future audit;
- f) Per DP, assist in the evaluation of tenders by providing advice on the following:
 - i. The completeness of the tender response in all respects;
 - ii. The technical/design aspects of the tenders;
 - iii. The effect and suitability and the Design Team's acceptance or rejection of alternatives that may have been included in the tender. Revise the Model to reflect accepted alternates or product qualification;
 - iv. The tenderer's ability to undertake the scope of work;
 - v. Participate in the bid variation analysis between bids and the class A estimate. If bids are above the class A estimate, with the CM and PWGSC's third-party consultant, undertake a mini-value engineering exercise to assess options to bring the tender within the class A estimate; and
 - vi. Update the Construction Cost Estimate and annual cash flows as per the Project schedule per major Cost center to reflect the accepted DP bid price and reconcile said updates with the CM and PWGSC's third-party cost consultant;
- g) Through the CM, as applicable per DP, follow up with municipal officials until permits are obtained; and
- h) Determining and monthly reporting on the percentage complete of Design Team activities through all Project stages, linking this information (resource demand) with the Consultant's monthly resource-loaded schedule.

15.2 Retender

The Design Team must:

- a) As required and approved by the DR, redesign and reissue DP, updating the Model and Specifications as necessary to bring the Cost within the stipulated limits; and

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- b) If required, in coordination with the CM, prepare and submit a detailed narrative of the implications for retendering, including Cost impacts and the risk implications and proposed mitigations.

15.3 100% Construction Documents Issued-for-Construction

The Design Team must, in collaboration with relevant disciplines, the CM and the DR:

- a) Prepare and update DPs to include all revisions resulting from the addenda issued during the tender period;
- b) Confirm in writing to the CM and DR that all addenda have been integrated into the tender documents to be issued for construction, that the Model is fully updated and coordinated with all component and system clashes resolved, and updated Specifications reflect all addenda; and
- c) Per DP, sign and seal all “Issued-for-Construction” documents (Drawings and Specifications) within 5 Working Days of the issuance of the last addendum. .

15.4 FF&E and Connectivity Installation

The Design Team must update the BCM and the Model with the final make, model, and description of all awarded FF&E and Connectivity goods.

15.5 Tender Service Deliverables

At a minimum, the Design Team must:

- a) Prepare pre-qualification requirements as requested by the CM and DR;
- b) Provide the DR and CM with responses within two Working Days of receipt of the question(s), or as agreed by the DR;
- c) Provide the DR and CM with addenda within two Working Days of receipt of the question, or as agreed by the DR;
- d) Per DP, submit to the DR and CM within two Working Days of bid close, or as agreed by the DR:
 - i. A record of inquiries to the DR and CM at the close of bidding;
 - ii. Completeness of the tender response;
 - iii. Bid variation analysis;
 - iv. Acceptance or rejection of alternatives proposed in the bid(s);
- e) Per DP, submit to the DR and CM within five Working Days of bid close, or as agreed by the DR:
 - i. An update the Construction Cost Estimate reflective of the accepted DP bid price; and
 - ii. Sign and seal all “Issued-for-Construction” documents. Confirm to the DR and CM all addenda have been integrated in said documents; and
 - iii. One reproducible copy of the complete DP, or tender documents as applicable;
- f) Update and provide the DR the BCM and the Model within 10 Working Days of each FF&E and Connectivity contract award;

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- g) Per DP, as agreed by the DR and CM, provide a summary of the status of building permit applications;
- h) If and when instructed by the DR, revised DPs for retendering, including a detailed narrative of the implications for retendering; and
- i) Monthly reporting of Design Team resources progress percentage complete against each WBS element, integrated with the Consultant's monthly schedule submission.

16 SITE SERVICES

16.1 Intent

Site Services are an essential aspect of the Consultant's Contract. These Services are the primary focal point for the Consultant's input to and in support and administration of construction operations, for the entire scope identified in Project Brief section 4 and developed through the PD, SD, DD, and DP stages of the Project. The ongoing flow of accurate and coordinated information to and from the construction Site will support the design and construction sequencing and their completion.

The Consultant's Site Services team must have the authority, ability and capacity to immediately respond to evolving situations on all parts of the Site, coordinating Site information with ongoing design production, and providing immediate access to design direction to the CM for all Site matters of construction, temporary protection, work sequencing, shoring, etc.

The Consultant must provide highly experienced, multi-disciplinary team of licensed and non-licensed professionals well-orchestrated and coordinated to respond in real time. Led by a highly experienced and licensed Architect or Engineer, the Consultant's Site Services team must adapt in composition as the overall Project advances and include administration support. The Consultant's human resources plan, as described in Project Brief sections 10.2.1.6 and 10.3.1, must reflect the Site Services required by discipline, by construction stage/progress.

16.2 General Services

The Design Team must, in full coordination with the CM and DR:

- a) Coordinate and manage all Design Team's Services, activities and communication at the Site;
- b) Lead the design and advise the DR in all investigation activities by planning, coordinating and scoping investigation DPs, reflecting the prioritized information requirements of the Design Team . Services include:
 - i. Coordinating all Design Team information and efforts;
 - ii. Preparing and issuing DPs;
 - iii. Managing, administering, accurately compiling data, for each investigation element; and
 - iv. Coordinating and validating all Site investigation findings to confirm accuracy and completeness of information, relaying the findings to the Design Team and the DR within 36 hours of each investigation;
- c) Address the DR's technical and, once hired, the CM's constructability review comments for suitability to confirm appropriate design production integration. Services include:

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- i. Understanding the design intent, design direction, scope mandate, design assumptions, and design limitations;
- ii. Assessing, discussing and reporting of construction sequencing options, risk assessments, material substitutions, and life-cycle considerations for materials, components and systems; and
- iii. Providing formal written response to the CM and the DR for all constructability comments;
- d) Participate in meetings and workshops in accordance with Project Brief section 10.1.1–Meetings and Workshops;
- e) Provide ongoing Services, with monthly summaries, to include:
 - i. Managing, coordinating and controlling all design production documentation to and from the Site for accuracy and completeness on an ongoing basis;
 - ii. Coordinating with the CM and Design Team, providing supplemental information required by the municipality or other Authorities having jurisdiction to resolve design issues related to any permit;
 - iii. Responding to submittals and Requests for Information (RFI) from the CM, suppliers and subcontractors, or the DR with accurate, coordinated and complete information in accordance with sections d) and e) of Project Brief Appendix D–PROCESS MAPS. Submittals include shop Drawings, samples, mock-ups, test reports, and demonstrations for all submittals requiring the Design Team’s review and approval.

The Design Team must prioritize the review of, response to, and acceptance of submittals and RFIs to not compromise the Critical Path of the Project schedule by:

1. Establishing a submittal and RFI review, acceptance and response framework based on submittal or RFI importance, with the input and the acceptance of the CM and DR. Include a mechanism to reclassify importance when required;
2. Confirming the degree of importance of each RFI or submittal on receipt from the CM;
3. Prioritizing responses so that responses by the Design Team critical to the Project schedule are provided by the critical date established by the CM;
4. Validating that the Model Element data file provided matches the submittal being reviewed and accepted and retain the Model Element data file for reference in the as-built Model; and
5. Responding to all submittals and RFIs within 5 Working Days but never longer than 15 Working Days; however,
 - a) Should the Design Team require more than 5 Working Days for submittals and RFIs deemed by the CM as critical/important, the applicable design discipline(s) is/are to notify the Consultant, DR and CM in writing within 2 Working Days of receiving the RFI and provide a timeline for response, for review and acceptance by the DR, in consultation with the CM; and
 - b) Should the proposed additional time not be accepted by the DR, the Consultant and applicable design discipline(s) must reprioritize their current work load to provide the RFI response within a timeframe acceptable to the DR and CM;

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- iv. Reviewing the construction routinely, daily if and when required, interpreting design information and confirming construction in accordance with the design intent;
 - v. Providing the CM with direction and rejecting work that does not conform to DP or approved performance requirements, notify the DR immediately;
- f) Provide field clarifications within 2 Working Days of issue identification, or when required by the CM in accordance with section f) of Project Brief Appendix D–PROCESS MAPS;
- g) Prepare and issue in a timely manner to the CM accurate and coordinated DPs, supplementary instructions, notices, contemplated change notices, change orders in accordance with section g) of Project Brief Appendix D–PROCESS MAPS. The Design Team must confirm that:
 - i. Detailed quotations with price support that reflect all aspects of the proposed work and, if not, return the quotation to the CM, indicating which elements of the quotation are problematic;
 - ii. Alternative solutions proposed are thoroughly assessed for compatibility and viability;
 - iii. Quotations, alternative design solutions, contemplated change notices, and change orders are reviewed by all relevant Design Team disciplines within 5 Working Days or less, or with the approval of the DR within an agreed timeframe;
 - iv. Quotations only include rates for personnel and percentage mark-ups provided for in the CM's contract; and
 - v. After comprehensive review and verification, recommend to the DR if the quotation is complete, fair, and reasonable;
- h) Update the Model and every 3 months or more frequently if requested by the DR reissue the Issued-for-Construction DPs to incorporate all supplementary and Site instructions and change orders;
- i) Analyze and report monthly on all activities of the construction and construction schedule for viability, including the status of all design activities relative to the construction schedule. Confirm ongoing design production is fully coordinated with DP tendering schedules. Report potential design production gaps and mitigation measures to the CM and the DR within 5 Working Days of the end of each month;
- j) Analyze and report on the CM's proposed sub-contractor productivity measurement methodology before tender. Make suggestions to the CM and DR for productivity measurement improvements. Confirm productivity measurement methodology is included within each sub-contractor tender before tender. Advise the CM and DR of each sub-trade productivity measurement methodology;
- k) Report monthly or more frequently if warranted on any proposed blasting and vibration Monitoring procedures, if any. Inform the CM and the DR in writing immediately of any conditions that require immediate remedial measures;
- l) Review and confirm the completeness and appropriateness of the CM's estimate for each Site instruction that attracts Cost, each contemplated change notice, and each change order;
- m) Review and assess, from the Design Team's perspective, potential impact to the Project scope, time, Cost, and risk related to the Site instruction, contemplated change notice, and change order;
- n) Reconcile each construction change/instruction that attracts Cost against the Construction Cost Estimate to present a monthly report to the DR a running total of contingency use, balance, and projection of the estimated Cost at Project completion. Code changes to the detailed WBS for each scope element, sub-element and Work activity;

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- o) Develop and keep current a construction Cost trend analysis with discussion of factors influencing future forecasts;
- p) Validate, from the Design Team's perspective, potential CM or subcontractor claims;
- q) Validate material types and quantities related to unit price work;
- r) Validate the CM's work and services completed monthly;
- s) Establish an acceptable process with the CM and to the satisfaction of the DR for the measurement and validation of materials, equipment and labour in advance of each progress payment application, and:
 - i. Review and recommend to the DR for payment the CM's progress payment applications for accuracy and completeness, within 5 Working Days of receipt;
 - ii. Assess equipment and material types and quantities against approval submittals;
 - iii. Certify the degree of completion of all aspects of the construction; and
 - iv. Confirm to the DR that applications for progress payment are complete and only reflect the work that has progressed to the date of the invoice;
- t) Prepare a full accounting of all DPs incorporating all changes and adjustments by major Cost center, according to the detailed WBS;
- u) Determining and monthly reporting on the percentage complete of Design Team activities through all Project stages, linking this information (resource demand) with the Consultant's monthly resource-loaded schedule; and
- v) Provide input to the CM's lessons learned related to the construction.

16.3 Model-Related Services

The Design Team must provide Project specific Model operators at the Site capable of laser scanning, compiling point-cloud data, 24 mega-pixel high-resolution photogrammetry (referred herein as photogrammetry), and integration of point-cloud data and photogrammetry into the Model, printing and plotting capability are mandatory to support the daily design coordination, construction and administration effort.

Laser scanning and photogrammetry equipment, calibration and maintenance are a disbursement to the Contract or the CM's contract. Obtain the approval of the DR prior to acquiring the equipment. Equipment must be secured and protected at all times. Develop and maintain a protocol for access to equipment and its storage. Revise as required to the approval of the DR.

The Design Team must confirm Model updates and interdisciplinary coordination, are performed weekly or more often depending on the criticality of the information. Provide the CM and DR all related information. Identify, prioritize and resolve the building component and systems interferences.

The Design Team must:

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- a) Manage and perform detailed construction laser scanning, photogrammetry, and compile and incorporate point-cloud data and photogrammetry into the Model for each building assembly and Site element affected by investigations, temporary protection, blasting, shoring, construction Monitoring systems, and other construction activities. The Design Team must include:
 - i. Information describing the physical configuration, ongoing modification, and condition of the building assemblies or Site elements;
 - ii. Verifications and updates to existing Model information, include building elements, components, sensors, related devices and their actual interoperability in the as-built Model;
 - iii. Temporary protection, shoring, and other design direction, or as determined with the CM and DR as described in paragraph e) of Project Brief section 10.2.1.1–Design Management Planning;
 - iv. Data collected as applicable with the requirements of building envelope, structural, and other discipline Monitoring systems;
 - v. All construction, including but not limited to:
 - 1. Typical and unique assembly (e.g., walls, floors, doors, windows) and sub-grade compositions;
 - 2. Typical and unique assembly connections, including composition;
 - 3. Typical and unique window jamb, head and sill connection with its adjacent wall;
 - 4. Typical and unique door jamb, head and sill connection with its adjacent wall;
 - 5. Various materials of the wall, floor, window, and door composition;
 - 6. Quantities of the various elements by measuring their thicknesses. In cases where the thickness may vary, a maximum and minimum dimension must be measured and recorded in the Model;
 - 7. Laser scan, photograph, compile point-cloud data, and incorporate all data into the Model of each as-constructed Project element before concealment and in its final state; and
 - 8. Confirm the as-built Model reflects the actual orientation, anchoring, interconnection, and attachment of each building component and system; and
- b) Inform the DR if and when additional legal or topographical survey information is needed to advance the design.

16.4 FF&E and Connectivity Services

The Design Team must:

- a) Coordinate with the CM and the DR the FF&E and Connectivity goods delivery and installation schedule, including integration into and coordination with the overall construction schedule;
- b) Initial Inspection: For all deliveries to Site, be present to complete an initial inspection of deliveries against the packing slip. Either accept or reject deliveries to Site. Track all deficiencies with a written and visual description in an inspection report. Update the inspection report daily throughout the delivery period;

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- c) Final Inspection: Coordinate with the CM on where to relocate items accepted on Site to the final location. Complete a final inspection and issue an inspection report. Develop and use a standard inspection report template accepted by the DR; and
- d) Coordinate rectification of delivery and installation deficiencies to the satisfaction of the DR.

16.5 Coordination with PWGSC's GEICs and Other Consultants/Contractors

The Design Team must understand and coordinate their on-Site Services with those of PWGSC's GEICs and other consultants /contractors. Discuss with the GEICs and other consultants and the CM at all meetings or more often the relevant aspects of the GEICs' and other consultants' design and on-Site work requirements. Adjust the Design Team's activities accordingly to accommodate and integrate the geotechnical, environmental, and pre-construction works.

16.6 Move Services

The Design Team must:

- a) Oversee each move and provide direction to the CM as required;
- b) Confirm the receipt at the TSTS hub and inspect of all moved goods/equipment for damage, photographing, documenting, and immediately advising the CM and DR of any damage;
- c) Confirm correct placement all moved goods and equipment; and
- d) Oversee and validate the CM's start-up and commissioning of moved goods and equipment.

16.7 Commissioning Services

The Design Team must confirm compliance with and implementation of the commissioning plan and training program by:

- a) Developing and updating a commissioning issues log at the commencement of the Consultant's Site Services and those of the GEICs, in a format agreeable to the DR and PWGSC Commissioning Manager, to specifically track commissioning-related matters;
- b) Discussing and tracking commissioning issues at construction and commissioning meetings, including those related to the GEICs. Should a question arise regarding the ability to achieve the operational and design intent, or sustainability performance requirements, or the owners Project requirements in accordance with ASHREA 202-18, then:
 - i. The DR must be made aware of the commissioning matter;
 - ii. Sufficient analysis by the Consultant must be undertaken to understand and resolve the matter at its root cause; and
 - iii. If necessary, redesign, reconstruction, resequencing, and retesting be undertaken to achieve the operational and design intent, sustainability performance requirements, the owners Project requirements in accordance with ASHREA 202-18, etc.;
- c) Assembling, reviewing and approving all commissioning documentation including installation check lists, performance verification report forms, performance verification procedures, instruments to be

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used and instrument calibration and incorporate relevant data from reviewed and accepted shop Drawings and installed component data;

- d) Witnessing and certifying tests conducted before concealment and start-up;
- e) Verifying each system is completed, safe to operate and ready to start-up;
- f) Confirming that all deficiencies are rectified and notify the CM that the installed components and systems are ready for commissioning;
- g) Witnessing and certifying all testing, including testing off-hours or off-Site;
- h) Completing thermographic scanning of the building envelope in winter conditions and whole building air tightness testing before substantial performance. Determine corrective actions, if any, and instruct the CM;
- i) Measuring and recording energy consumption per building system and by utility. Confirm energy consumption targets are being met. Adjust systems or sequence of operations as required to meet approved energy consumption targets, while maintaining the approved operational intent;
- j) Measure, record, and confirm the performance of components and systems for sustainability and intelligent building initiatives. Adjust systems or sequence of operations as required to meet the approved design intent, while maintaining the approved operational intent;
- k) Planning and implementing a full-load system testing for each building system as a prerequisite to integrated systems testing. Identify and resolve deficiencies. Retest as required until intended operation and performance is achieved. Document results and necessary follow-up action for each test. Confirm deficiencies, if any, are corrected before proceeding with further testing;
- l) Providing instruction and testing sequence to the CM and the implicated Subcontractors and Suppliers for each life safety system. Test and document the performance of each system and necessary follow-up actions. Confirm deficiencies, if any, are corrected before proceeding with further testing. As a prerequisite to subparagraph j), successfully commission and document the flawless performance of each individual life safety system;
- m) Completing a full integrated system (life safety compliance) test without system fault before Substantial Performance. Repeat the integrated systems test without fault before, as a condition for, handover to Canada. Integrate and comply with CAN/ULC S-1001 in the planning and implementation of this test. Provide instructions and testing sequence to the CM and the implicated Subcontractors and Suppliers. Each integrated systems test must include the following activity sequence:
 - i. Place the building in a fire condition with flowing standpipe water (fire pump running) and confirm all life safety systems are operation (i.e.; elevators in motion, etc.);
 - ii. Disconnect the normal power supply at the primary breakers;
 - iii. Assess and document the correct (proper) sequence of operation of each life safety system in an emergency condition;
 - iv. Assess and document the correct (proper) sequence of operation the building automation and security systems (likely applicable to second test only);
 - v. Reinstate normal power and clear the fire condition (stop running water); and
 - vi. Assess and document the correct (proper) sequence of operation of each life safety system, building automation and security system in their return to normal operation;

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- n) Repeating, if required, each integrated system test until successfully completed without fault (i.e., no errors);
- o) Implementing integrated systems (life safety compliance) testing is a condition precedent for Substantial Performance of the CM's contract. Confirm deficiencies to or from emergency power in a fire (water flow) condition. Resolve deficiencies and retest if necessary;
- p) Completing a full infra-red scan of the entire electrical system under full load after TSTS occupant move-in. Determine corrective actions, if any, and instruct the CM;
- q) Confirming compliance with the owners Project requirements (OPR), in accordance with ASHRAE 202-18, linked to the final functional program and design requirements; and
- r) Updating the design intent brief, SDB, ABDB, and ITDB to reflect each as-commissioned building systems.

16.8 Benefit Register and Benefit Plan

The Design Team must:

- a) Validate, and if necessary, update the Baseline benefits register and benefits plan with the input of the CM and DR, which includes and compares current benefit status/projection(s) with 100% SD Baseline information / targets and metrics on preferred SD design option; and
- b) Describe all rationale for any change(s) to the Baseline benefits and metrics for measurement.

16.9 Deliverables

The Design Team must:

- a) Provide monthly reporting of all Design Team activities, as separate sections, noting:
 - i. Progress and productivity of the design production and the construction;
 - ii. Quality of the construction work;
 - iii. Monitoring, inspection, commissioning, and if required blasting, procedures and reports;
 - iv. A complete reconciliation of each construction change/instruction that attracts Cost against the Construction Cost Estimate, a running total of contingency use, balance, and projection of the estimated Cost at Project completion;
 - v. Analysis and trend of construction Costs;
 - vi. All commissioning issues in a detailed commissioning log;
 - vii. Information gaps, including when these must be resolved and who is to take the required action/decision; and
 - viii. Potential opportunities and risks, including criticality and timing for resolution;
- b) Issue and maintain orderly and updated files at the Site for the use of the DR, including:
 - i. DPs;
 - ii. Issued-for-Construction documents;
 - iii. Approved submittals and completed RFIs;

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- iv. Supplementary and Site instructions;
 - v. Field clarifications;
 - vi. Contemplated change notices;
 - vii. Change orders;
 - viii. Certification of progress payment applications;
 - ix. Memoranda;
 - x. Inspection, testing and deficiency reports;
 - xi. Correspondence and minutes of meetings; and
 - xii. Names, addresses, telephone numbers of the DR, Design Team members, CM key personnel and key sub-trade personnel, including home telephone numbers in case of emergencies;
- c) Provide written comments for all CM bid-ability and constructability feedback;
 - d) Confirm compliance with the owners Project requirements (OPR) before substantial performance and again before handover to Canada;
 - e) Finalize the Design Team's design intent brief, SDB, AVDB, and ITDB to reflect each as-commissioned building system within six months of Substantial Performance of the CM's contract; Undertake seasonal commissioning activities and corrective work as described in Project Brief section 17–POST-CONSTRUCTION SERVICES;
 - f) Provide a full Cost accounting of all DPs with changes/adjustments;
 - g) Provide an up-to-date benefit register and benefit plan;
 - h) Provide signed documentation for substantial performance and completion;
 - i) Provide an as-built Drawings, as-built Specifications, and an as-built Model of the built work prior to occupancy; and
 - j) Monthly reporting of Design Team resources progress percentage complete against each WBS element, integrated with the Consultant's monthly schedule submission.

17 POST-CONSTRUCTION SERVICES

17.1 Seasonal Commissioning and Close-out

The Design Team must:

- a) Revise the commissioning plan as required to meet seasonal commissioning requirements. Conduct all seasonal commissioning activities, testing, adjusting, repairing, revalidating and reporting on each seasonal commissioning activity;
- b) Witness all testing, including tests during evenings and weekends. Submit reports to the CM and DR and within 5 Working Days of each activity;
- c) Instruct CM to correct any deficiency, agreeing on appropriate schedule for correction with the CM and DR. Inspect, laser scan, photograph and report on all deficiency repairs prior to concealment or within 5 Working Days of repair completion if concealment is not a requirement. Compile point-cloud and photogrammetry data and update the as-built (record) Model within 14 Working Days of deficiency correction;
- d) Verify and confirm functionality of the long-term hygrothermal Monitoring system for exterior wall system freeze-thaw cycles. Adjust, recalibrate, correct equipment as required;
- e) Confirm building and life safety system checks that must be carried out by the CM or PWGSC operations staff prior to the expiration of warranties;
- f) Measure and record energy consumption per building system and by utility and rerun whole building LCA and LCCA. Confirm sustainability targets for energy consumption are being met. Adjust systems or sequence of operations as required to meet approved sustainability objectives, while maintaining the approved operational intent;
- g) Rerun energy models and the whole-building LCCA 11 months after substantial performance. Confirm energy consumption meets the DD and DP defined requirements. Adjust systems if and as required to obtain approved energy performance;
- h) Validate procedures for post-occupancy electrical system infra-red scanning with CM prior to scan. Review results and provide CM with corrective instructions, if required. Confirm corrective measures are completed;
- i) Validate procedure for building envelope thermographic scanning with CM prior to scan. Review results and provide CM with corrective instructions, if required. Confirm corrective measures are completed;
- j) Confirm any modification to building components, systems or operational parameters are updated in the as-built (record) Model(s) in use by TSTS occupants;
- k) Update the full Cost accounting of all DPs with changes/adjustments during post-construction, if any;
- l) Determining and monthly reporting on the percentage complete of Design Team activities through all Project stages, linking this information (resource demand) with the Consultant's monthly resource-loaded schedule;

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- m) Obtain sustainability certification(s) within 12-18 months of substantial performance and submit said certification documents to the DR; and
- n) Participate in a lessons-learned workshop with the CM, DR and NRC and TSB at a time approved by the DR.

17.2 Training

The Design Team must conduct Design Team-led training that provides an understanding of:

- a) The design and operational intent of systems and why the systems were selected and why others were not;
- b) The limitations of systems; and
- c) How to use and extract information from the Model (multiple training sessions);
- d) Sustainability objectives and results, which, from an operational perspective, include:
 - i. Requirements for all building occupants (i.e., occupant employees and managers, operations and maintenance staff, third-party contractors) related to all sustainability features within the building and Site;
 - ii. Project-specific post-construction requirements/instructions for:
 - 1. 'Green' purchasing of materials and products (e.g., floor finishes, disinfectants, janitorial paper products, trash bags, hand soaps/sanitizers) that meet relevant product standards including Green Seal, UL EcoLogo, EPA Standards, and FSC certification;
 - 2. Operations and maintenance guidance, including cleaning materials and methods, landscape and integrated pest management practices within the building and on the Site;
 - 3. Performance expectations/requirements for energy, water, and waste;
 - 4. The use of:
 - 1. Powered cleaning equipment that includes safeguards, ergonomic design and environmentally preferable batteries as applicable; and
 - 2. Vacuum cleaners that meet relevant certifications such as the Carpet and Rug Institute Seal of Approval/Green Label Vacuum Program and operate with a maximum sound level of 70 dBA or less in accordance with ISO 11201.
 - iii. Waste collection, storage and pick-up requirements, including recycling and composting, and the following operational waste reduction targets:
 - 1. Divert 75% by weight of all non-hazardous operation waste, including 75% of plastic waste and 95% of paper materials; and
 - 2. Eliminate the use of unnecessary single-use plastics in operations, events and meetings.
- e) Work not completed as part of the Project, if any;

The Design Team must coordinate the dates of the training session(s) with the DR to organize the location and provide the lists of participants. Prepare a summary of each training session, indicate the session dates,

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subject matter and participants in attendance. Once training is completed, submit the training summary to the DR.

17.3 Manuals

The Design Team must:

- a) Review and validate the CM's sub-contractor 100% operations and maintenance manuals to confirm completeness and submit comments to the PWGSC Commissioning Manager. Manuals must be in accordance with all modifications undertaken during the Project. O & M manuals must include:
 - i. Workplace Hazardous Materials Information System (WHMIS) information, as a separate volume, containing all information relating to products used in building operations and maintenance. This manual is to be subdivided by supplier then by product, with detailed index;
 - ii. Inventory of spare parts, special tools, maintenance materials with instructions for use; and
 - iii. Warranty information by supplier;
- b) Review and validate the content of the CM's commissioning manual to confirm all commissioning activities (e.g., training, testing) are included and that as-commissioned results and necessary revisions are detailed;
- c) Prepare Standard Operating Procedures (SOPs) per building system in accordance with relevant codes, standards and the [PWGSC Commissioning Policy](#). Include separate Site-specific SOPs for halocarbon containing equipment. Validate content with the CM and DR. Refined SOPs during the seasonal commissioning period to reflect as-commissioned components and systems;
- d) Prepare all information required for equipment labelling protocols;
- e) Make the revisions to commissioning documentation to reflect all changes, modifications, revisions and adjustments as finally determined upon the completion of the commissioning process; and
- f) Update the design intent brief, SDB, AVDB, and ITDB to reflect seasonal commissioning adjustments. Update the rationale for all sustainable features and strategies for revisions during post-construction, the post-construction LCCA and energy Model, and their resulting implications for building performance and TSTS occupants (i.e., what are the changes for occupants), lessons learned to date, and final sustainability certification awarded.

17.4 Benefit Register and Benefit Plan

The Design Team must:

- a) Validate, and if necessary, update the Baseline benefits register and benefits plan with the input of the CM and DR, which includes and compares current benefit status/projection(s) with 100% SD Baseline information / targets and metrics on preferred SD design option; and
- b) Describe all rationale for any change(s) to the Baseline benefits and metrics for measurement.

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17.5 Deliverables

The Design Team must provide and submit to the DR:

- a) Performance verification reports and compile Model updates for all seasonal commissioning activities to create a final as-built Model of the built work;
- b) Training reports for all training sessions, after each session;
- c) A final Cost account of all DPs with changes/adjustments;
- d) A final benefit register and benefit plan at or just before handover to Canada;
- e) Final, as-commissioned energy Model, LCA, and LCCA at or just before handover to Canada;
- f) Verification that the CM O&M manuals are complete and accepted before the start of CM-led training;
- g) Standard Operating Procedures for each building system at or just before handover to Canada;
- h) Green building (sustainability) certificates;
- i) Final design intent brief, SDB, AVDB, and ITDB at or just before handover to Canada;
- j) Post-construction evaluation and lessons learned reports; and
- k) Monthly reporting of Design Team resources progress percentage complete against each WBS element, integrated with the Consultant's monthly schedule submission.

18. INDIGENOUS PARTICIPATION PLAN

The Consultant:

- a) Must develop a refined Indigenous participation plan (IPP), which is sufficiently detailed to assess the quality and value of the participation proposed as well as the probability of meeting the IPP objectives, based upon the IPP commitments made in the Consultant's solicitation proposal for this Contract. Include:
 - i. A summary of all measures the Consultant will take to apply the necessary effort to provide participation in an equitable manner;
 - ii. The process(es) and methodology(ies) to apply, wherever possible, an equal percentage of participation among available regional Indigenous entities as identified in the Consultant's solicitation proposal or broader national Indigenous participation;
 - iii. When equal regional participation are not feasible, the process(es) and methodology(ies) and supporting records of correspondence and proposals with Indigenous entities. For example, the Indigenous current capacity is lower than expected but the Consultant will work throughout the Contract period to assist Indigenous entities in building capacity for the respective Nation;
 - iv. The following four subsections:
 - 1. Human resources, indicating how:
 - a) The Consultant or its Subconsultant(s) and Specialty Consultant(s) intend to

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- maximize the use of Indigenous employment;
 - b) Employment of Indigenous people will be managed, including:
 - i. Details on the work to be carried out for each position proposed to be filled by an Indigenous person;
 - ii. Strategies for recruitment of Indigenous persons;
 - iii. Strategies for retention of Indigenous persons;
 - iv. Succession planning; and
 - v. Staff management;
 - c) In addition to standard workplace requirements for members of the Design Team, identify Indigenous candidates for managerial positions or other roles such as project managers/officers, supply chain managers/officers, procurement managers/officers, business managers/officers, support staff, etc.;
2. Skills development, indicating how:
- a) The Consultant or its Subconsultant(s) and Specialty Consultant(s) intend to maximize the training and skills development of Indigenous persons, including the use of:
 - i. Apprenticeship programs;
 - ii. Pre-professional programs;
 - iii. Post-secondary programs;
 - iv. On the job training; and
 - v. In-house training programs; and
 - b) Training of Indigenous people will be managed, including the complexities of a trainee's academic schedule if applicable, the cultural cycles of Indigenous life, the capacity of Consultant's staff to oversee, Monitor, support and coordinate trainees, and the availability of training facilities;
3. Indigenous business, indicating how the Consultant or its Subconsultant(s) and Specialty Consultant(s) intend to:
- a) Maximize the use of Indigenous firms in various design-related fields, including:
 - i. Identification of Indigenous firms to complete specific parts of the design work along with a preliminary statement of work, as well as the employment hours and dollar value of the said work, including Indigenous sub-contractors and suppliers and sub-sub-contractors and sub-sub suppliers;
 - ii. How business with Indigenous firms will be managed from developing sources of supply to administration; and
 - iii. Detail any development of new sources of supply, or new capabilities; and
 - b) Work with outside organizations that have experience or mandates in various aspects of contracting with Indigenous people or firms such as, but are not limited to:

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- i. Indigenous organizations;
 - ii. Crown-Indigenous Relations and Northern Affairs Canada; and
 - iii. Indigenous Services Canada Employment and Social Development Canada;
- c) Based on previous engagement(s), substantiate the organizational experience or a mandate related to contracting with Indigenous people or firms; and
- d) Ask the DR for assistance, and when, to identify Indigenous firms and relevant information regarding the goods and services they could provide;
- 4. Innovative approaches and other measures that the Consultant considers relevant to produce Indigenous participation that are not identified above, which could include but are not limited to:
 - b) Specialized training or programs necessary for on-Site employment;
 - c) Other activities related to but not specifically identified in the preliminary statement of work;
 - d) Participation in career events such as high school visits and career presentations;
 - e) Community outreach projects to create a positive image;
 - f) Other approaches that could stimulate economic development of Indigenous communities and contribute to capacity building for Indigenous businesses and peoples; and
 - g) Scholarships, bursaries, and community outreach to encourage Indigenous youth to enter into design or construction fields.
- b) May consider amending the IPP at any time during the Contract to increase participation along with the rationale for the amendment. The amendment rationale must include all relevant details of the change and the increase in participation. The DR and Contracting Authority will not accept a proposed change that reduces the quality or quantity of Indigenous participation. The DR and Contracting Authority will provide comments on or agreement of the proposed IPP amendment within 10 Working Days of receipt of the proposed amendment. PWGSC has no obligation to accept an IPP amendment regardless of its content or justification.

c) Indigenous Participation Plan Obligations

The Consultant must provide the following Indigenous Benefits:

(Table to be completed by Contracting Authority prior to contract award)

Indigenous Participation Plan Obligations	Minimum Commitment
Skills Development	\$
Human Resources	\$
Business Plan	\$
Innovative Approaches and Other Measures	\$
Total	\$

PROJECT BRIEF APPENDICES

APPENDIX A—GUIDE TO PREPARATION OF CONSTRUCTION DOCUMENTS

1. Purpose

This document provides direction for the Design Team in the preparation of DPs (i.e., Specifications, Drawings, and addenda) for PWGSC projects. The Design Team must incorporate Project Brief Appendix A information in this in preparing DPs.

Drawings, Specifications, and addenda are to be complete and clear, so that a Contractor can prepare a bid without guesswork. Standard practice for the preparation of DPs includes:

- a) Drawings, which are the graphic means of showing work to be done, as they depict shape, dimension, location, quantity of materials and relationship between building components; and
- b) Specifications, which are written descriptions of materials and construction processes in relation to quality, colour, pattern, performance and characteristics of materials, installation and quality of work requirements.

2. Principles of DPs for the Contract

Base DPs on common public procurement principles: open, fair and transparent solicitations.

3. Quality Assurance

The Design Team must undertake their own quality control process and will review, correct and coordinate (between disciplines) their documents before sending them to the CM.

4. Specifications

4.1 National Master Specification

The NMS is a bilingual system of master construction Specification sections, which is divided into 48 Divisions and used for a wide range of construction and/or renovation projects. In preparing Project Specifications, the Design Team must use the current edition of the NMS in accordance with the NMS “User’s Guide” and format requirements stipulated.

The Design Team retains overriding responsibility for content and must edit, amend and supplement the NMS as deemed necessary to produce an appropriate Project Specification free from conflict and ambiguity.

4.2 Specification Organization

Narrow scope sections describing single units of work are preferred for more complex Work; however, broad scope sections may be more suitable for less complex work. Either the NMS 1/3–2/3-page format or the Construction Specifications Canada full-page format can be utilized.

Start each section on a new page and show Project number, section title, six-digit section number and page number on each page. Specification date and Design Team discipline’s name are not to be indicated.

4.3 Terminology

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Use the term CM instead of Engineer, PWGSC, Owner, Consultant or Architect. CM means the entity designated in the Project construction contract, and/or subcontract, or by written notice to the Contractor and/or subcontractor, to act as the representative for the purposes of the Project construction contract, and includes a person, designated and authorized in writing by the representative to the Contractor.

Notations such as; "verify on site", "as instructed", "to match existing", "example", "equal to" or "equivalent to", "to be determined on site by the CM", must not be indicated in the Specifications as this promotes inaccurate and inflated bids. Specifications must permit bidders to calculate all quantities and bid accurately. If quantities are impossible to identify (i.e., cracks to be repaired) give an estimated quantity for bid purposes (unit prices). Confirm that the terminology used throughout the Specifications is consistent and does not contradict the applicable standard DPs.

4.4 Dimensions

Dimensions must be in metric only. Dual dimensioning is forbidden.

4.5 Standards

As references in the NMS may not be the most current, it is the responsibility of the Design Team to confirm that Project Specification use the latest applicable edition. The following is a list of Internet websites, which provides the most current publications of standards for reference in the construction Specification document.

- a) CSA standards: <http://www.csa.ca>;
- b) CGSB standards: <http://www.pwgsc.gc.ca/cgsb>;
- c) ANSI standards: <http://www.ansi.org>;
- d) ASTM standards: <http://www.astm.org>;
- e) ULC standards: <http://www.ulc.ca>; and
- f) General reference of standards: <http://www.techstreet.com>;

For the website addresses of other standards organizations and manufacturers associations, refer to the [Canadian National Master Construction Specification \(NMS\) \(http://www.nrc-cnrc.gc.ca/eng/solutions/advisory/nms_index.html\)](http://www.nrc-cnrc.gc.ca/eng/solutions/advisory/nms_index.html).

4.6 Specifying Materials

The practice of specifying actual brand names, model numbers, etc., is against PWGSC policy except for special circumstances. The method of specifying materials must be by using recognized standards such as those produced by Canadian Gas Association (CGA), Canadian General Standards Board (CGSB), CSA, and Underwriters' Laboratories of Canada (ULC), or by trade associations such as Canadian Roofing Contractors' Association (CRCA) and Terrazzo, Tile, Marble Association of Canada (TTMAC). Canadian standards must be used wherever possible.

If the above method cannot be used and where no standards exist, specify by a non-restrictive, non-trade name prescription or performance-type Specifications.

If no standards exist and when a suitable non-restrictive, non-trade name prescription or performance-type Specification cannot be developed, specify by trade name. Include all known materials acceptable for the purpose intended, and in the case of equipment, identify by type and model number.

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Acceptable Materials: set up the paragraph format as follows:

Acceptable Materials:

1. ABC Co. Model [_____].
2. DEF Co. Model [_____].
3. GHI Co. Model [_____].

The Design Team is responsible to review and evaluate all requests for approval of alternative materials.

The term “Acceptable Manufacturers” must not be used, as this restricts competition and does not ensure the actual material or product will be acceptable. A list of words and phrases that should be avoided is included in the NMS “User's Guide”.

Sole Sourcing: Sole sourcing for materials and work can be used for proprietary systems (i.e. fire alarm systems, EMCS systems).

Wording for the sole source of work must be in Part 1 as:

“Designated Contractor

- .1 Hire the services of [_____] to do the work of this section.”;

Wording for the sole source of EMCS systems must be in Part 1 as

“Designated Contractor

- .1 Hire the services of [_____] or its authorized representative to complete the work of all EMCS sections.”;

And in Part 2 as “Materials

- .1 There is an existing [_____] system presently installed in the building. All materials will be selected to confirm compatibility with the existing [_____] system.

Wording for the sole source of materials (i.e. fire alarm systems) should be in Part 2 as:

“Acceptable materials

- .1 The only acceptable materials are [_____].”

Prior to including sole source materials and/or work, the Design Team must contact the DR to obtain the approval in writing for the sole sourcing.

4.7 Unit Prices

Unit prices are used only for unknown work (i.e. rock removal) and the approval of the DR and the CM will be sought in advance of their use.

Use the following wording:

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[The work for this section] or [defines the specific work if required, e.g. rock excavation] will be paid based on the actual quantities measured on-Site and the unit prices stated in the CM's "Bid and Acceptance Form", or equivalent document.

Replace paragraph title "Measurement for Payment" with "Unit Prices".

Sample of Unit Price Table:

The unit price table designates the work to which a unit price arrangement applies.

- a) The "Price per Unit" and the "Estimated Total Price" must be entered for each item listed; and
- b) Work included in each item is as described in the referenced Specification section.

Item	Specification Reference	Class of Labour, Plant, or Material	Unit of Measurement	Estimated Quantity	Price per Unit HST extra	Estimated Total Price HST extra
TOTAL ESTIMATED AMOUNT <i>(Transfer amount to CM's bid and accept form)</i>						

4.8 Cash Allowances

DPs must be complete and contain all the requirements for the contractual Work. Cash allowances are to be used only under exceptional circumstances (i.e. utility companies; municipalities), where no other method of specifying is appropriate. The DR's approval must be obtained in advance to incorporate cash allowances and the section of the NMS will be used to specify the criteria.

4.9 Warranties

This Project will require a minimum 12-month warranty period. When necessary to extend beyond the 12-month warranty period provided for in the General Conditions of the Contract, use the following wording in Part 1 of the applicable technical sections, under the heading "Extended Warranty":

- a) "For the work of this Section [____], the 12-month warranty period is extended to xx months"; or
- b) Where the extended warranty is intended to apply to a particular part of a Specification section modify the above as follows: "For [____] the 12-month ... [____] months."

Delete all references to manufacturer's guarantees.

4.10 Scope of Work

Paragraphs must not include statements such as "Scope of Work".

4.11 Summary and Section Includes in Part-1 of Section

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Delete paragraphs identified as “Summary” and/or “Section Includes”.

4.12 Related Sections

In every section of the Specification at 1.1 “Related Sections”, coordinate the list of related Specification sub-sections and appendices. Confirm coordination among the Specification sub-sections and confirm not to reference any section or appendices that do not exist.

4.13 Index

List all the Drawings and Specification sections with correct number of pages and correct Drawing titles and section names. The format must be that presented in Project Brief Appendix A, Attachment B–Sample Index for Drawings and Specifications.

4.14 Division 1 Specifications

The scope and content of the Division 1 Specifications must be assessed by and agreed to between the Design Team and the CM, to the approval of the DR. Common sections that apply to the entire Specification will be prepared by the Design Team, such as environmental, sustainability, and commissioning Specifications. Other sections such as health and safety, work restrictions, etc. will be prepared by the CM.

The CM will combine the Design Team’s and CM’s Specifications to create a common ‘front-end’ document for the CM’s tendering of the work.

4.15 Health and Safety

For all Project Specifications include NMS “Section 01 35 29.06–Health and Safety Requirements.” Confirm with the CM to determine if there are any instructions to meet specific Project requirements.

4.16 Designated Substances Report

Include Section 01 14 25–Designated Substances Report

4.17 Subsurface Investigation Reports

If required, subsurface investigation report(s) shall be included after Section 31, and the following paragraph added to Section 31:

Subsurface Investigation Report(s)

- .1 Subsurface investigation report(s) are included in the specification following this section.

If the Departmental Representative determines that it is not practical to include the subsurface investigation report(s), alternate instructions will be provided. Where tender documents are to be issued in both official languages, the subsurface investigation report(s) must be issued in both languages. In addition to providing the subsurface investigation report(s), the foundation information required by the current *National Building Code of Canada* (Division C, Part 2, 2.2.4.6) must be included on foundation drawings.

4.18 Experience and Qualifications

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Remove experience and qualification requirements from Specification sections.

4.19 Prequalification

Do not include in the Specification any mandatory supplier and/or subcontractor prequalification requirements that could become a subcontract award condition. A prequalification process is required prior to tender of all specialty and major tenders.

There must be no references to certificates, transcripts or license numbers of a trade or subcontractor being included with the bid information.

4.20 Contracting Issues

Specifications describe the workmanship and quality of the work. Contracting issues must not appear in the Specifications. Division 00 of the NMS is not used for PWGSC projects.

Remove all references to the following:

- a) General instructions to bidders;
- b) General conditions;
- c) CCDC documents;
- d) Priority of documents;
- e) Security clauses;
- f) Terms of payment or holdback;
- g) Tendering process;
- h) Bonding requirements;
- i) Insurance requirements;
- j) Alternative and separate pricing;
- k) Site visit (Mandatory or Optional); and
- l) Release of Lien and deficiency holdbacks.

4.21 Quality Issues

Confirm that there are no Specification clauses with square brackets “[]” or lines “_____” indicating that the spec is incomplete or missing information.

5. Drawings

5.1 Title Blocks

Use PWGSC title block for Drawings and sketches (including addenda).

5.2 Dimensions

Dimensions are to be in metric only (no dual dimensioning).

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5.3 Trade Names

Trade names on Drawings are not acceptable.

5.4 Specification Notes

No Specification-type notes are to appear on any Drawing.

5.5 Terminology

Use the term CM instead of Engineer, PWGSC, Owner, Consultant, or Architect. CM means the entity designated in the Project construction contract, and/or subcontract, or by written notice to the Contractor and/or subcontractor, to act as the representative for the purposes of the Project construction contract, and includes a person, designated, and authorized in writing by the representative to the Contractor.

Notations such as: "verify on site", "as instructed", "to match existing", "example", "equal to" or "equivalent to", "to be determined on site by the CM", must not be indicated on the Drawings as this promotes inaccurate and inflated bids. Drawings must permit bidders to calculate all quantities and bid accurately.

5.6 North Arrow

Include a north arrow on all plans. Orient all plans in the same direction for easy cross-referencing. Wherever possible, lay out plans so that the north point is at the top of the sheet.

5.7 Information to be included

Drawings must show the quantity and configuration of the Project work, the dimensions and details of how it is constructed. There must be no references to future work nor information that will be changed by a future addendum. The scope of work must be clearly detailed and elements not in the scope of the DP should be eliminated or kept to an absolute minimum.

6. Addenda

6.1 Format

Refer to Project Brief Appendix A, Attachment C—Sample Addendum Format. No signature-type information is to appear.

Every page of the addendum (including attachments) must be numbered consecutively. All pages must have the Project number and the appropriate addendum number. Sketches are to appear in the PWGSC format, stamped and signed.

No Design Team design discipline information (name, address, phone number, consultant project number, etc.) must appear in the addendum or its attachments (except on sketches).

6.2 Content

Each item must refer to an existing paragraph of the Specification or note/detail on the Drawings. The clarification-style of note is not acceptable.

7. Documentation

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7.1 Translation

When required, all documentation included in the DP must be in both official languages. Obtain clarification of translation requirements from the Departmental Representative at the beginning of DP production. If required, confirm that English and French documents are equal in all respects. There can be no statement that one version takes precedence over the other.

The Design Team must provide:

- a) Per DP submission, a completed and signed Project Brief Appendix A, Attachment A–Checklist for the submission of Construction Documents;
- b) Specification: provide originals printed one side on 216 mm x 280 mm white bond paper, or in an acceptable format for mass printing;
- c) Index: in accordance with Project Brief Appendix A, Attachment B–Sample Index for Drawings and Specifications;
- d) Addenda (if required): in accordance with Project Brief Appendix A, Attachment C–Sample Addendum Format, for issue by the CM;
- e) Drawings: reproducible originals, sealed and signed by the Design Team’ design authority; and
- f) Tender information:
- g) Provide a description of all units and estimated quantities to be included in unit price table(s); and
 - i. Design Team must provide an electronic true copy of the final documents (Specifications and Drawings) on one or multiple CD-ROM in PDF without password protection and printing restrictions, or as agreed by the CM and DR. The electronic copy of Drawings and Specifications is for bidding purposes only and do not require to be signed and sealed.

The CM will provide:

- a) General and special instructions to bidders;
- b) Bid and acceptance form, or equivalent; and
- c) Construction documents.

8. Project Brief (PB) Appendix A–Attachments

PB Appendix A, Attachment A–Checklist for the submission of Construction Documents;
PB Appendix A, Attachment B–Sample Index for Drawings and Specifications; and
PB Appendix A, Attachment C–Sample Addendum Format.

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PB Appendix A: Attachment A:

Checklist for the Submission of Construction Documents

Date:		
Project Title:	Project Location:	
Project Number:	Departmental Representative:	
Design Team consultant's Name:	CM Representative:	
Design Package Review Stage:		
50%	90%	100%

Item	Verified by:	Comments
Specifications:		
1 Current edition of the NMS has been used.		
2a Either the NMS 1/3–2/3-page format or the Construction Specifications Canada full-page format is used.		
2b Each section starts on a new page and the project number, section title, section number and page number show on each page.		
2c Specification date and consultant's name are not indicated.		
3a Term CM is used instead of Engineer, PWGSC, Owner, Consultant or Architect.		
3b Notations such as: "verify on site", "as instructed", "to match existing", "example", "equal to", "equivalent to" and "to be determined on site by" are not used.		
4 Dimensions are provided in metric only.		
5 The latest edition of all references quoted is used.		
6a Method of specifying materials uses recognized standards. Actual brand names and model numbers are not specified.		
6b Identify if non-restrictive, non-trade name "prescription" or "performance" Specifications are used.		
6c Indicate if a list of acceptable materials has been used.		
6d Term "Acceptable Manufacturers" is not used.		
6e Indicate if sole sourcing has been used.		
7 Unit prices are used only for unknown Work.		

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8 Indicate if cash allowances have been used.		
9a Indicate if warranties extend more than 24 months. If so, indicate the extended duration.		
9b Manufacturers guarantees are not indicated.		
10 No paragraphs noted as “Scope of Work” are included.		
11 In part 1 of section, paragraphs “Summary” and “Section Includes” are not used.		
12 List of related sections and appendices are coordinated.		
13 The index shows a complete list of Drawings and Specification sections with the correct number of pages and correct Drawing titles and section names.		
14 Section 01 00 10–General Instructions is included, if agreed by the CM.		
15 Section 01 35 29.06–Health and Safety Requirements is included.		
16 Section 01 14 25–Designated Substances Report is included, if agreed by the CM.		
17 Subsurface reports are included in Division 31.		
18 Experience and qualification requirements do not appear in the Specification sections		
19 There are no mandatory Contractor and/or subcontractor pre-qualification requirements or references to certificates, transcripts or license numbers of a trade or subcontractor being included in the bid.		
20a Contracting issues do not appear in the Specifications.		
20b Division 00 of the NMS is not used.		
21 There are no Specification clauses with square brackets “[]” or lines “___” indicating that the document is incomplete or missing information.		
Specification Quality Management Verification All previous submission review comments approved/provided by the DR are appropriately incorporated in the Specifications and responses to all comments send to the DR.		

Item	Verified by:	Comments
Drawings:		
1 PWGSC title block is used.		
2 Dimensions are provided in metric only.		
3 Trade names are not used.		
4 There is no Specification-type notes.		

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5 Term CM is used instead of Engineer, PWGSC, Owner, Consultant or Architect.		
6 Notations such as; “verify on site”, “as instructed”, “to match existing”, “example”, “equal to”, “equivalent to” and “to be determined on site by” are not used.		
7 Project quantity and configuration, dimensions and construction details are included.		
8 References to future work and elements not in contract do not appear or are kept to an absolute minimum and clearly marked.		
Drawings Quality Management Verification All previous submission review comments approved/provided by the DR are appropriately incorporated in the Specifications and responses to all comments send to the DR.		

I confirm that the Drawings and Specifications have been thoroughly reviewed and that the items listed above have been addressed or incorporated. I acknowledge and accept that by signing, I am certifying that all items noted above have been addressed.

Consultant’s Representative:

Firm name:

Signature:

Date:

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PB Appendix A: Attachment B:

Sample Index for Drawings and Specifications

Project No: _____

Index

Page 1 of ____

DRAWINGS AND SPECIFICATIONS

DRAWINGS:

SPEC NOTE: List all Drawings by number and title.

C-1	Civil
L-1	Landscaping
A-1	Architectural
S-1	Structural
M-1	Mechanical
E-1	Electrical

SPECIFICATIONS:

SPEC NOTE: List all divisions, sections (by number and title) and number of pages.

<u>DIVISION</u>	<u>SECTION</u>	<u>NO. OF PAGES</u>
DIVISION 01	01 00 10–General Requirements.....XX
	01 14 25–Designated Substances Report.....XX
	01 35 30–Health and Safety.....XX
DIVISION 23	23 xx xx	
DIVISION 26	26 xx xx	

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PB Appendix A: Attachment C:

Sample Addendum Format

ADDENDUM No. ____

Project Number: _____

The following changes in the bid documents are effective immediately. This addendum will form part of the DPs

DRAWINGS

SPEC NOTE: indicate Drawing number and title, then list changes or indicate revision number and date, and re-issue Drawing with addendum.

- 1 A1 Architectural

SPECIFICATIONS

SPEC NOTE: indicate section number and title.

- 1 Section 01 00 10–General Requirements

SPEC NOTE: list all changes (i.e. delete, add or change) by article or paragraph

- .1 Delete article (xx) entirely.
- .2 Refer to paragraph (xx.x) and change ...

- 2 Section 23 05 00–Common Work Results–Mechanical

- .1 Add new article (x) as follows:

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APPENDIX B–TERMS

The following terms and abbreviations are used in this document:

Baseline	The original plan and/or schedule approved by the DR (for Project, DP, or activity), plus or minus approved scope changes.
Building Information Modelling (or Modelling,)	The process and technology used to create Models.
Building Information Model Execution Plan (BXP)	A document developed collaboratively by the Project Team to establish standardized procedures, conventions and guidelines with agreed targets for responsibility, timely delivery, exchange, and reuse of the Model.
Construction Manager, or Contractor	Means the person(s) or entity(ies) identified and authorized by the PWGSC to perform the construction management services and Construction Services for work under this Contract.
Contracting Authority	Means the individual delegated by the Minister of PWGSC to enter into contracts, amend the contracts and is responsible for all matters concerning and interpretation of the terms and conditions of the Contract. The delegated individual is responsible for the management of the Contract. Any changes to the Contract terms and conditions must be authorized in writing by the Contracting Authority.
Cost, or Contract Cost Principles	The principles used to determine reasonable direct and indirect costs related to the Contract, as defined at the following website: https://buyandsell.gc.ca/policy-and-guidelines/standard-acquisition-clauses-and-conditions-manual/3/1031-2/6
Cost and Time Consultant	The entity in contract with PWGSC engaged to provide independent Cost planning, estimating and Monitoring, as well as time planning, scheduling and Monitoring, and related quality assurance services directly to PWGSC.
Critical Activity	Any task/activity on a Critical Path.
Critical Path	A series of tasks/activities that determines the longest duration of the Project.
Critical Path Method	A network analysis technique used to predict Project duration by analyzing which sequence of activities (which path) has least amount of scheduling flexibility (least amount of Float).
Design Package	Project-specific Specifications and Drawings that include Models or Model Elements to define the part of the overall scope of the Project, that is specific to a limited number of trades or even one trade, and is prepared by the Consultant to acquire or construct one or more building element and/or to acquire and construct/install one or FF&E or Connectivity element.
Design Team	The combined forces of the Consultant, Sub-Consultant(s), and Specialist Consultant(s).
Drawings	The 2D Drawings generated from the Model and traditional 2D Drawings not generated from the Model.
Float	The amount of time that an activity may be delayed from its early start without delaying the Project finish date. Float is a mathematical calculation and can change as the Project progresses.

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FRAMEWORK	The joint venture consultant team retained by LC, legally known as FRAMEWORK FSTII Design Partners JV, who's membership includes Stantec Architecture Ltd, Stantec Consulting, Merrick & Company, Merrick Canada ULC, Dialog Ontario Inc, and Dialog Alberta Architecture Engineering Interior Design Planning Inc.
GEICs	Multiple entities contracted by PWGSC for this Project to provide geotechnical and environmental engineering services and industrial hygiene services.
Model	A digital representation of the physical and functional configuration, characteristics or attributes of the Project or a portion of the Project.
Model Element	Means a part of the Model representing a portion of the Project or a system or assembly within the Project or the Project Site(s) as well as data sets.
Monitoring	The capture, analysis, and reporting of Project performance, usually as compared to an original plan/Baseline.
National Master Specification	The standard framework used for writing construction Project Specifications for this Contract.
Network (Logic) Diagram	A schematic display of logical relationships of Project activities and is always drawn from left to right to reflect Project chronology.
Project	All Services and work required to fulfill the Services described in the Contract, including additional or incremental Services and work.
Project Management Support Services consultant	The entity contracted by PWGSC for project management support services for this Project.
Project Team	The combined private sector and government sector teams responsible for delivering the Project including the Design Team, the GEICs, the Project Management Support Services consultant, the Cost and Time Consultant, the Construction Manager, the Departmental Representative, and the TSTS occupant representatives.
Site, or Place of the Work	Means the designated location of the work identified in the Contract documents or by the Departmental Representative.
Specifications	Are that portion of the Design Package consisting the written technical requirements and standards for the Work of the Contract as prepared by the Consultant or Construction Manager, as applicable.
Working Day	Means a day other than a Saturday, Sunday, or a statutory holiday that is observed by the construction industry in the area of the Place of the Work.

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APPENDIX C–ACRONYMS

ACPDR	Advisory Committee on Planning, Design and Realty
ASHRAE	American Society of Heating, Refrigeration and Air-conditioning Engineers
ARC	Aerospace Research Centre
AV	Audio-Visual
BAS	Building Automation System
BMP	Building Management Plan
BXP	BIM Execution Plan
CADD	Computer-aided Design and Drafting
CATV	Cable Television
CBRN	Chemical-Biological-Radiological-Nuclear
CCTV	Closed-circuit Television
CDR	Construction, Renovation, and Demolition
CGA	Canadian Gas Association
CGSB	Canadian General Standards Board
CIQS	Canadian Institute of Quantity Surveyors
CM	Construction Manager
CMP	Contract Management Plan
CO ² e	Embodied Carbon Dioxide
COE	Center of Excellence, National
COHS	Canada Occupational Health and Safety Regulations
CPM	Critical Path Method
CRCA	Canadian Roofing Contractors Association
CSA	Canadian Standards Association
CSIS	Canadian Security Intelligence Service
CSO	Corporate Security Officer
DAS	Distributed Antenna Systems
DD	Design Development
DP	Design Package
DR	Departmental Representative
ECCC	Environment and Climate Change Canada
ECMP	Environnemental Compliance Management Program
EMCS	Electronic Monitoring and Control System
FC	Field Clarification
FF&E	Furniture, Fixtures and Equipment
FF&EM	Furniture, Fixtures and Equipment Matrix
FLUDA	Federal Land Use and Design Approval
GBR	Geotechnical Baseline Report
GDM	Geotechnical Design Memorandum
GDR	Geotechnical Design Report
GEICs	Geotechnical, Environmental and Industrial Hygiene Consultants
HVAC	Heating, Ventilation and Air Conditioning system
IAA	<i>Impact Assessment Act</i>
IFC	Industry Foundation Class

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I ² SL	International Institute of Sustainable Laboratories
IM/IT	Information Management/Information Technology
IPP	Indigenous Participation Plan
IPTV	Internet Protocol Television Distribution
IOT	Internet of Things
ISS	Integrated Security System
KPI	Key Performance Indicators
LC	Laboratories Canada
LCA	Life-Cycle Assessment
LCCA	Life Cycle Cost Analysis, or Life Cycle Costing
LVA	Laboratory Ventilation Assessment
MEPF	Mechanical, Electrical, Plumbing, Fire Protection
NBCC	National Building Code of Canada 2020
NCC	National Capital Commission
NCR	National Capital Region
NFCC	National Fire Code of Canada
NMS	National Master Specification
NRC	National Research Council of Canada
OFC	Operational and Functional Component
OPR	Owners Project Requirements
OWS	Operator Work Station
P&TS	Professional and Technical Services
PCM	Phase Contrast Microscopy
PDF	Portable Document Format
PLM	Polarized Light Microscopy
PMSS	Project Management Support Services
PMT	Project Management Team
PAVR	Preliminary Audio-Visual Requirements
PIEVC	Public Infrastructure Engineering Vulnerability Committee
PITR	Preliminary Information Technology Requirements
PSR	Preliminary Security Requirements
PWGSC	Public Works and Government Services Canada
RACI	Responsible, Accountable, Consulted, Informed
RLDF	Repeatable Laboratory Design Framework
RFI	Request for Information
RPS	Real Property Services
RS	Required Services
SD	Schematic Design
SLS	Serviceability Limit State
SMPL	Structures and Materials Performance Laboratory
SOA	Science Office Accommodation
SOP	Standard Operating Procedures
SOS	Statement of Sensitivity
SPC	Speech Privacy Class
SSC	Shared Services Canada
SSR	Security Space Requirements
STC	Speech Transmission Class

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TEM	Transmission Electron Microscopy
TEMPEST	Transient Electromagnetic Pulse Emanation Standard
ToR	Terms of Reference
TR	Telecommunications Rooms
TRA	Threat and Risk Assessment
TSB	Transportation Safety Board of Canada
TSSA	Technical Standards and Safety Authority
TSTS	Transportation Safety and Technology Science
TTMAC	Terrazzo, Tile, Marble Association of Canada
ULC	Underwriters Laboratories of Canada
ULS	Ultimate Limit State
UPS	Uninterrupted Power Supply
VE	Value Engineering
WBS	Work Breakdown Structure
WHMIS	Workplace Hazardous Materials Information System
WIFI	Wireless Internet

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APPENDIX D—PROCESS MAPS

The following process maps depict the general workflow and Project Team members involved with subject in question. Time periods indicated show activity duration.

Process maps applicable to the Contract include:

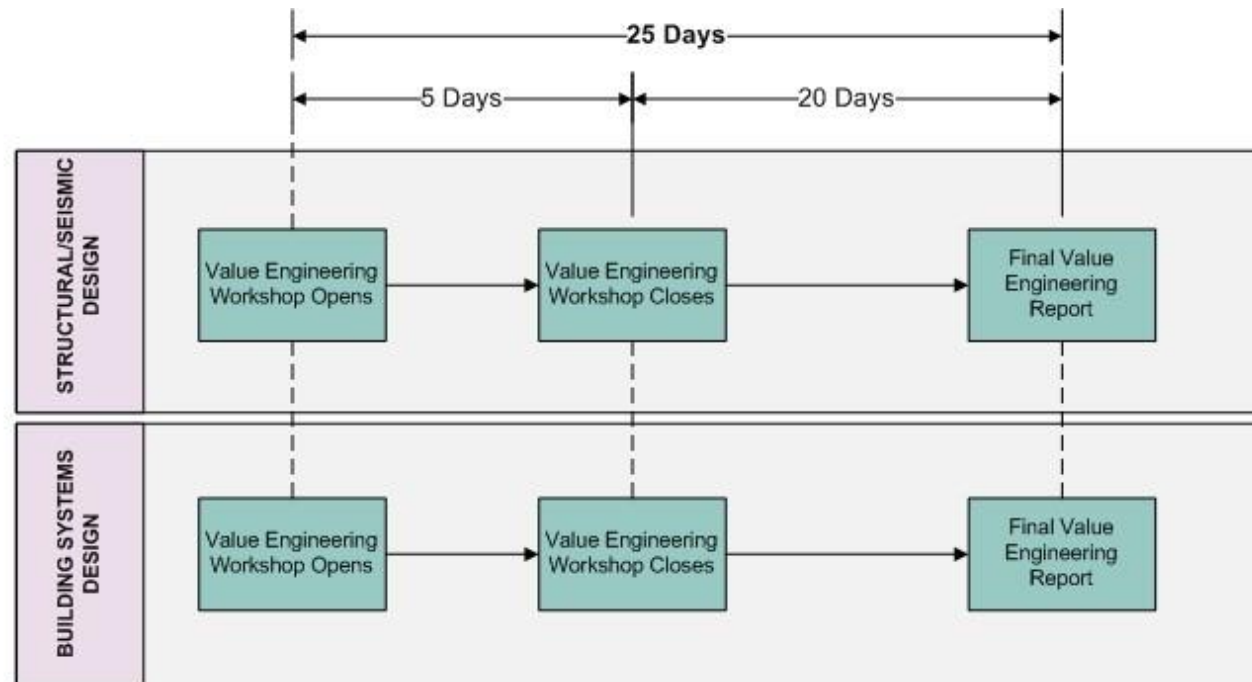
- a) Value engineering;
- b) SD, DD, DP submissions;
- c) NCC approval and LC presentations;
- d) Construction submittals;
- e) Request for Information (RFI),
- f) Field clarification (FC) and supplementary instruction (SI); and
- g) Expenditure authority (EA) for CM Subcontract changes;

Refer to the DR for clarification or refinement of any individual workflow process.

The DR may redefine existing and add new workflow processes.

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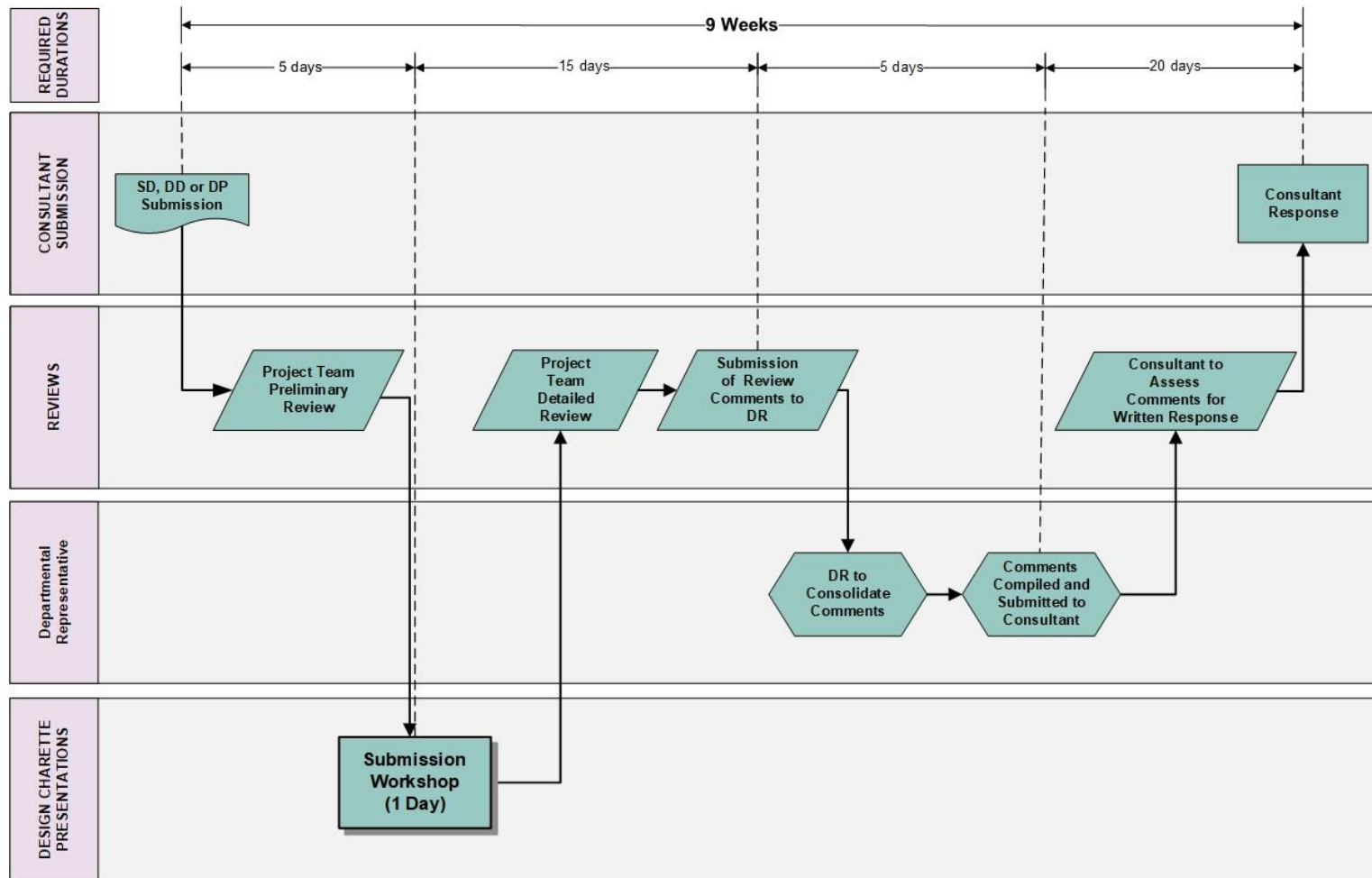
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VALUE ENGINEERING WORKSHOP PROCESS

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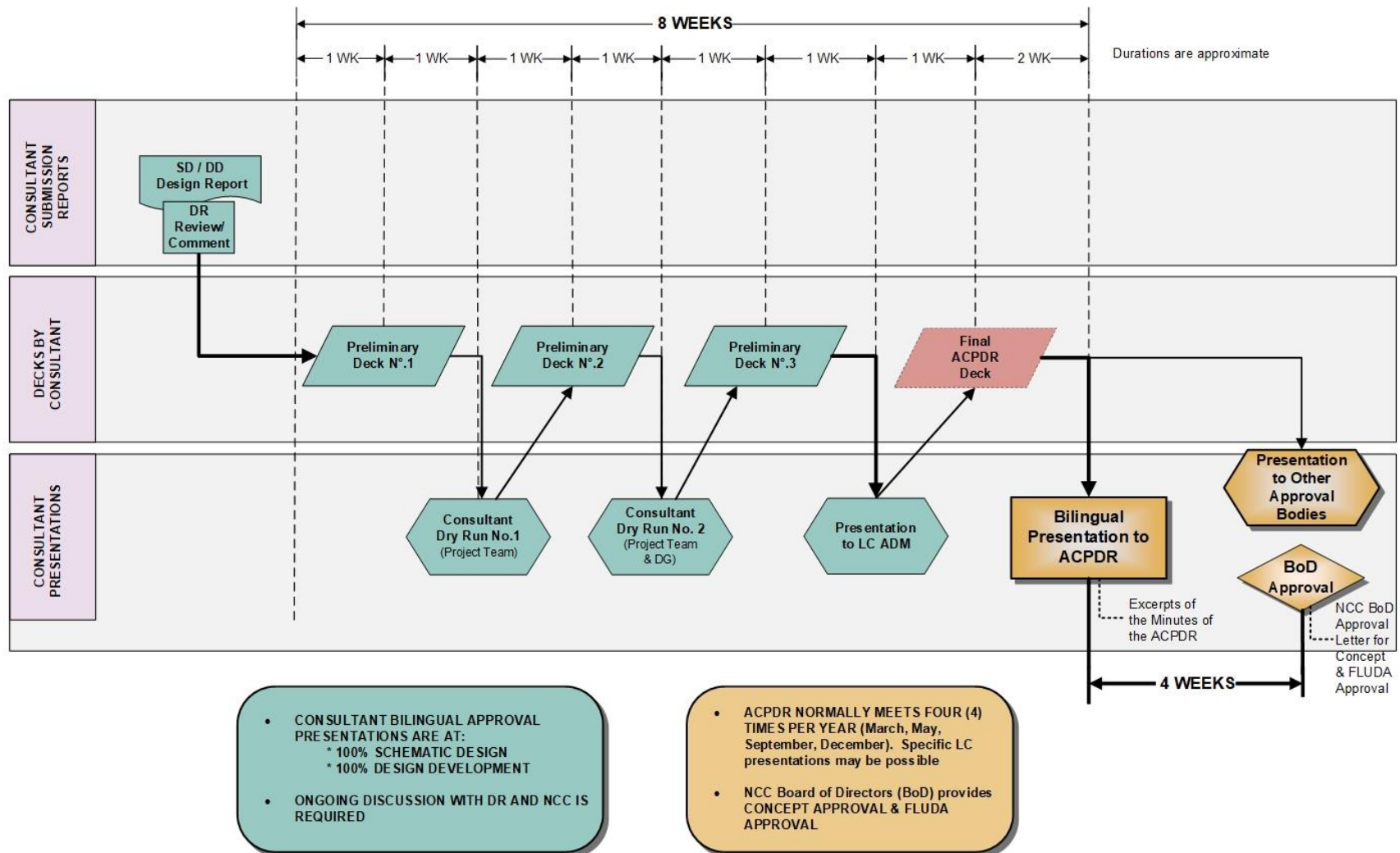


SD, DD and DP REVIEW PROCESS

Repeat for all submissions
SD and DD: 50% and 90%
DPs: 50% and 90%

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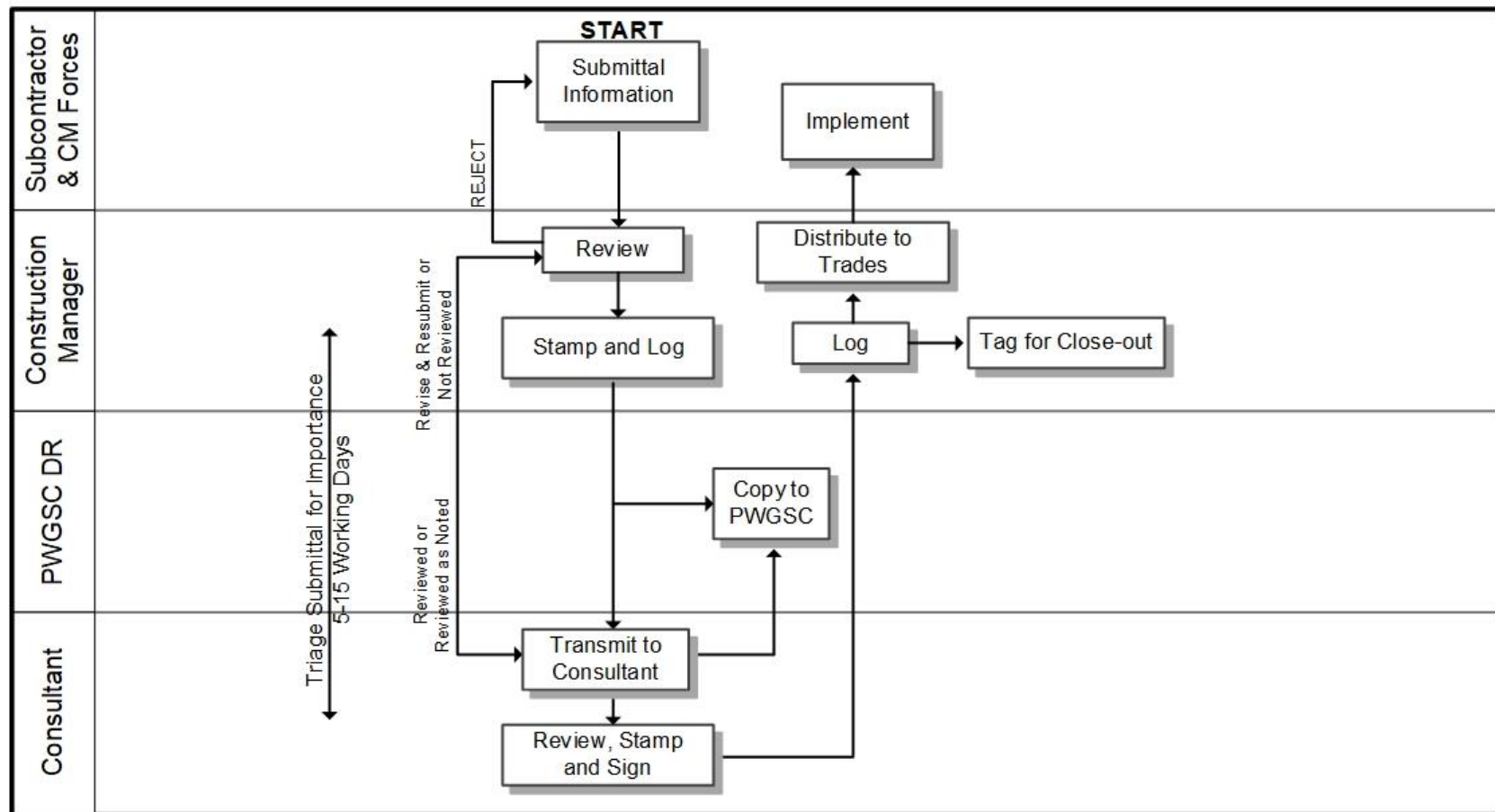


APPROVAL PRESENTATION PROCESS MAP

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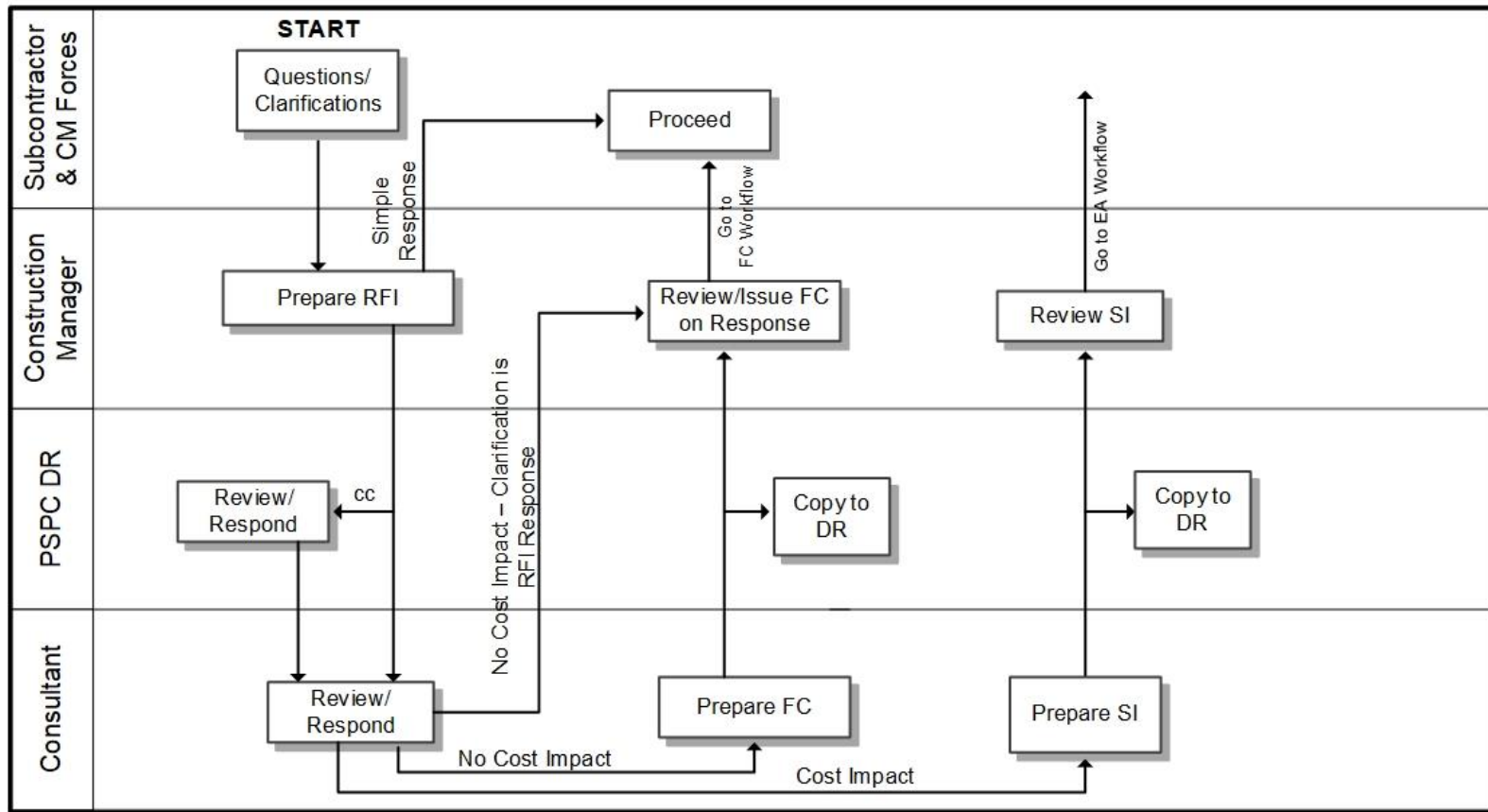
CONSTRUCTION SUBMITTALS FLOWCHART



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RFI WORKFLOW

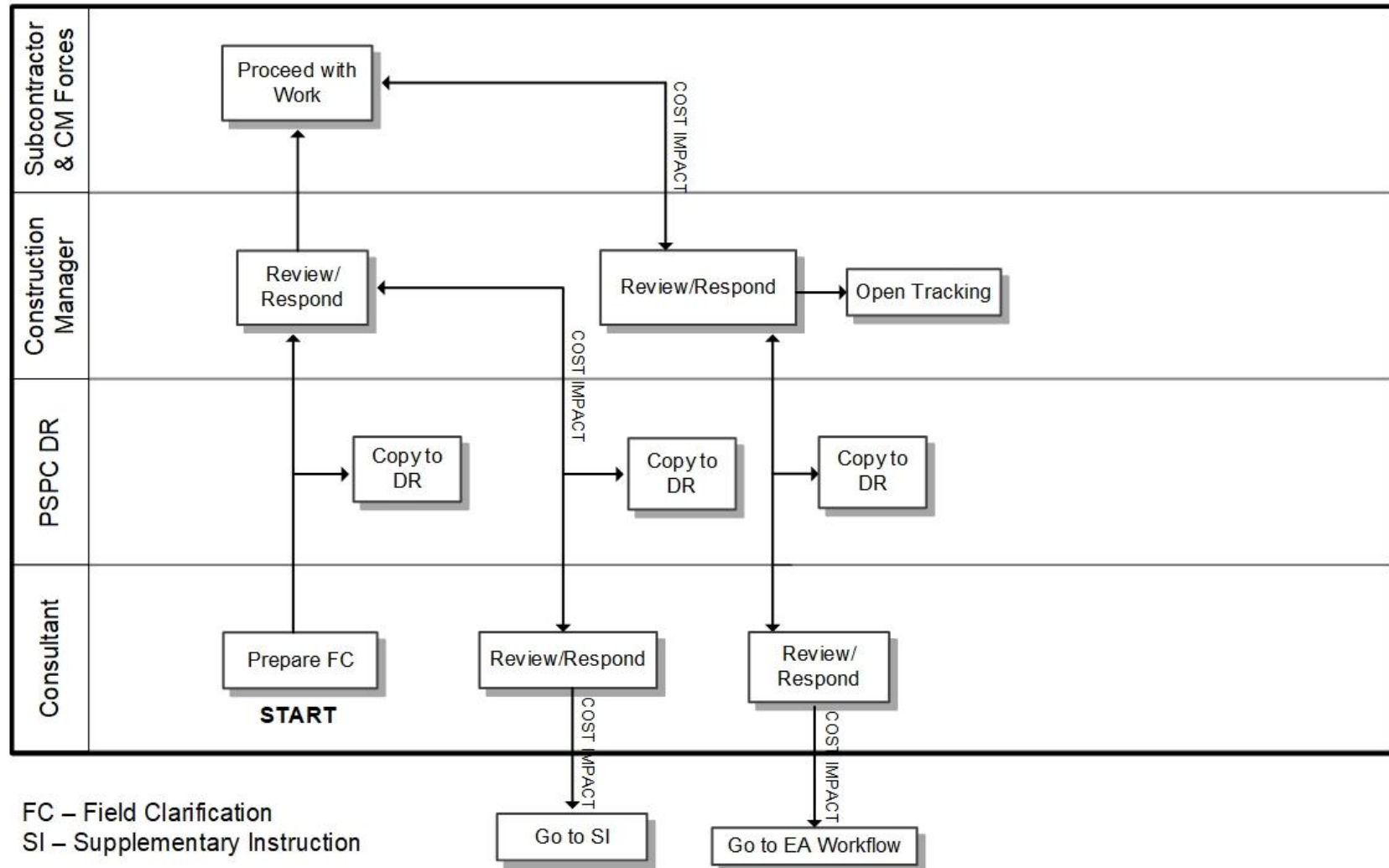


RFI – Request for Information
 FC – Field Clarification
 SI – Supplementary Instruction

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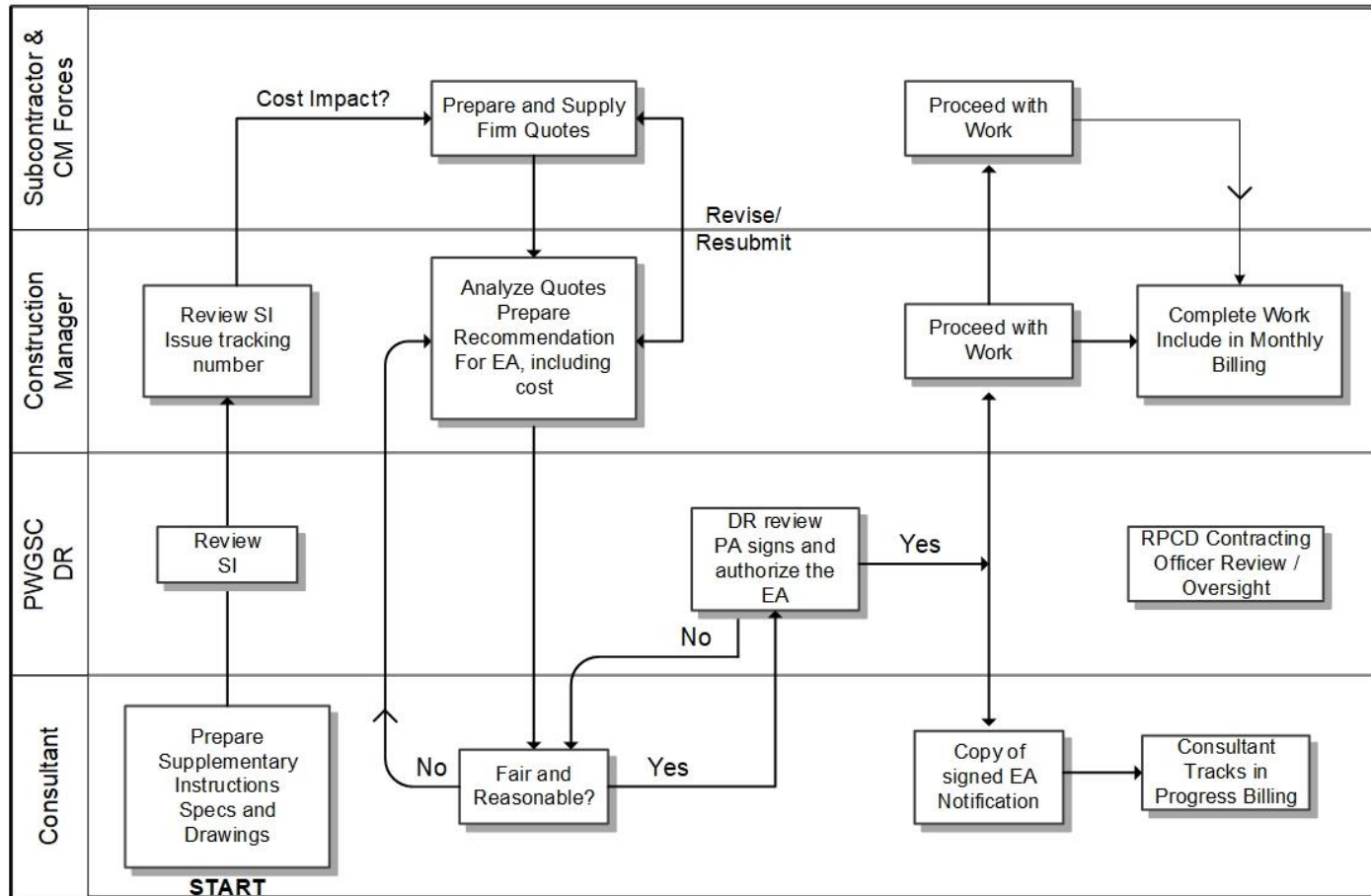
FC-SI WORKFLOW



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CM SUBCONTRACTOR EXPENDITURE AUTHORITY (EA) WORKFLOW

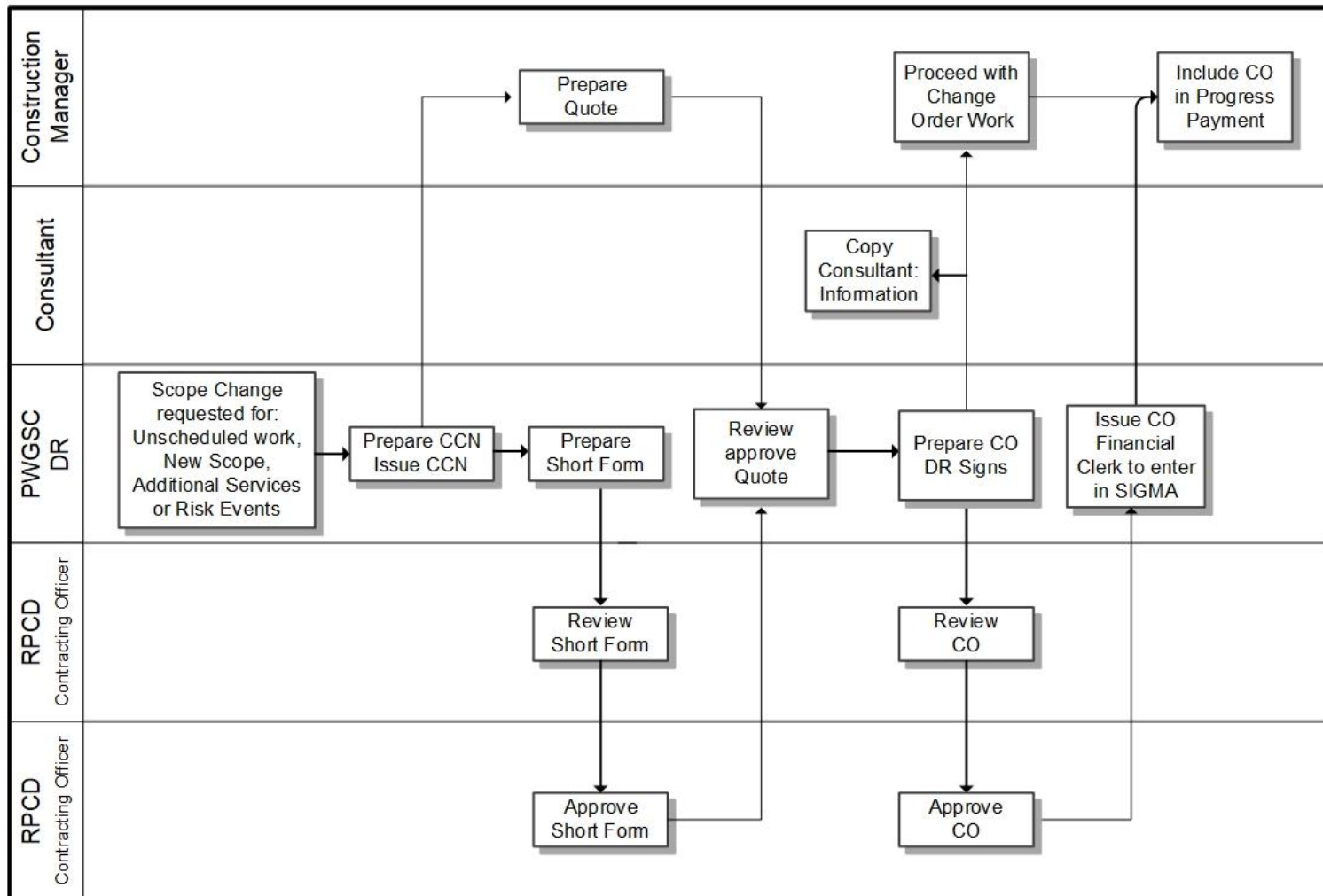


SI – Supplementary Instruction
 TP – Tender Package
 DR – Departmental Representative
 PA – Project Authority

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CHANGE TO CM CONTRACT



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APPENDIX E–FF&E COMPONENT WBS DICTIONARY

The following breakdown defines the categories and various elements that comprise FF&E components.

a) Custom Furniture:

- i. Lighting: This element refers to the lighting fixtures (lamps) for general, accent or task lighting. Such lighting elements may include lamps for desks, floors and tables, including lamps for TSTS occupant executives. It excludes fixed lighting that is associated with the base building;
- ii. Seating: This element refers to seating whether it is upholstered or un-upholstered, task or guest seating, occasional seating, soft seating in the form of chairs, loveseats or sofas, with or without arms;
- iii. Specialty: This element refers to specialty furniture which are unique, one-of-a-kind items that cannot be classified under any other category. These items are often utilized by a particular user group to perform a specific task. Such items may include bookcases, lecterns, and room dividers;
- iv. Tables: This element refers to tables such as coffee, side and end tables, height adjustable tables, various sizes and types of meeting room tables, bistro tables, cafeteria tables, flip-up and folding tables, lunch room and restaurant tables, etc., as well as the various transportation carts associated with these elements; and
- v. Wood Case Goods: This element refers to freestanding wood case goods such as bookcases, desks and computer desks, credenzas, meeting tables, wardrobes, hutches, pedestals, etc., including wood case goods for TSTS occupant executives;

b) Equipment:

- i. Appliances: This element refers to small and major appliances. Small appliances may be portable or semi-portable machines, generally used on table-tops or counter-tops. Such items may include laundry detergent dispensers, microwaves, water dispensers, etc. Major appliances cannot be easily moved and are generally placed on the floor, such as dishwashers, refrigerators, and laundry machines;
- ii. Client Locks: This element refers to keyed lock sets to be installed by the TSTS occupant;
- iii. Food Services: This element refers to general-purpose equipment utilized for cafeterias, cooking and refrigeration. Such items may include food or beverage carts, food prep counters, ice machines, small wares, and vending machines;
- iv. Health and Safety: This element refers to health and safety equipment to identify, reduce, and control employee exposure to hazards through the practice of occupational safety and health equipment, materials and protective devices. Such items may include WHIMS stations and boards, safety cabinets, spill kits and general first aid equipment such as backboards, blankets, and first aid kits;
- v. Housekeeping/Janitorial: This element refers to equipment to perform janitorial and housekeeping responsibilities. Such items may include cleaning trolleys, pressure washers, floor cleaners such as vacuums, buffers, burnishers, extractors, polishers, sweepers, mops,

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- brooms, along with safety elements used when performing these tasks such as floor safety signs;
- vi. Ice and Water: If required, this element refers to equipment for TSTS occupant ice and water rooms. Such items may include ice caddy's, ice machines, serving trays, water bottles for dispenser, water bottle racks, water glasses, and water pitchers;
 - vii. Laundry: This element refers to equipment for TSTS occupant laundry facility areas. Such items may include motorized garment conveyors, garment racks, laundry hampers, irons, laundry carts and bags, and clothes hangers;
 - viii. Maintenance and Handling: This element refers to equipment for transport, maintenance, repair and operation of the TSTS occupant within the building. Such items may include aerial platforms, belt sanders, bench grinders, drills, various types of transportation bins, carts and cages, moving and panel dolly's, moving blankets, hand trucks and hand pallet trucks, ladders, and tool cabinets;
 - ix. Office Equipment: This element refers to equipment to perform day-to-day TSTS occupant office activities, which are generally excluded from the Project scope. Such items may include computer monitors, corner makers, chair mats, CPU holders, document holders, electric calculators, electric surge protectors, keyboard trays, label makers, desk and wall mounted phones, fax machines, floor and table model copiers including all-in-one copiers, printers, scanners, shredders, and wall clocks;
 - x. Postal: Postal refers to the equipment used within the TSTS occupant postal facility area; it excludes the physical transportation of TSTS occupant mail or postal documentation. This element refers to commercially available postal equipment such as mail carts, mail sorters, packing benches, table model postal scales, and sealing and strapping machines.
 - xi. Printing: This element refers to printing equipment such as low and medium volume copiers, cutting machines, folders, foot stitchers, laminators, paper cutters, press drills, and spiral punches;
 - xii. Security: This element refers to building stand-alone security equipment such as surveillance consoles, walkthrough metal detectors (WTMD), x-ray baggers, badge printers, fire arm training simulators, gun cabinets, gun cleaning and unloading stations, hand wands, encrypted radios and chargers, safe, and cabinets. It excludes those items related to the integrated security system;
 - xiii. Specialty: This element refers to specialty equipment which are unique, one-of-a-kind items that cannot be classified under any other category, as well as laboratory and scientific equipment, as follows:
 - 1. Specialty building items may include automated teller machines (ATM), specialty carts, IT racks, key lock cabinets, radios and chargers, simultaneous interpretation booths, stage risers and associated accessories, stanchions;
 - 2. Specialty laboratory items may include peripheral or support equipment to assist in the operation of a laboratory, but is not essential for experimentation such as motorized or manual forklifts, freezers, computing or UPS equipment (i.e., monitors, CPUs, keyboards) that are designated to a piece of scientific equipment;
 - 3. Speciality scientific items may include is any type of apparatus or device whose primary function is necessary to perform scientific activities, specifically developed for

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research and testing in experiments, or take measurements, and/or gather data, such as microscopes, mass spectrometers, and centrifuges; and

4. Specialty ancillary laboratory and scientific items include other equipment or goods not categorized above that may also be found in a laboratory such as beakers, test tubes, scales, cylinders, and pipettes;
 - xiv. Visual Aids: This element refers to audio visual aids utilized throughout TSTS occupant meeting rooms, court rooms, and multipurpose rooms. Such items may include bulletin boards, flip charts, monitor carts, presentation boards, cabinets and rails, projection screens complete with their associated accessories, television and brackets, tripod easels, Velcro boards and whiteboards;
 - xv. Waste Management: This element refers to commercially available waste management equipment for the generation, prevention, monitoring, handling, and residual disposition of solid waste. Such items may include battery disposals, recycle and waste bins, containers, dollies and collector units; and
 - xvi. Window Coverings: This element refers to the base building fixed and motorized coverings, including but not limited to black-out blinds, window shades and soft window coverings such as drapes and curtains; and
- c) Commercial Goods:
- i. Lighting: This element refers to lighting fixtures (lamps) for general, accent or task lighting. Such lighting elements may include lamps for desks, floors and tables, including lamps for TSTS occupant executives. It excludes fixed lighting that is associated with the base building;
 - ii. Metal Furniture: This element refers to metal furniture such as bookcases, file cabinets, high density storage filing, various sizes and types of locker units, shelving units, storage cabinets;
 - iii. Office Accessories: This element refers to office accessories such as coat trees;
 - iv. Seating: This element refers to seating whether it is upholstered or unupholstered, task or guest seating, occasional seating, soft seating in the form of chairs, loveseats or sofas, with or without arms;
 - v. Specialty: This element refers to specialty furniture which are unique, one-of-a-kind items that cannot be classified under any other category. These items are often utilized by a particular TSTS occupant group to perform a specific task. Such items may include bookcases, lecterns, and room dividers;
 - vi. Systems Furniture: Systems furniture is composed of various components of panels, work surfaces, shelves and other items which connect together and may be either panel hung or freestanding. It is often associated with open plan arrangements such as office landscape environments however; systems furniture may be included within a closed office work setting. This element refers to systems furniture such as bookcases, desk and computer desks, credenzas, hutches, overhead bins, pedestals, personal storage towers, power poles, shelves, study carrels, freestanding tables, work surfaces, workstation panels and sliding privacy doors;
 - vii. Tables: This element refers to tables such as coffee, side and end tables, height adjustable tables, various sizes and types of meeting room tables, bistro tables, cafeteria tables, flip-up and folding tables, lunch room and restaurant tables, as well as the various transportation carts associated with these elements; and

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- viii. Wood Case Goods: This element refers to freestanding wood case goods such as bookcases, desks and computer desks, credenzas, meeting tables, wardrobes, hutches, pedestals, etc., including wood case goods for TSTS occupant executives.

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APPENDIX F—CONNECTIVITY INTGRATION WITH DESIGN DELIVERABLES

The objective of this appendix is to provide a roadmap to align the Connectivity planning and design deliverables with the Project Team throughout all phases of the design.

Modern, high-end buildings have an extensive and complex Connectivity infrastructure comprised of, but not limited to:

- Audio-visual (AV): which includes audio and video presentation, and is required simultaneous interpretation systems;
- Information Technology (IT): primarily the switches, wireless access points and cabling which connect networked devices such as computers, servers, ISS devices, audio-visual devices and telephones;
- Integrated Security Systems (ISS) for access control, intrusion protection & detection and video monitoring, including computers, cameras, sensors, card readers and electronic door hardware, security intercom and related sensors and output devices.

Audio-visual Deliverables Mapping

The AV Specialist Consultant is to develop four sets of audio-visual design deliverables. The first is the accommodation guidelines, a written document which provides detailed guidelines for accommodating audio-visual technology in architectural and engineering deliverables. This is an input to Schematic Design. Next comes the audio-visual schematic design which is aligned to the design options analysis performed in the schematic design phase. The third AV deliverable is the general arrangements computer-aided design drawings which specify the required layout of the audio-visual components in the building. This requires the most coordination with the Design Team during the Design Development phase. The objective of the final, AV detailed design deliverable is to produce tender Drawing Specifications and bills of material which specify the audio-visual equipment and connectivity required throughout the building.

The table below shows how the AV Specialist Consultant's design deliverables are aligned to the audio-visual design deliverables. It is assumed that Schematic Design would be performed in a 50-90-100 format with Design Development as 50-90-100 and Design Packages as 50-90-100. Should this format change, the table can be updated to reflect the new iterations.

Coordinated electrical and architectural drawings would incorporate at minimum the following audio-visual items: cable pathway; infrared wireless radiators and cable pathway; video conference camera mounts and cable pathway; floor boxes and cable pathway; wall and ceiling speakers and cable pathway; televisions and cable pathway; presentation monitors and cable pathway; projection screens; projectors, projector lifts and cable pathway; AV control systems and cable pathway; wireless microphone antennae and cable pathway; millwork coordination with AV elements including cable management; AVER layouts including placement of the racks, transformer, UPS and lighting; TV Control Room layouts; conference and court room layouts; electronic signage; Simultaneous Interpretation equipment integration in millwork and chairs; AV integration in furniture.

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Coordinated mechanical drawings may include some of the above and would integrate acoustical requirements in particular.

The following table outlines the Design Team deliverables as an input for audio-visual design.

Consultant Deliverable	Required for AV Accommodation Guidelines	Required for AV Schematic Design	Required for AV General Arrangements Document			Required for AV Detailed Design
			Draft	Final Draft	Final	
Pre-Design	Functional Program	Functional Program				
50% Schematic Design		Floor Grid (raised floor or slab)				
90% Schematic Design						
100% Schematic Design						
50% Design Development			Furniture Plan Reflected Ceiling Plan Floor Grid Site Plan Coordinated Electrical Coordinated Architectural			
90% Design Development						
100% Design Development			Acoustic Designs for court rooms, speciality rooms			Furniture Plan Acoustic Designs for court rooms, speciality rooms, Site Plan
50% Design Packages				Reflected Ceiling Plan Floor Grid Room Elevations Coordinated Electrical Coordinated Architectural		Reflected Ceiling Plan Floor Grid Room Elevations
90% Design Packages					Reflected Ceiling Plan Floor Grid Coordinated Electrical Coordinated Architectural Coordinated Mechanical	
100% Design Packages						

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ISS Deliverables Mapping

The following table below shows how the Design Team deliverables are aligned to ISS design deliverables. This table has been developed within the assumption that the Consultant is responsible for security system requirements definition and responsible for architectural, mechanical and electrical design services, to the approval of the TSTS occupants. It is assumed that Schematic Design would be performed in a 50-90-100 format with Design Development as 50-90-100 and Design Packages as 50-90-100. Should this format change, the table can be updated to reflect the new iterations.

Coordinated electrical, architectural and mechanical drawings would incorporate at minimum but not limited to the following ISS items: security cameras, access doors, intrusion alarms, monitored doors, security intercom stations, panel and hardware locations, security devices (e.g., motion detectors), guard post components, infrastructure and door hardware.

Consultant Deliverable	Required for ISS Concept Design by IT Consultant		Required for ISS Preliminary & Detailed Design by IT Consultant	
	Provided by Consultant	Provided by Consultant	Provided by Consultant	Provided by Consultant
Pre-Design	Functional Program	Threat and Risk Assessment Recommendations (Sanitized) Security Design Brief Security Requirements Concept of Operations Security Accommodation Guidelines		
50% Schematic Design	Blocking and Stacking Room Data Sheets	Security Component Layouts Security Zoning Diagrams		
90% Schematic Design	Electrical Drawings Mechanical Drawings Architectural Drawings	Updated Security Component Layouts Updated Security Zoning Diagrams CBRN Detection System* Blast Mitigation* Updated Non-ISS Components (X-Ray Scanners, WTMD, Through Glass Intercom, Turnstiles, Keyboxes) Guard Post Requirements <i>*May not affect IT design, depending on integration requirements</i>		

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Consultant Deliverable	Required for ISS Concept Design by IT Consultant		Required for ISS Preliminary & Detailed Design by IT Consultant	
	Provided by Consultant	Provided by Consultant	Provided by Consultant	Provided by Consultant
100% Schematic Design		Finalized Security Design Brief Finalized Concept of Operations Finalized Security Requirements Updated Security Component Layouts Updated Security Zoning Diagrams Updated CBRN Detection System Updated Non-ISS Components Updated Guard Post Requirements		
50% Design Development			Door Schedule Door Hardware Schedule (Draft) Guard Post Layouts Screening & Scanning Area Layouts Electrical Drawings Mechanical Drawings Architectural Drawings	Security Component Layouts Security Zoning Diagrams Security Camera Matrix Non-ISS Components
90% Design Development			Updated Door Schedule Updated Door Hardware Schedule Updated Guard Post Layouts & Millwork Updated Screening & Scanning Area Layouts Updated Electrical Drawings Updated Mechanical Drawings Updated Architectural Drawings	Updated Security Component Layouts Updated Security Zoning Diagrams Security Door Functional Descriptions Security Camera Matrix Alarm Device Matrix (e.g. Motion Detectors, Duress Buttons) Security Intercom System Matrix Non-ISS Components
100% Design Development			Final Door Schedule Final Door Hardware Schedule (draft) Final Screening & Scanning Area Layouts Final Guard Post Layouts & Millwork Coordinated Electrical Drawings Coordinated Mechanical Drawings Coordinated Architectural Drawings	Final Security Component Layouts Final Security Zoning Diagrams Final Security Door Functional Descriptions Final Security Camera Matrix Final Alarm Device Matrix (e.g. Motion Detectors, Duress Buttons) Final Security Intercom System Matrix Final Non-ISS Components
50% Design Packages			Coordinated Electrical Drawings	Updated Security Requirements Document Package

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Consultant Deliverable	Required for ISS Concept Design by IT Consultant		Required for ISS Preliminary & Detailed Design by IT Consultant	
	Provided by Consultant	Provided by Consultant	Provided by Consultant	Provided by Consultant
			Coordinated Mechanical Drawings Coordinated Architectural Drawings	Vulnerability Gap Analysis
90% Design Packages			Coordinated Electrical Drawings Coordinated Mechanical Drawings Coordinated Architectural Drawings	Finalized Security Requirements Document Package Vulnerability Gap Analysis
100% Design Packages				

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APPENDIX G—FF&E AND CONNECTIVITY RESPONSIBILITIES MATRIX

F&E/Connectivity Item ¹	Designed or Specified By ³	Procured By ^{2,4}	Delivery Inspection By	Installed By	Tested By	Responsibility for warranty
Custom Furniture¹						
Lighting	Consultant	CM	Consultant	CM	CM	CM
Seating	Consultant	CM	Consultant	CM	CM	CM
Specialty	Consultant	CM	Consultant	CM	CM	CM
Tables	Consultant	CM	Consultant	CM	CM	CM
Wood case goods	Consultant	CM	Consultant	CM	CM	CM
Equipment 1						
Appliances	Consultant	CM	Consultant	CM	CM	CM
Client locks	Consultant	TSB/NRC	Consultant	TSB/NRC	TSB/NRC	TSB/NRC
Food service/kitchenette	Consultant	CM	Consultant	CM	CM	CM
Health and Safety	Consultant	CM	Consultant	CM	CM	CM
Housekeeping/janitorial	Consultant	CM	Consultant	CM	CM	CM
Lockers	Consultant	CM	Consultant	CM	CM	CM
Ice and Water	Consultant	CM	Consultant	CM	CM	CM
Laundry	Consultant	CM	Consultant	CM	CM	CM
Maintenance and Handling	Consultant	CM	Consultant	CM	CM	CM
Office equipment	Consultant	TSB/NRC	Consultant	TSB/NRC	TSB/NRC	TSB/NRC
Postal	Consultant	TSB/NRC	Consultant	TSB/NRC	TSB/NRC	TSB/NRC
Printing—office copiers	Consultant	TSB/NRC	Consultant	TSB/NRC	TSB/NRC	TSB/NRC
Security—cabling and end devices	Consultant	CM	Consultant	CM	CM	CM
Specialty building items—built in items only	Consultant	CM	Consultant	CM	CM	CM
Specialty laboratory items	Consultant	CM	Consultant	CM	CM	CM
Specialty scientific items—built in items only	Consultant	CM	Consultant	CM	CM	CM
Specialty ancillary laboratory and scientific items	TSB/NRC	TSB/NRC	TSB/NRC	TSB/NRC	TSB/NRC	TSB/NRC
Visual aids—built in	Consultant	CM	Consultant	CM	CM	CM
Waste management	Consultant	CM	Consultant	CM	CM	CM
Window Coverings—motorized/non-motorized	Consultant	CM	Consultant	CM	CM	CM
Move—office-related and all laboratory, scientific and ancillary goods and equipment	Consultant	CM	Consultant	CM	CM	CM
Move—experiments, biological, and hazardous products/materials	TSB/NRC	TSB/NRC	TSB/NRC	TSB/NRC	TSB/NRC	TSB/NRC
Commercial 1						
Lighting	Consultant	CM	Consultant	CM	CM	CM
Metal furniture	Consultant	PWGSC	Consultant	PWGSC	PWGSC	PWGSC
Office accessories	Consultant	TSB/NRC	Consultant	TSB/NRC	TSB/NRC	TSB/NRC
Seating	Consultant	PWGSC	Consultant	PWGSC	PWGSC	PWGSC
Specialty	Consultant	CM	Consultant	CM	CM	PWGSC
Systems furniture	Consultant	PWGSC	Consultant	PWGSC	PWGSC	PWGSC
Tables	Consultant	PWGSC	Consultant	PWGSC	PWGSC	PWGSC
Wood case goods	Consultant	PWGSC	Consultant	PWGSC	PWGSC	PWGSC
Integrated Security Support						
Registered Keyway cylinders	Consultant	TSB/NRC	Consultant	TSB/NRC	TSB/NRC	TSB/NRC
Admin PC	Consultant	CM	Consultant	CM	CM	CM
Audio Sub-station	Consultant	CM	Consultant	CM	CM	CM
Cable Management under guard post cabinet and grommet holes	Consultant	CM	Consultant	CM	CM	CM

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F&E/Connectivity Item ¹	Designed or Specified By ³	Procured By ^{2,4}	Delivery Inspection By	Installed By	Tested By	Responsibility for warranty
Cables between Door JB and Door Devices	Consultant	CM	Consultant	CM	CM	CM
Card reader	Consultant	CM	Consultant	CM	CM	CM
Chexit emergency exit devices & door paddles power	Consultant	CM	Consultant	CM	CM	CM
Conduits, cable trays, raceways, pull boxes, end devise junction boxes	Consultant	CM	Consultant	CM	CM	CM
Construction lock Cylinders and final Cylinders	Consultant	CM	Consultant	CM	CM	CM
Controllers and Expansion Boards	Consultant	CM	Consultant	CM	CM	CM
CPU	Consultant	CM	Consultant	CM	CM	CM
Door contact	Consultant	CM	Consultant	CM	CM	CM
Door Device End of Line Resistors	Consultant	CM	Consultant	CM	CM	CM
Door operator	Consultant	CM	Consultant	CM	CM	CM
Door Release Control Panel	Consultant	CM	Consultant	CM	CM	CM
Duress Buttons (hard-wired)	Consultant	CM	Consultant	CM	CM	CM
Duress Wireless Receiver	Consultant	CM	Consultant	CM	CM	CM
Duress Wireless Transmitter	Consultant	CM	Consultant	CM	CM	CM
Electrified locksets	Consultant	CM	Consultant	CM	CM	CM
Electrified strikes	Consultant	CM	Consultant	CM	CM	CM
Elevator System Interface	Consultant	CM	Consultant	CM	CM	CM
Fire Alarm Master Interface Point	Consultant	CM	Consultant	CM	CM	CM
Glass Breaks	Consultant	CM	Consultant	CM	CM	CM
Handicap paddles	Consultant	CM	Consultant	CM	CM	CM
Infrared Request-to-Exit	Consultant	CM	Consultant	CM	CM	CM
ISS Dedicated Workstations	Consultant	CM	Consultant	CM	CM	CM
Key Watch Box	Consultant	CM	Consultant	CM	CM	CM
Keypads and Intrusion Panels	Consultant	CM	Consultant	CM	CM	CM
Local audible alarm device	Consultant	CM	Consultant	CM	CM	CM
Magnetic locks	Consultant	CM	Consultant	CM	CM	CM
Magnetic Locks-Reset Key Switch and Power Supply	Consultant	CM	Consultant	CM	CM	CM
Master Station	Consultant	CM	Consultant	CM	CM	CM
Metal Detectors	Consultant	CM	Consultant	CM	CM	CM
Motion Detectors	Consultant	CM	Consultant	CM	CM	CM
Network Video Recorders	Consultant	CM	Consultant	CM	CM	CM
Pedestals (where handicap buttons not on wall or jamb)	Consultant	CM	Consultant	CM	CM	CM
TC closet Power supplies–low voltage	Consultant	CM	Consultant	CM	CM	CM
Relays and Miscellaneous Integration HW with base building systems	Consultant	CM	Consultant	CM	CM	CM
Sound control gaskets	Consultant	CM	Consultant	CM	CM	CM
Special UPS units	Consultant	CM	Consultant	CM	CM	CM
Transfer loops	Consultant	CM	Consultant	CM	CM	CM
Turnstile	Consultant	CM	Consultant	CM	CM	CM
Turnstile - Integration HW	Consultant	CM	Consultant	CM	CM	CM
Vehicle Blocker	Consultant	CM	Consultant	CM	CM	CM
Vehicle Gates	Consultant	CM	Consultant	CM	CM	CM
Security Cameras	Consultant	CM	Consultant	CM	CM	CM
Video/Audio Sub-station	Consultant	CM	Consultant	CM	CM	CM
X-Ray Machine	Consultant	CM	Consultant	CM	CM	CM
Functional Program to be included in the ISS						
Blue Bag Bin	Consultant	CM	Consultant	CM	CM	CM
Deal Tray@ security post	Consultant	CM	Consultant	CM	CM	CM
Elevator Control Computer	Consultant	CM	Consultant	CM	CM	CM

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F&E/Connectivity Item ¹	Designed or Specified By ³	Procured By ^{2,4}	Delivery Inspection By	Installed By	Tested By	Responsibility for warranty
Elevator Emergency Telephone	Consultant	CM	Consultant	CM	CM	CM
Emergency Phones (if necessary)	Consultant	CM	Consultant	CM	CM	CM
Emergency Voice/Alarm Communication Equipment; Control for Voice Communication	Consultant	CM	Consultant	CM	CM	CM
Fire Alarm Computer	Consultant	CM	Consultant	CM	CM	CM
Fire Alarm Control Panel	Consultant	CM	Consultant	CM	CM	CM
Firefighter's emergency Telephone System	Consultant	CM	Consultant	CM	CM	CM
HVAC interface	Consultant	CM	Consultant	CM	CM	CM
Public Address System	Consultant	CM	Consultant	CM	CM	CM
Signage (e.g.: Emergency Exits, etc.)	Consultant	CM	Consultant	CM	CM	CM
Telephones	SSC	SSC	SSC	SSC	SSC	SSC
Through the Glass Intercom	Consultant	CM	Consultant	CM	CM	CM
Digital Radio System	Consultant	CM	Consultant	CM	CM	CM
Connectivity						
All electrical work including grounding of rack bases in AV Equipment Rooms.	Consultant	CM	Consultant	CM	CM	CM
AV Equipment racks	Consultant	CM	Consultant	CM	CM	CM
AV Equipment Room transformer	Consultant	CM	Consultant	CM	CM	CM
AV end devices—flat screens, etc.	Consultant	CM	Consultant	CM	CM	CM
AV Laboratory and control room built-in furniture/equipment	Consultant	CM	Consultant	CM	CM	CM
Backup monitoring console/furniture	Consultant	CM	Consultant	CM	CM	CM
Cable pass-thru holes in floors	Consultant	CM	Consultant	CM	CM	CM
Cable Tray, Conduits and Electrical Boxes for Connectivity Use (including roof)	Consultant	CM	Consultant	CM	CM	CM
Cable Winch and Mounts for ceiling mounted or wall/pillar mounted AV devices. (e.g.: ambient microphones, IR radiators, Sound reinforcement, etc.)	Consultant	CM	Consultant	CM	CM	CM
Cabling - Inter-building connectivity	SSC	SSC	SSC	SSC	SSC	SSC
Cabling and termination - ISS	Consultant	CM	Consultant	CM	CM	CM
Cabling - IT installation	Consultant	CM	Consultant	CM	CM	CM
Cabling - AV	Consultant	CM	Consultant	CM	CM	CM
Centralized UPS	Consultant	CM	Consultant	CM	CM	CM
Custom Millwork to Support/Enable Tasks (e.g.: Desk and Cable Management, Working Surface, etc.)	Consultant	CM	Consultant	CM	CM	CM
Custom mounts for Videoconferencing cameras	Consultant	CM	Consultant	CM	CM	CM
e-Signage - Monitor	Consultant	CM	Consultant	CM	CM	CM
e-Signage - Mounting bracket (Wall)	Consultant	CM	Consultant	CM	CM	CM
e-Signage - Mounting Post (Ceiling)	Consultant	CM	Consultant	CM	CM	CM
e-Signage - PC	Consultant	TSB/NRC	Consultant	TSB/NRC	TSB/NRC	TSB/NRC
Floor Boxes	Consultant	CM	Consultant	CM	CM	CM
IT Racks/Cabinets	Consultant	CM	Consultant	CM	CM	CM
Lighting - Architectural	Consultant	CM	Consultant	CM	CM	CM
Lighting - Laboratory	Consultant	CM	Consultant	CM	CM	CM

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F&E/Connectivity Item ¹	Designed or Specified By ³	Procured By ^{2,4}	Delivery Inspection By	Installed By	Tested By	Responsibility for warranty
Lighting - Mounts	Consultant	CM	Consultant	CM	CM	CM
Mounting Backing, Assembly and Infrastructure for AV Items (e.g.: Subwoofer, Line Array Speakers, IR Radiators, room Status Displays and E-signage (if Wall Mounted)) or IT (Path Panels, etc.)	Consultant	CM	Consultant	CM	CM	CM
Raised Floor and Cable Trays Under Raised Floor	Consultant	CM	Consultant	CM	CM	CM
Shelves for videoconference cameras	Consultant	CM	Consultant	CM	CM	CM
Speakers and ancillary devices	Consultant	CM	Consultant	CM	CM	CM
Technology Integration in custom furniture, desks, meeting room tables and laboratories, etc.)	Consultant	CM	Consultant	CM	CM	CM
Notes: <ol style="list-style-type: none"> As defined in Project Brief Appendix E–FF&E Component WBS Dictionary and Project Brief section 4.3.4.5 CM = TSTS Construction Manager; Consultant = TSTS A&E Consultant; and TSB, NRC, PWGSC or SSC, as applicable 						

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APPENDIX H–DELIVERABLES SUMMARY

The following table summarizes the Design Team’s deliverables. In case of conflict or future amendment of this Contract, the requirements of each Project Brief section and sub-section will prevail over the following summary.

	Deliverables	Timeline	Project Brief Reference
ADMINISTRATION AND DESIGN SERVICES	Project Meetings; agenda, notice to invitees, minutes, database; top five risks from this database with the final minutes of each meeting	Monthly; issue final meeting minutes within 2 Working Days of meeting	Section 10.1.1.1
	Design Meetings; agenda, notice to invitees, minutes, database; top five risks from this database with the final minutes of each meeting	Weekly; issue final meeting minutes within 2 Working Days of meeting	Section 10.1.1.2
	Submission Presentations	Required at 50% and 100% SD, DD, as required during Project implementation	Section 10.1.1.4
	Subject Matter Workshops	required at 50% SD, 90% SD, 50% DD, 90% DD, and at other stages of Projects, as required	Section 10.1.1.5
	Subject Matter Workshops final workshop minutes	Within 2 working days of workshop	Section 10.1.1.5
	Functional Program Workshops	During Pre-Design, SD and DD	Section 10.1.1.5
	Functional Program Workshops final workshop minutes	Within 2 Working Days of workshop	Section 10.1.1.5
	FF&E Workshops	During the SD, DD, and DP phases	Section 10.1.1.5
	FF&E Workshops final workshop minutes	Within 2 Working Days of workshop	Section 10.1.1.5
	Value Engineering (or target value) Workshops; agenda, notice to invitees and issue workshop minutes	1 per SD and DD stage; within 2 Working Days of each workshop	Section 10.1.1.5

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	Deliverables	Timeline	Project Brief Reference
	Monthly Reports; decision log; issues log; CMP and BXP sections; quarterly IBP section	Monthly; revise the reporting structure within 5 Working Days of receipt of the DR's comments	Section 10.1.6
	Formal Presentations	As described in Project Brief Appendix D–PROCESS MAPS	Section 10.1.8.5
	National Capital Commission; reports, Model generated Drawings, sample boards, Power Point presentations, and oral presentations	50% and 100% SD and 50% and 100% DD stages	Section 10.1.8.5.3
	Submit a refined and sufficiently detailed IPP for review and comment. Revise; resubmit the refined IPP	Within 60 Working Days of Contract award; within 5 Working Days of receipt of PWGSC's comments	Section 10.1.11
	Submit a IPP report for review and comment. Revise and resubmit the refined IPP	Quarterly, within 10 Working Days of each quarterly anniversary of the Contract award date, as agreed by the DR and Contracting Authority; Resubmit within 5 Working Days of receipt of PWGSC's comments	Section 10.1.11
	Contract Management Plan; Prepare, submit, maintain/update and implement - includes six distinct plans - Design management plan; Quality management plan; Cost management plan; Time management plan; HR management plan; and Risk management plan	Submit to the DR for approval within 30 Working Days of Contract award, or as indicated later in this section	Section 10.2.1
	Design management plan; Quality management plan; Cost management plan; Time management plan; and Risk management plan; develop, update, and implement	Review by DR Within 30 Working Days of Contract award; A draft addressing all issues raised by the DR on the initial layout and format for review by the DR within 20 Working Days of the acceptance of the plan layout and format; and; A final for acceptance by the DR within 20 Working Days after receiving DR's review comments on the draft	Section 10.2.1.1; Section 10.2.1.2; Section 10.2.1.3; Section 10.2.1.4; Section 10.2.1.5 Section 10.2.1.7

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	Deliverables	Timeline	Project Brief Reference
	HR management plan	Update, resubmit to DR every three months, or more often if requested.	Section 10.2.1.7
	BIM Execution Plan; submit a draft BXP to the DR for review	Within 60 working days of the Contract award	Section 10.2.2.3
	Re-evaluate the BXP	Monthly; summary of proposed changes within 10 Working Days	Section 10.2.2.3
	CMP updates and, if necessary, updates to individual plans	With the Consultant's monthly report, including: a Critical Path Method design production schedule within 3 Working Days of the last Working Day of each month; a monthly and a 3-month design production look-ahead schedule; related time management analysis; an HR plan update, etc.	Section 10.3.1
	BIM Services; clash detection reports as defined in the BXP	Weekly	Section 10.3.2.3
	Submit the up-to-date Model to the DR for review and interrogation	At 50%, 90% and 100% SD and DD, and again during the DP and construction stages as requested	Section 10.3.2.3
	BIM Services; develop Model in as prescribed in the BXP	Ongoing	Section 10.3.2.3
	Reporting of Design Team resources progress percentage complete against each WBS element, integrated with the Consultant's monthly schedule submission	Monthly	Section
PRE-DESIGN SERVICES	Preliminary Gap Analysis report based on Design Teams review of the Project Brief section 8—REFERENCE INFORMATION and information from interviews	Monthly update	Section 11.2.1; Section 11.15
	Prioritized listing of investigations necessary, per discipline	Within 60 Working Days of Contract award	Section 11.3.1

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	Deliverables	Timeline	Project Brief Reference
	Update the prioritized investigation list to reflect new or evolving requirements and resubmit to the DR	Monthly, or more often if requested	Section 11.3.1
	Detailed investigation summary	Within 10 Working Days of each investigation	Section 11.16
	Structural Modelling framework	Within 7 months of Contract award.	Section 11.11
	Summary of the reference documentation reviewed and an initial gap analysis per discipline	Within 60 Working Days of Contract award	Section 11.16
	PD report template complete with table of contents and subsections identified	Within 60 Working Days of Contract award. Revise the PD report template and resubmit the template within 20 Working Days of receiving the DR's comments	Section 11.16
	Gap analysis update, incorporating additional investigation findings and ongoing research and analysis. Include an overall gap analysis summary in the Pre-Design Report	Monthly until the end of the PD stage	Section 11.16
	Investigations program update, of prioritized investigations which reflect new or evolving requirements	Monthly; or more frequently if warranted	Section 11.16
	PD report which consolidates completed investigations findings, progress of on-going investigations and discipline-specific deliverables identified in Project Brief section 11	Written response to the DR within 20 Working Days to all the submission comments	Section 11.16
	Reporting of Design Team resources progress percentage complete against each WBS element, integrated with the Consultant's monthly schedule submission	Monthly	Section 11.16
	Prepare and submit a written response to the DR	Within 20 Working Days to all the submission comments	Section 11.17

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	Deliverables	Timeline	Project Brief Reference
SCHEMATIC DESIGN SERVICES	Confirm enabling projects design interferences within the Model are identified and resolved	Weekly, or as defined in the up-to-date BXP	Section 12.2
	Adapt and optimize the individual work flow of each Design Team member to meet enabling projects design production requirements and, if possible, shorten durations, as agreed by the DR	Ongoing	Section 12.2
	Schematic Design report	50%, 90% and 100% unless otherwise indicated	Section 12.6
	Coordinate and integrate all Services of the Design Team and with the input of the GEICs	Ongoing	Section 12.6
	Through ongoing investigation findings, ongoing research and analysis, update the PD gap analysis quarterly until the end of the SD stage and integrate findings, within each SD sub-phase	Ongoing	Section 12.6
	Develop SD options, sub-options, analysis and recommendations	Ongoing	Section 12.6
	Submit 50%, 90%, and 100% SD submissions and Cost estimates per option, per SD submission, as well as the including the completed, federated Model and all supporting information according to requirements described in this Project Brief section 12	As per key intermediate dates defined in Project Brief section 1.3.3–Milestones	Section 12.6
	Draft Project-specific benefits register and benefits plan	Submit with the 90% SD submission	Section 12.6
	Detailed Project-specific benefits register and benefits plan based on the recommended SD option	Submit with the 100% SD submission	Section 12.6

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	Deliverables	Timeline	Project Brief Reference
	Prepare and deliver SD presentations	Described in Project Brief section 10.1.1.4–Design Submission Presentations and subsection c) of APPENDIX D–PROCESS MAPS	Section 12.6
	Update NCC FLUDA documentation and obtain NCC FLUDA approval	Ongoing	Section 12.6
	Prepare and submit presentation materials associated with approval processes	Presentation-specific	Section 12.6
	Update the final design review response of the compiled review comments and submit a final submission to the DR for acceptance	Within 20 Working Days, in accordance with subsection b) of APPENDIX D–PROCESS MAPS	Section 12.6
	Prepare and submit concise SD report chapters for each design discipline, consolidating information gathered, to illustrate an integrated analysis of the Design Team’s SD options	50%, 90% and 100% unless otherwise indicated	Section 12.6
	Review and analyse all the comments provided by the Project Team	After each SD submission	Section 12.6
	Prepare and submit a written response to the DR	Within 20 Working Days to all the submission comments	Section 12.6
	Reporting of Design Team resources progress percentage complete against each WBS element, integrated with the Consultant’s monthly schedule submission	Monthly	Section 12.6
	Integrate comments into the subsequent submissions as directed by the DR	Ongoing	Section 12.6
DESIGN DEVELOPMENT	Coordinate and integrate all Services of the Design Team and with the input of the CM	Ongoing	Section 13.5
	Develop the approved SD and sustainability sub-options, complete with analysis and recommendations	Ongoing	Section 13.5

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	Deliverables	Timeline	Project Brief Reference
	Integrate findings within the design and itemize in each DD sub-phase report	Ongoing	Section 13.5
	Submit 50%, 90%, and 100% DD submissions and Cost estimates per DD submission according to requirements described in this Project Brief section 13, as well as the including the completed, federated Model and all supporting information	As per key intermediate dates defined in Project Brief section 1.3.3–Milestones	Section 13.5
	Submit an up-to-date benefit register and benefits plan including rationale for changes	With the 90% DD submission	Section 13.5
	Prepare and deliver DD presentations	Described in Project Brief section 10.1.1.4–Design Submission Presentations and subsection c) of APPENDIX D–PROCESS MAPS	Section 13.5
	Update NCC FLUDA documentation and obtain NCC FLUDA approval	Ongoing	Section 13.5
	Confirm draft and final reports contain integrated and coordinated designs	With each DD submission	Section 13.5
	Update the final design review response of the compiled review comments and submit a final submission to the DR for acceptance	Within 20 Working Days of receipt of comments	Section 13.5
	Based on the prioritized construction planning and scheduling by the CM, proceed with DP stage activities and the preparation of identified DPs before acceptance of the 100% DD submission, as approved by the DR	Ongoing	Section 13.5
	Prepare and submit concise reports for each discipline consolidating information gathered to illustrate an integrated analysis of the Design Team’s design. Include commissioning and property management requirements and Cost estimates. Place supporting information and reports (e.g., investigations, etc.) as appendices	With each DD submission	Section 13.5

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	Deliverables	Timeline	Project Brief Reference
	Response to Design Development reports	Within 20 working days to all the submission comments	Section 13.6
	Reporting of Design Team resources progress percentage complete against each WBS element, integrated with the Consultant's monthly schedule submission	Monthly	Section 13.5
	Integrate comments into the subsequent submissions as directed by the DR	Ongoing	Section 13.6
DESIGN PACKAGE SERVICES	Submit 50%, 90%, and 100% DP submissions, class A estimates, and Cost analysis according to requirements described in this Project Brief section 14, with the scope and according to the schedule provided by the CM	50%, 90% and 100% per DP as agreed with DR and CM, unless otherwise indicated	Section 14.3.13 Section 14.4; Section 14.6
	Submit to the DR a complete listing of all sustainability performance requirements and updated sustainability budget for each Design Team discipline, whole-building energy Model, if required whole building LCCA, and related sustainability information	After completion of all DPs	Section 14.6
	Reporting of Design Team resources progress percentage complete against each WBS element, integrated with the Consultant's monthly schedule submission	Monthly	Section 14.6
	Prepare and submit a written response to the DR to all the submission comments, taking into account the submission and review processes	within 20 working days, as defined in subsection b) of Project Brief APPENDIX D–PROCESS MAPS	Section 14.7
	Integrate comments into the subsequent submissions as directed by the DR	After each DP submission	Section 14.7
TENDERING	Prepare pre-qualification requirements in collaboration with and as required by the CM and DR	As required, ongoing	Section 15.1 Section 15.5

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	Deliverables	Timeline	Project Brief Reference
	Attend bidders' briefing meetings for pre-qualification	As required by CM	Section 15.1
	Analyze and respond to questions during the pre-qualification of suppliers and during DP tendering. Provide the DR and CM with responses	Within two Working Days of receipt of the question, or as agreed by the DR	Section 15.1 Section 15.5
	Update the Model, Drawings, and Specifications based on bidders' questions. Provide the DR and CM with addenda inclusive of all information required by bidders to fully interpret the tender documents	Within two Working Days of receipt of the question, or as agreed by the DR	Section 15.1 Section 15.5
	Maintain a record of all inquiries directed to DR and CM during the bidding period and submit the record to the DR and CM for future audit	Per DP, at the close of bidding	Section 15.1 Section 15.5
	Assist in the evaluation of tenders by providing advice, as specified	Per DP	Section 15.1 Section 15.5
	Provide a summary of follow-up meetings with municipal officials regarding the status of building permit applications	As applicable per DP	Section 15.1 Section 15.5
	Redesign and reissue DP, updating the Model and Specifications as necessary to bring the Cost within the stipulated limits	As required and approved by the DR	Section 15.2 Section 15.5
	Prepare and submit a detailed narrative of the implications for retendering, including Cost impacts and the risk implications and proposed mitigations	If required, in coordination with the CM	Section 15.2 Section 15.5
	Issued-for-Construction Drawings and Specifications. Provide one reproducible copy of the complete DP (or tender documents as applicable); an update the Construction Cost Estimate reflective of the accepted DP bid price	Per DP, within 5 Working Days of the issuance of the last addendum	Section 15.1 Section 15.3 Section 15.5

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	Deliverables	Timeline	Project Brief Reference
	Update the BCM and the Model with the final make, model, and description of all awarded FF&E and Connectivity goods	Within 10 Working Days of each FF&E and Connectivity contract award	Section 15.4 Section 15.5
	Reporting of Design Team resources progress percentage complete against each WBS element, integrated with the Consultant's monthly schedule submission	Monthly	Section 15.5
SITE SERVICES	Coordinating and validating all Site investigation findings to confirm accuracy and completeness of information, relaying the findings to the Design Team, the CM, and the DR	Within 36 hours of each investigation	Section 16.2
	Managing, coordinating and controlling all design production documentation to and from the Site for accuracy and completeness	Ongoing	Section 16.2
	Responding to all RFIs or submittals	Within 5 working days, but never longer than 15 working days, accordance with section d) and e) of Project Brief Appendix D–PROCESS MAPS	Section 16.2
	Provide field clarifications	Within 2 Working Days of issue identification, or when required by the CM in accordance with section f) of Project Brief Appendix D–PROCESS MAPS	Section 16.2
	Prepare and issue in a timely manner to the CM accurate and coordinated DPs, supplementary instructions, notices, contemplated change notices, change order	Within 2 Working Days of issue identification, or when required by the CM in accordance with section g) of Project Brief Appendix D–PROCESS MAPS	Section 16.2
	Update the Model and reissue the Issued-for-Construction DPs	Every 3 months or more frequently if requested by the DR	Section 16.2

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	Deliverables	Timeline	Project Brief Reference
	Analyze all activities of the construction and construction schedule for viability, including the status of all design activities relative to the construction schedule. Confirm ongoing design production is fully coordinated with tendering schedules. Report potential design production gaps and mitigation measures	Monthly, within 5 Working Days of the end of each month	Section 16.2
	Analyze and report on the CM's proposed sub-contractor productivity measurement methodology. Make suggestions to the CM and DR for productivity measurement improvements. Confirm productivity measurement methodology is included within each sub-contractor tender before tender. Advise the CM and DR of each sub-trade productivity measurement methodology	Before tender	Section 16.2
	Report on any proposed blasting procedures, if any. Inform the CM and the DR in writing immediately of any conditions that require immediate remedial measures	Monthly or more frequently if warranted	Section 16.2
	Review and confirm the completeness of the CM's estimate for each Site instruction that attracts Cost, contemplated change notice, and change order; Review and assess potential impact to the Project scope, time, Cost, and risks	Ongoing	Section 16.2
	Reconcile each construction change/instruction that attracts Cost against the Construction Cost Estimate to present a report to the DR a running total of contingency use, balance, and projection of the estimated Cost at Project completion. Code changes to the detailed WBS for each scope element, sub-element and Work activity; Develop and keep current a construction Cost	Ongoing, report Monthly	Section 16.2

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	Deliverables	Timeline	Project Brief Reference
	trend analysis with discussion of factors influencing future forecasts		
	Review and recommend to the DR for payment the CM's progress payment; Confirm that applications for progress payment are complete and only reflect the work that has progressed to the date of the invoice	Within 5 Working Days of receipt	Section 16.2
	Developing and updating a commissioning issues log	At the commencement of the Consultant's Site Services; for each commissioning meeting thereafter	Section 16.7
	Provide reporting of all Design Team activities, as separate sections, as specified	Monthly	Section 16.9
	Provide written comments for all CM constructability feedback	Ongoing	Section 16.9
	Provide a full Cost accounting of all DPs with changes/adjustments	Timing as agreed with DR	Section 16.9
	Finalize the Design Team's design intent brief, SDB, AVDB, and ITDB to reflect each as-commissioned building system	Within six months of Substantial Performance of the CM's contract	Section 16.9
	Confirm compliance with the owners Project requirements (OPR)	Before substantial performance and again before handover to Canada	Section 16.9
	Undertake seasonal commissioning activities and corrective work	As described in Project Brief section 17–POST-CONSTRUCTION SERVICES	Section 16.9
	Provide an up-to-date benefit register and benefit plan	At substantial performance	Section 16.9
	Provide signed documentation for Substantial Performance and Completion	At substantial performance	Section 16.9
	Provide an as-built Drawings, as-built Specifications, and an as-built Model of the built work	Prior to occupancy	Section 16.9

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	Deliverables	Timeline	Project Brief Reference
	Reporting of Design Team resources progress percentage complete against each WBS element, integrated with the Consultant's monthly schedule submission	Monthly	Section 16.9
POST CONSTRUCTION SERVICES	Revised Commissioning Plan	Revise, resubmit as required and agreed by DR and CM	Section 17.1
	Testing reports	Within 5 Working Days of each activity	Section 17.1
	Deficiency inspection; as-built (record) Model update	Inspection prior to concealment or within 5 Working Days of repair completion; Model update within 14 Working Days of deficiency correction	Section 17.1
	Rerun energy models, LCA and LCCA. Confirm energy consumption meets the DD and DP defined requirements	11 months after substantial performance	Section 17.1 Section 17.5
	Obtain sustainability certification(s)	Within 18-24 months of Substantial Performance and submit said certification documents to the DR	Section 17.1
	Participate in a lessons-learned workshop with the CM, DR and NRC and TSB	At a time approved by the DR	Section 17.1
	Performance verification reports, infra-red and building envelope thermographic scanning	Timing as agreed with DR and CM	Section 17.5
	A final Cost account of all DPs with changes/adjustments	Timing as agreed by the DR	Section 17.5
	Training reports for all training sessions	After each session	Section 17.5
	A final benefit register and benefit plan at or just before handover to Canada	At or just before handover to Canada	Section 17.5
	Verification that the CM O&M manuals are complete and accepted	Before CM-led training sessions	Section 17.5
	Standard Operating Procedures for each building system	At or just before handover to Canada	Section 17.5

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	Deliverables	Timeline	Project Brief Reference
	Final design intent brief	At or just before handover to Canada	Section 17.5
	Post-construction evaluation and lessons learned reports.	Timing as agreed with DR and CM	Section 17.5
	Reporting of Design Team resources progress percentage complete against each WBS element, integrated with the Consultant's monthly schedule submission	Monthly	Section 17.5

END OF PROJECT BRIEF