

SCHEDULE 10**REVIEW PROCEDURE****PART A**
DESIGN AND CONSTRUCTION REQUIREMENTS**1. WORKS SUBMITTALS**

1.1 The provisions of Part A of this Schedule 10 shall apply to the Design Development Submittals, the Construction Document Submittals, the Design Data and any and all items, documents and anything else required or specified by this Project Agreement, including all Works Submittals listed in Appendix A and Appendix B to this Schedule 10, in respect of the Design and Construction Works to be submitted to, reviewed or otherwise processed by the City in accordance with the Review Procedure prior to or after Substantial Completion in respect of the completion of Minor Deficiencies, including any and all subsequent revisions, amendments and changes thereto (collectively and individually, “Works Submittal” or “Works Submittals” as applicable in Part A of this Schedule 10).

2. SCHEDULE FOR WORKS SUBMITTALS

2.1 The Works Schedule shall provide for a progressive and orderly flow of Works Submittals from Project Co to the City Representative to allow sufficient time for review of each Works Submittal by the City Representative taking into account both the resources necessary to be available to the City Representative to conduct such review and whether delay in the review of the subject matter of the Works Submittal shall have a material impact on Project Co’s ability to progress future anticipated Works Submittals and the Design and Construction Works in accordance with the Works Schedule.

2.2 The Works Schedule and any amendment to the Works Schedule shall allow a period of 10 Business Days (or such longer period as the Parties may agree) from the date of receipt for review of and response to each Works Submittal, provided that if Project Co has made major changes to the grouping and volume of Works Submittals, such period of time shall be adjusted by Project Co, acting reasonably, taking into account the factors set forth in Section 2.1 of this Schedule 10.

2.3 Project Co shall, in scheduling Works Submittals and in the performance of the Project Scope, allow adequate time prior to performing the Project Scope that are the subject of the Works Submittals, for review of the Works Submittals and for Project Co to make changes to Works Submittals that may be required if comments are received on the Works Submittals, such review and required changes to be in accordance with Part A of this Schedule 10.

2.4 If the Works Schedule indicates that a large number of Works Submittals will be made at one time, the City Representative may, at the City Representative’s discretion, request a longer period for review or a staggering of the Works Submittals, and Project Co shall review and revise the Works Schedule accordingly, taking into account both the

resources necessary to be available to the City Representative to conduct such review and whether delay in the review of the subject matter of the Works Submittal shall have a material impact on Project Co's ability to progress future anticipated Works Submittals and the Design and Construction Works in accordance with the Works Schedule.

2.5 Project Co shall submit all Works Submittals to the City in accordance with the current Works Schedule.

3. GENERAL REQUIREMENTS FOR WORKS SUBMITTALS

3.1 Unless otherwise specified by the City Representative, Project Co shall issue 3 printed copies of all Works Submittals to the City, together with an electronic copy in a format agreed by the Parties acting reasonably and one printed copy of each Works Submittal to the Independent Certifier, together with an electronic copy in a format agreed by the Parties acting reasonably.

3.2 Project Co shall compile and maintain a register of the date and contents of the submission of all Works Submittals and the date of receipt and content of all returned Works Submittals and comments thereon, which shall be provided to the City upon request.

3.3 All Works Submittals shall be in English.

3.4 All Works Submittals required by this Project Agreement or by Applicable Law to be signed or sealed by persons with professional designations (including, where applicable, by registered professional engineers or architects) shall, where applicable, be so signed and sealed.

3.5 All Works Submittals shall include copies of all documents to be reviewed and shall clearly identify the purpose of the Works Submittal and Project Co's proposed course of action relating to the Works Submittal and the Project Scope that are the subject of the Works Submittal.

3.6 All Works Submittals shall, where applicable, refer to the relevant provisions of the Output Specifications, any other applicable Schedule to the Project Agreement and to any Design Data that has previously been subject to review.

3.7 All Works Submittals shall be clearly identified as a Works Submittal and shall be delivered with appropriate covering documentation, which shall include a list of all attached Works Submittals and for each Works Submittal:

- (a) the document number(s) or drawing number(s);
- (b) revision numbers (if applicable);
- (c) document or drawing title(s);
- (d) name of entity that prepared the Works Submittal;

- (e) the Works Submittal history showing date and delivery information and/or log number of all previous submissions of that Works Submittal including reviewer and checker initials; and
- (f) identification of any previous Works Submittal superseded by the current Works Submittal.

4. COMMENTS

4.1 The City Representative shall review and respond to each Works Submittal in accordance with the time periods specified in Section 2.2 of this Schedule 10. The City Representative shall return Works Submittals to Project Co with a copy to the Independent Certifier and assign one of the following 3 comments:

- (a) “REVIEWED”;
- (b) “REVIEWED AS NOTED”; or
- (c) “REJECTED”.

4.2 The comment “REVIEWED” will be assigned to those Works Submittals that, in the opinion of the City Representative, conform to the requirements of this Project Agreement. Project Co shall comply with and implement such Works Submittals.

4.3 The comment “REVIEWED AS NOTED” will be assigned to those Works Submittals that, in the opinion of the City Representative, generally conform to the requirements of this Project Agreement, but in which immaterial deficiencies have been found by the City Representative’s review. Project Co shall correct these Works Submittals and provide a copy of the corrected Works Submittals to the City Representative. Project Co shall comply with and implement such Works Submittals after correction, in accordance with the comments. If at any time it is discovered that Project Co has not corrected the deficiencies on Works Submittals stamped “REVIEWED AS NOTED”, then Project Co will be required to modify the Works Submittals and Project Scope as required to ensure that the Design and Construction Works comply with the Output Specifications, any other applicable Schedule to the Project Agreement, and the Project Co Proposal Extracts and Project Co may be required, at the City Representative’s discretion, to resubmit relevant Works Submittals. In such circumstances the City Representative shall act promptly in considering whether such deficiencies have been corrected. No extension of time will be given or additional compensation paid in respect of any such modification or re-submittal.

4.4 The comment “REJECTED” will be assigned to those Works Submittals that, in the opinion of the City Representative, contain significant deficiencies or do not generally conform to the requirements of this Project Agreement, including this Schedule 10. Project Co shall correct and re-submit these Works Submittals within 10 Business Days after the Works Submittal has been returned to Project Co, or such longer period as Project Co may reasonably require, and (unless the Works Submittal is re-submitted within 5 Business Days) shall give the City Representative not less than 5 Business Days’

- notice of when the Works Submittals shall be resubmitted. The City Representative will then review such re-submitted Works Submittals and assign a comment to the corrected Works Submittal. The Works Submittals shall be corrected, revised and resubmitted as often as may be required to obtain a comment that permits Project Co to proceed. No extension of time will be given or additional compensation paid in respect of any such modification or re-submittal.
- 4.5 Where the City Representative issues the comment “REVIEWED AS NOTED” or “REJECTED”, the City Representative shall provide reasons for the comment, referencing the particulars of the Section(s) of this Project Agreement that the Works Submittal fails to satisfy, and, if requested by the Project Co Representative, the City Representative shall meet with the Project Co Representative to discuss the reasons for the comment.
- 4.6 If, at any time after assigning any comment to a Works Submittal, the City Representative or Project Co discovers any significant deficiencies or any failure to conform to the requirements of this Project Agreement, the City Representative may revise the comment assigned to any Works Submittal. If the Parties agree or it is determined in accordance with Section 5 of this Schedule 10 that the revised comment is correct, Project Co shall make all such corrections to the Works Submittals and the Project Scope. No extension of time will be given or additional compensation paid in respect of any such modification or re-submittal.
- 4.7 For the purpose of facilitating and expediting the review and correction of Works Submittals, the City Representative and the Project Co Representative shall meet as may be mutually agreed to discuss and review any outstanding Works Submittals and any comments thereon.
- 4.8 Where a Works Submittal is voluminous, the City Representative at his or her discretion may elect to stamp only the cover page or first sheet of the Works Submittal with the appropriate comment, if any, and return to Project Co the cover page or first page together with individual pages or sheets on which comments are made, together with an explanation of the status of all pages not returned to Project Co. Any pages returned without such an explanation as to their status shall be deemed to be “REVIEWED” by the City.
- 4.9 In lieu of returning a Works Submittal, the City Representative may by letter notify Project Co of the comment assigned to the Works Submittal and if such comment is “REVIEWED AS NOTED” or “REJECTED” the letter shall contain comments in sufficient detail for Project Co to identify the correction sought.
5. **DISPUTES**
- 5.1 If Project Co disputes any act of the City or the City Representative in respect of a Works Submittal under this Part A of Schedule 10, Project Co shall promptly notify the City Representative and the Independent Certifier of the details of such Dispute and shall submit the reasons why Project Co believes a different comment should be assigned,

together with appropriate supporting documentation. The City Representative shall review the Works Submittal, the reasons and supporting documentation and within 5 Business Days after receipt thereof shall either confirm the original comment or notify Project Co of a revised comment. If the City Representative confirms the original comment, Project Co may request the Independent Certifier to resolve the Dispute and render a decision within 5 Business Days of such request.

5.2 If either Party is not satisfied, acting reasonably, with the resolution of the Independent Certifier, subject to Section 10.2 of this Schedule 10, either Party may refer the matter for determination in accordance with Schedule 27 – Dispute Resolution Procedure.

5.3 Notwithstanding the provisions of Sections 5.1 and 5.2, the City may direct Project Co to revise the Works Submittals in accordance with the comments of the City and proceed to perform and complete the Design and Construction Works on the basis of such revised Works Submittals. For clarity, such direction shall be considered a Dispute and Project Co may proceed in accordance with Section 58 of the Project Agreement and Schedule 27 – Dispute Resolution Procedure of the Project Agreement.

6. EFFECT OF REVIEW

6.1 Any review and comment by the City or the City Representative of any Works Submittals is for general conformity to the obligations and requirements of this Project Agreement, and any such review and comment shall not relieve Project Co of the risk and responsibility for the Project Scope and for meeting all of its obligations under and requirements of this Project Agreement, and shall not create any new or additional obligations or liabilities for the City. Without limiting the generality of the foregoing any and all errors or omissions in Works Submittals or of any review and comment shall not exclude or limit Project Co's obligations or liabilities in respect of the Design and Construction Works under this Project Agreement or exclude or limit the City's rights in respect of the Design and Construction Works under this Project Agreement.

7. WORKS SUBMITTAL EXPLANATION

7.1 The City is adopting a Project Management and Systems engineering approach for the OLRT which follows the requirements of ISO/IEC 15288 "Systems Engineering Life Cycle Processes". ISO/IEC 15288 describes a set of standard project processes which will provide a systems engineering approach and will offer all project stakeholders a common process framework that improves the communication and cooperation during the project life cycle. This systems engineering approach will be applicable for all levels in the systems hierarchy and for all disciplines.

7.2 At any time, the City Representative may, acting reasonably, require Project Co or any Project Co Parties, including Project Co's consultants and any other relevant personnel, at no additional cost to the City, to explain to the City Representative and the City's advisors the intent of Project Co's Works Submittals, including in relation to any design and any associated documentation and as to its satisfaction of the Output Specifications or any other Schedule to the Project Agreement, as applicable.

8. REVISIONS

- 8.1 Project Co shall ensure that Works Submittals keep the same, unique reference number throughout the review process, and that subsequent revisions of the same Works Submittal are identified by a sequential revision number. Correspondence related to such Works Submittal shall reference the reference number and revision number.
- 8.2 Re-submittals shall clearly show all revisions from the previous Works Submittal. Bound documents, including reports and manuals, shall contain a preface that clearly states how revisions are marked and the previous revision number against which the revisions have been marked. A consistent format for mark-ups of documents shall be used (e.g. deletions struck out and additions underscored). Revised portions of drawings shall be clearly marked (with appropriate means to visually distinguish between the parts of the drawing that are revised and the parts that are not revised) and the revision number and description of the revision shall be included on the drawing.
- 8.3 All revisions on print media shall be initialled by hand by the individual designer, design checker and, where applicable, by the drafter and the drafting checker and shall identify the persons who initialled the Works Submittal. Electronic versions of the Works Submittal shall identify the persons who initialled the revisions to the printed version of the Works Submittal. All such revisions must be able to be integrated into the As Built Drawings.
- 8.4 Project Co shall keep all Design Data current. If any Design Data is revised as part of a Works Submittal, all other Design Data relying on or based on that Design Data shall also be revised accordingly. All such revised Design Data shall also be submitted with the Works Submittal to which it relates.

9. AUDIT BY THE CITY REPRESENTATIVE

- 9.1 Without limiting any other right under this Project Agreement, the City Representative shall have the right to audit all Works Submittals, including comparing all Works Submittals to previous Works Submittals.
- 9.2 If during an audit or at any other time it is discovered by the City or Project Co (or resolved pursuant to Section 9.3 of this Schedule 10) that any Works Submittals were not correctly implemented, Project Co shall at its sole cost immediately take all necessary steps to correct and modify the applicable Works Submittals and the Project Scope to which they relate and shall advise the City Representative of all such corrections and modifications.
- 9.3 Any Dispute concerning the implementation of a Works Submittal, subject to Section 5.1 of this Schedule 10, shall be referred in the first instance to the Independent Certifier for resolution.

10. VARIATIONS

- 10.1 No alteration or modification to the design, quality and quantity of the Project Scope arising from the development of detailed design or from the co-ordination of the design in connection with any Works Submittal shall be construed or regarded as a Variation.
- 10.2 If, having received comments from the City Representative on any Works Submittal, Project Co considers that compliance with those comments would amount to a Variation, Project Co shall, within 10 Business Days of receipt of and before complying with the comments, provide written notice to the City of the same and, if it is agreed by the Parties that a Variation would arise if the comments were complied with, the City may, at its election, (a) issue a Variation Enquiry and it shall be dealt with in accordance with Schedule 22 – Variation Procedure or (b) amend its comment on the Works Submittal. If the Parties do not agree that a Variation would arise if the comments were complied with, either party may proceed to resolve the matter in accordance with Section 5 of this Schedule 10 including for clarity, the exercise by the City of its rights under Section 5.3 of this Schedule 10. Subject to the foregoing sentence, any failure by Project Co to notify the City in accordance with this Section 10.2 that Project Co considers compliance with any comments of the City Representative would amount to a Variation shall constitute an irrevocable acceptance by Project Co that any compliance with the City Representative's comments shall be without cost to the City and without any extension of time.

**SCHEDULE 10
REVIEW PROCEDURE****PART B
MAINTENANCE TERM****1. MAINTENANCE SUBMITTALS**

- 1.1 The provisions of Part B of this Schedule 10 shall apply to any and all items, documents and anything else required or specified by this Project Agreement, other than the Design Development Submittals, the Construction Document Submittals and the Design Data, to be submitted to, reviewed or otherwise processed by the City in accordance with the Review Procedure in respect of the Project, after the Revenue Service Availability, except in respect of the completion of Minor Deficiencies, including any and all subsequent revisions, amendments and changes thereto (collectively and individually, “**Maintenance Submittal**” or “**Maintenance Submittals**” as applicable in Part B of this Schedule 10).
- 1.2 Project Co shall allow a period of 10 Business Days (or such longer period as the Parties may agree) from the date of receipt for review of and response to each Maintenance Submittal.
- 1.3 Project Co shall, in scheduling Maintenance Submittals and in the performance of the Project Scope, allow adequate time prior to performing the Project Scope that are the subject of the Maintenance Submittals, for review of the Maintenance Submittals and for Project Co to make changes to Maintenance Submittals that may be required if comments are received on the Maintenance Submittals, such review and required changes to be in accordance with Part B of this Schedule 10.

2. GENERAL REQUIREMENTS FOR MAINTENANCE SUBMITTALS

- 2.1 Unless otherwise specified by the City Representative, Project Co shall issue 3 printed copies of all Maintenance Submittals to the City, together with an electronic copy in a format agreed by the Parties acting reasonably.
- 2.2 Project Co shall compile and maintain a register of the date and contents of the submission of all Maintenance Submittals and the date of receipt and content of all returned Maintenance Submittals and comments thereon, which shall be provided to the City upon request.
- 2.3 All Maintenance Submittals shall be in English.
- 2.4 All Maintenance Submittals required by this Project Agreement or by Applicable Law to be signed or sealed by persons with professional designations (including, where applicable, by registered professional engineers or architects) shall, where applicable, be so signed and sealed.

- 2.5 All Maintenance Submittals shall include copies of all documents to be reviewed and shall clearly identify the purpose of the Maintenance Submittal and Project Co's proposed course of action relating to the Maintenance Submittal and the Project Scope that are the subject of the Maintenance Submittal.
- 2.6 All Maintenance Submittals shall, where applicable, refer to the relevant provisions of the Expanded Output Specifications and/or any other applicable Schedule to the Project Agreement.
- 2.7 All Maintenance Submittals shall be clearly identified as a Maintenance Submittal and shall be delivered with appropriate covering documentation, which shall include a list of all attached Maintenance Submittals and for each Maintenance Submittal:
- (a) the document number(s) or drawing number(s);
 - (b) revision numbers (if applicable);
 - (c) document or drawing title(s);
 - (d) name of entity that prepared the Maintenance Submittal;
 - (e) the Maintenance Submittal history showing date and delivery information and/or log number of all previous submissions of that Maintenance Submittal; and
 - (f) identification of any previous Maintenance Submittal superseded by the current Maintenance Submittal.

3. COMMENTS

- 3.1 The City Representative shall review and respond to each Maintenance Submittal in accordance with the time periods specified in Section 11.2 of this Schedule 10. The City Representative shall return Maintenance Submittals to Project Co and assign one of the following 3 comments:
- (a) "REVIEWED";
 - (b) "REVIEWED AS NOTED"; or
 - (c) "REJECTED".
- 3.2 The comment "REVIEWED" will be assigned to those Maintenance Submittals that, in the opinion of the City Representative, conform to the requirements of this Project Agreement. Project Co shall comply with and implement such Maintenance Submittals.
- 3.3 The comment "REVIEWED AS NOTED" will be assigned to those Maintenance Submittals that, in the opinion of the City Representative, generally conform to the requirements of this Project Agreement, but in which immaterial deficiencies have been found by the City Representative's review. Project Co shall correct these Maintenance

Submittals and provide a copy of the corrected Maintenance Submittals to the City Representative. Project Co shall comply with and implement such Maintenance Submittals after correction, in accordance with the comments. If at any time it is discovered that Project Co has not corrected the deficiencies on Maintenance Submittals stamped “REVIEWED AS NOTED”, then Project Co will be required to modify the Maintenance Submittals and Project Scope as required to ensure that the Project Scope comply with the Expanded Output Specifications and Project Co may be required, at the City Representative’s discretion, to resubmit relevant Maintenance Submittals. In such circumstances the City Representative shall act promptly in considering whether such deficiencies have been corrected. No extension of time will be given or additional compensation paid in respect of any such modification or re-submittal.

- 3.4 The comment “REJECTED” will be assigned to those Maintenance Submittals that, in the opinion of the City Representative, contain significant deficiencies or do not generally conform with the requirements of this Project Agreement, including this Schedule 10. Project Co shall correct and re-submit these Maintenance Submittals within 10 Business Days after the submittal has been returned to Project Co, or such longer period as Project Co may reasonably require, and (unless the Maintenance Submittal is re-submitted within 5 Business Days) shall give the City Representative not less than 5 Business Days’ notice of when the Maintenance Submittals shall be resubmitted. The City Representative will then review such re-submitted Maintenance Submittals and assign a comment to the corrected Maintenance Submittal. The Maintenance Submittals shall be corrected, revised and resubmitted as often as may be required to obtain a comment that permits Project Co to proceed. No extension of time will be given or additional compensation paid in respect of any such modification or re-submittal.
- 3.5 Where the City Representative issues the comment “REVIEWED AS NOTED” or “REJECTED”, the City Representative shall provide reasons for the comment, referencing the particulars of the Section(s) of this Project Agreement that the Maintenance Submittal fails to satisfy, and, if requested by the Project Co Representative, the City Representative shall meet with the Project Co Representative to discuss the reasons for the comment.
- 3.6 If, at any time after assigning any comment to a Maintenance Submittal, the City Representative or Project Co discovers any significant deficiencies or any failure to conform to the requirements of this Project Agreement, the City Representative may revise the comment assigned to any Maintenance Submittal. If the Parties agree or it is determined in accordance with Section 14 of this Schedule 10 that the revised comment is correct, Project Co shall make all such corrections to the Maintenance Submittals and the Project Scope. No extension of time will be given or additional compensation paid in respect of any such modification or re-submittal.
- 3.7 For the purpose of facilitating and expediting the review and correction of Maintenance Submittals, the City Representative and the Project Co Representative shall meet as may be mutually agreed to discuss and review any outstanding Maintenance Submittals and any comments thereon.

- 3.8 Where a Maintenance Submittal is voluminous, the City Representative at his or her discretion may elect to stamp only the cover page or first sheet of the Maintenance Submittal with the appropriate comment, if any, and return to Project Co the cover page or first page together with individual pages or sheets on which comments are made, together with an explanation of the status of all pages not returned to Project Co. Any pages returned without such an explanation as to their status shall be deemed to be “REVIEWED” by the City.
- 3.9 In lieu of returning a Maintenance Submittal, the City Representative may by letter notify Project Co of the comment assigned to the Maintenance Submittal and if such comment is “REVIEWED AS NOTED” or “REJECTED” the letter shall contain comments in sufficient detail for Project Co to identify the correction sought.

4. DISPUTES

- 4.1 If Project Co disputes any act of the City or the City Representative in respect of a Maintenance Submittal under this Part B, Project Co shall promptly notify the City Representative of the details of such Dispute and shall submit the reasons why Project Co believes a different comment should be assigned, together with appropriate supporting documentation. The City Representative shall review the Maintenance Submittal, the reasons and supporting documentation and within 5 Business Days after receipt thereof shall either confirm the original comment or notify Project Co of a revised comment.
- 4.2 If after such review by the City Representative Project Co disputes the comment on a Maintenance Submittal, subject to Section 19.1 of this Schedule 10 Project Co may refer the matter for determination in accordance with Schedule 27 – Dispute Resolution Procedure.

5. EFFECT OF REVIEW

- 5.1 Any review and comment by the City or the City Representative of any Maintenance Submittals is for general conformity to the obligations and requirements of this Project Agreement, and any such review and comment shall not relieve Project Co of the risk and responsibility for the Project Scope and for meeting all of its obligations under and requirements of this Project Agreement, and shall not create any new or additional obligations or liabilities for the City. Without limiting the generality of the foregoing any and all errors or omissions in Maintenance Submittals or of any review and comment shall not exclude or limit Project Co’s obligations or liabilities under this Project Agreement in respect of matters related to the Maintenance Submittal or exclude or limit the City’s rights under this Project Agreement in respect of matters related to the Maintenance Submittal.

6. MAINTENANCE SUBMITTAL EXPLANATION

- 6.1 At any time, the City Representative may, acting reasonably, require Project Co or any Project Co Parties, including Project Co’s consultants and any other relevant personnel, at no additional cost to the City, to explain to the City Representative and the City’s

advisors the intent of Project Co's Maintenance Submittals, including as to its satisfaction of the Expanded Output Specifications.

7. REVISIONS

- 7.1 Project Co shall ensure that Maintenance Submittals keep the same, unique reference number throughout the review process, and that subsequent revisions of the same Maintenance Submittal are identified by a sequential revision number. Correspondence related to such Maintenance Submittal shall reference the reference number and revision number.
- 7.2 Re-submittals shall clearly show all revisions from the previous Maintenance Submittal. Bound documents, including reports and manuals, shall contain a preface that clearly states how revisions are marked and the previous revision number against which the revisions have been marked. A consistent format for mark-ups of documents shall be used (e.g. deletions struck out and additions underscored). Revised portions of drawings shall be clearly marked (with appropriate means to visually distinguish between the parts of the drawing that are revised and the parts that are not revised) and the revision number and description of the revision shall be included on the drawing.
- 7.3 All revisions on print media shall be initialled by hand by the individual designer, design checker and, where applicable, by the drafter and the drafting checker and shall identify the persons who initialled the Maintenance Submittal. Electronic versions of the Maintenance Submittal shall identify the persons who initialled the revisions to the printed version of the Maintenance Submittal.

8. AUDIT BY THE CITY REPRESENTATIVE

- 8.1 Without limiting any other right under this Project Agreement, the City Representative shall have the right to audit all Maintenance Submittals, including comparing all Maintenance Submittals to previous Maintenance Submittals.
- 8.2 If during an audit or at any other time it is discovered by the City or Project Co that any Maintenance Submittals were not correctly implemented, Project Co shall at its sole cost immediately take all necessary steps to correct and modify the applicable Maintenance Submittals and the Project Scope to which they relate and shall advise the City Representative of all such corrections and modifications.

9. VARIATIONS

- 9.1 If, having received comments from the City Representative on any Maintenance Submittal, Project Co considers that compliance with those comments would amount to a Variation, Project Co shall, within 10 Business Days of receipt of and before complying with the comments, provide written notice to the City of the same and, if it is agreed by the Parties, or is determined pursuant to Schedule 27 – Dispute Resolution Procedure, that a Variation would arise if the comments were complied with, the City may at its election, either issue a Variation Enquiry and it shall be dealt with in accordance with Schedule 22 – Variation Procedure or amend its comment on the Maintenance Submittal.

Any failure by Project Co to notify the City in accordance with this Section 19.1 that Project Co considers compliance with any comments of the City Representative would amount to a Variation shall constitute an irrevocable acceptance by Project Co that any compliance with the City Representative's comments shall be without cost to the City and without any extension of time.

**SCHEDULE 10
REVIEW PROCEDURE****APPENDIX A**
MINIMUM DESIGN AND CONSTRUCTION SUBMITTAL REQUIREMENTS**1. TECHNICAL APPRAISAL FORMS****1.1 Submission Requirements**

- (a) Each Final Design Development Submittal and Construction Document Submittal package submitted by Project Co shall be accompanied by a completed Technical Appraisal Form (TAF).
- (b) In any case where submitted Design Data involves any mechanical or electrical and/or Vehicles and Systems functions, or similar specialization, Project Co shall submit to the City Representative in accordance with the Review Procedure a TAF in respect of such data and functions.
- (c) In any case where the Works involves the complete or partial demolition of an existing Structure, Project Co shall submit to the City Representative in accordance with the Review Procedure a TAF in respect of such complete or partial demolition.

1.2 TAF Form and Content

Each TAF submitted by Project Co pursuant to Section 1.1(a) - Submission Requirements of this Appendix A shall be in the format shown in Attachment 1 - Sample Contents for a Structural TAF to this Schedule 10 and shall:

- (a) for Final Design Development Submittals, include the relevant design criteria, environmental and ground considerations, and interface requirements, together with a listing of the design documentation included in the design package;
- (b) be signed by:
 - (i) the Project Co Representative; and
 - (ii) the designer(s) and constructor(s), or their respective principal(s), as necessary.

1.3 TAF Variation

Any variation to a TAF which has been subject to the Review Procedure during design, assessment or any Construction Activity shall be submitted in accordance with the Review Procedure as an addendum to the TAF.

2. DESIGN SUBMISSIONS, REVIEW AND REPORTS**2.1 General**

All Design Submissions shall include, without limitation, the name, licences, qualifications and/or certifications of Third Parties used by Project Co.

2.2 Format of Design Submission

- (a) Project Co shall provide two hard copies and one electronic copy of each Design Development Submittal.
- (b) Drawings shall be in a format in accordance with the requirements of the City of Ottawa standards. Project Co shall confirm drawing conventions and standards, including but not limited to those standards used for any computer aided drawing and design (CADD) software, title block and stationing convention, with the City Representative prior to commencing design drawing production.
- (c) Drawings for the New Municipal Infrastructure to be constructed by Project Co shall be in accordance with the applicable City's standards.

2.3 Pre final and Final Design Development and Construction Document Submittal Review

Final Submittals from all design disciplines shall be submitted to the City Representative in accordance with Schedule 10 – Review Procedure and shall consist of the relevant TAF(s) together with all final design drawings, supporting Design Data and calculations required in accordance with this Appendix A.

2.4 Objection to Design Data

If the City Representative objects to any Design Data in accordance with the Review Procedure, the City Representative shall so notify Project Co and Project Co shall, unless Project Co disputes the objection by the City Representative to such Design Data in accordance with the Dispute Resolution Procedure, either:

- (a) cause to be made such alterations and additions as may be necessary such that the Design Data accords with the Project requirements and all other requirements of this Project Agreement, all in accordance with the Review Procedure; or
- (b) subject to the other provisions of this Project Agreement, submit an Innovation Proposal.

2.5 Temporary Works

As a minimum, design submissions for Temporary Works shall include those items intended for public use and/or potentially affecting public safety. Final designs for these

Temporary Works shall be submitted to the City Representative in accordance with the Review Procedure.

Design Data relating to any Temporary Works shall be checked as follows:

- (a) any such Design Data prepared by or on behalf of the Construction Contractor requires an independent check by the designer; and
- (b) any such Design Data prepared by the designer requires an independent check by a Checking Team which may be from the designer but shall be independent of the Design Team.

In performing the check referred to in paragraphs (a) and (b) above, the designer shall satisfy itself that:

- (a) the Design Data meets the Project requirements and otherwise complies with the requirements of the Project Agreement;
- (b) the Temporary Works (as a whole and the constituent parts) are satisfactory for the safe and proper discharge of Project Co's relevant obligations; and
- (c) the Design Data reflects the requirements of the relevant governmental authorities for all affected roads or areas used by or accessible to the public other than the New System Infrastructure.

Where any Temporary Works may endanger public safety on other road or area used by or accessible to the public other than the New LRT Infrastructure, Project Co shall consult the relevant governmental authority and the Design Data shall reflect the requirements of such authority.

3. FINAL DESIGN DEVELOPMENT SUBMITTALS

3.1 General

Final Design Development Submittals shall be prepared and shall have indexes and sectional dividers. The design folders shall contain pertinent correspondence, shall be arranged by subject matter in chronological order, and shall include design calculations and backup information. Design submissions shall include, without limitation, copies of all approvals, design reports, correspondence and calculations.

3.2 Public Art Integrated Projects

Design Review documents and drawings submissions to be done at the first Pre-final, second Pre-final and Final Design Development submittals.

The Final Design Development Submittals shall, without limitation:

- (a) First Pre-final Submittal:

- (i) Base construction costs (without application of art) of all built components affected by the art programme at all stations, including: Roof, Windscreens, Landscape, Escalator Chamber, and Tunnel & Platform Walls on both an overall and on a component or square meter or cubic meter cost basis;
 - (ii) Identification of artist(s);
 - (iii) Overview of art concept, including sketches, two-dimensional and three-dimensional (if available) representations, materials to be used;
 - (iv) Proposed locations for art;
 - (v) Description of implications for other construction disciplines; and
 - (vi) Anticipated details of integration of artwork into architecture.
- (b) Second Pre-final Submittal:
- (i) Developed art concept, including sketches, two-dimensional and three-dimensional representations of artwork integrated into architecture at all locations, materials and methods of art production and integration to be used, including:
 - (A) Integration of artwork with all other construction disciplines;
 - (B) Full scale, details of integration of artwork into architecture;
 - (C) Itemized artwork costing net of base construction costs; and
 - (D) Specific locations for bench and signbox art programmes at all stations.
- (c) Final Design Development Submittal:
- (i) Final art concept, including sketches, two-dimensional and three-dimensional representations of artwork integrated into architecture at all locations, materials and methods of art production and integration to be used, including:
 - (A) Complete integration of artwork with all other construction disciplines;
 - (B) Final, full scale, details of integration of artwork into architecture;
 - (C) Material sample of art applied to all architectural finishes affected by art project; and
 - (D) Final artwork costing net of base construction costs.

3.3 Public Art Non-Integrated Projects

Design Review documents and drawings submissions to be done at the first Pre-final, second Pre-final and Final Design Development submittals. The Final Design Development Submittals shall, without limitation:

- (a) First Pre-final Submittal:
 - (i) Base supply and installation costs of all built components affected by the art program including: Ceremonial Gate and Lantern at Lebreton Station;
 - (ii) Anticipated details of installation of artwork;
 - (iii) Cost Allowance for installation of all artworks;
 - (iv) Description of implications for other construction disciplines; and
 - (v) Base construction costs (without application of art) of all built components affected by the art programme at all stations, including: Ceremonial Gate and Lantern, on both an overall and on a component or square meter or cubic meter cost basis.

3.4 Utilities

The Final Design Development Submittals shall, without limitation:

- (a) contain all signed and sealed utility plan and profile drawings;
- (b) include all comments from all utility agencies;
- (c) address any comments of the City Representative from the Design Review Meetings, internal design reviews, quality control, and design reports;
- (d) show offsets for any utility within 2m of the proposed work;
- (e) plant location must be tied to property line, curb or a permanent structure;
- (f) show duct configuration;
- (g) show all plant / appurtenances; and
- (h) include a key plan of the proposed work.

Electronic Utility drawing submittals shall:

- (a) Have a total file size less than 3 MB;
- (b) All drawings must be in pdf format;

- (c) A narrative describing the work to be undertaken, a street location, the project manager, any known utility relocations, and any other information relevant to this aspect of the Project;
- (d) One full sized hard copy of plans; and
- (e) four half sized copy of plans.

Manual Utility drawing submittals shall:

- (a) Include 25 CD's;
 - (i) All CD's shall contain plans in PDF format;
 - (ii) All CD's must be individually labelled with the name of the Project (i.e. major streets, Project No., Utility /Consultant, date)
 - (iii) All CD's must be in a case/ protective packaging; and
 - (iv) All CD's must include a memo describing the works, a key plan and a table of contents/ index.
- (b) One full sized hard copy set of plans;
- (c) Four half sized hard copy set of plans;
- (d) A key plan;
- (e) A narrative describing the work to be undertaken, a street location, the project manager, any known utility relocations and any other relevant information; and
- (f) A copy of the table of contents.

3.5 **Drainage and Storm Water**

The Final Design Development Submittals shall, without limitation:

- (a) contain all signed and sealed drainage drawings;
- (b) include a stormwater management plan and drainage design report;
- (c) address any comments of the City Representative from the Design Review Meetings, internal design reviews, quality control, and design reports;
- (d) include revisions, stakeholder issues, environmental issues and mitigation plans;
- (e) include the Ministry of Environment Environmental Compliance Approval for sewage works; and

- (f) include bypass pumping plans.

3.6 **Geotechnical Design**

For the first Pre-final, second Pre-final and Final Design Development Submittals Project Co shall prepare a comprehensive geotechnical design report for the Project that covers existing geotechnical information and known site conditions, any new investigations performed for the Project, geotechnical engineering analysis, geotechnical design assumptions and design parameters (and the basis for these) and geotechnical design recommendations.

- (a) At the first Pre-final Design Submittal provide a geotechnical design report, for all Structures, including stations, bridges, tunnels, retaining walls, and overhead catenary Support Structures. The report shall include a narrative, design calculations, and a reduced size (11"x17") set of drawings showing the general arrangements of all structures. The report shall provide the following:
- (i) a summary of any additional work and subsurface investigations that have been completed since the interim submittals, including drafted drill summary logs indicating all relevant drilling, sampling and testing information in accordance with accepted practice;
 - (ii) an interpreted geologic profile along the entire alignment;
 - (iii) recommendations for foundation systems for structures, including loads and and/or allowable loading stresses and estimates of total and differential settlements at 2, 5, 10, 20, 40 and 100 years following construction;
 - (iv) geotechnical design recommendations for retaining structures;
 - (v) geotechnical design recommendations for guideways and pavements;
 - (vi) design of high fill embankments, including fill stages and consolidation period between each fill stage;
 - (vii) design details for time-rate-of-settlement control measures such as prefabricated vertical drains, lightweight fills, and/or preload/surcharge;
 - (viii) estimates of total and differential settlement of embankments, guideways and roadways at 2, 5, 10, 20, 40 and 100 years following construction;
 - (ix) plans and procedures for dewatering/unwatering or groundwater drawdown/depressurization where it is necessary for completing and maintaining excavations;
 - (x) plans and procedures for mitigating the effects of time dependent deformation (swelling) in shale bedrock, where applicable;

- (xi) a preliminary monitoring and instrumentation plan;
 - (xii) requirements for ground improvement measures necessary to meet the static and seismic performance requirements for foundations, cut and fill slopes, embankments and retaining structures;
 - (xiii) an assessment of the stability of approach embankments, guideway embankments, retaining structures, cut slopes and fill slopes under static and seismic loading conditions and the ability of these to meet the seismic performance requirements;
 - (xiv) descriptions of aesthetic treatment and maintenance considerations for all retaining walls, slopes, and embankments;
- (b) In addition to those items required for the first Pre-final Design Submittal, the second Pre-final Design Submittal shall include:
- (i) resolution of all issues identified during reviews of the first Pre-final Design Submittals and where required, revision of the submittals;
 - (ii) Hydrogeological Assessment as required.
 - (iii) Construction Impact Assessment Report (CIAR):
 - (A) Stage 1 – Report presenting deformation analysis methods, supporting calculations, and results. Highlight all key assumptions. Provide plan sheets showing contours of ground movement, including vibration attenuation and groundwater drawdown. List all Structures within the Zone of Influence, anticipated Structure movements and deformations, and anticipated types of damage. Identify which Structures will require mitigation measures in advance of construction to reduce the risk of potential impacts. Identify which Structures will be monitored during construction and mitigated if measured movements or deformations during construction indicate that impacts will be more severe than anticipated. The report may be produced for logical geographic and/or Project divisions rather than producing a single comprehensive report for the entire Project. Submit draft and final versions of the report(s).
 - (iv) A Geotechnical Instrumentation and Monitoring Plan which shall include, without limitation:
 - (A) Method Statement and construction drawings showing the location of the Construction Monitoring Zone, instrumentation installation locations and survey coordinates as applicable, structure being monitored, trigger and action values, and instrument reading frequency. Include geotechnical instrumentation types and

- installation details, schematics of physical locations of the components required for reading, transmitting, and storing automatically-read geotechnical instrumentation.
- (B) Geotechnical instrumentation and systems hardware, including without limitation:
- (1) Product data sheets, installation procedures, and manufacturers stated instrumentation accuracies.
 - (2) Operator manuals, including web-based geotechnical instrumentation reporting systems.
 - (3) Instructions for baselining instruments.
- (C) Implementation Plan on exceeding trigger and action levels;
- (D) Well and borehole decommissioning plan;
- (E) Geotechnical instrumentation and monitoring:
- (1) Geotechnical instrumentation installation records including drill logs identifying subsurface conditions, and performance of acceptance tests to ensure that the electronically read instruments are functioning as intended. This is to be submitted within five (5) working days of completing installation.
 - (2) Factory calibrated test certificates for instrumentation.
- (F) As-built plans of geotechnical instrumentation installation locations which shall be updated as set out in Schedule 33 to this Project Agreement.
- (G) Schedule of assets and associated information showing status of impact assessments acceptances of the monitoring and mitigation plans.
- (c) In addition to those items required for the first and second Pre-final Design Submittals, the Final Design Development Submittal shall include:
- (i) Resolutions of all issues identified during reviews of the first and second Pre-final Design Development Submittals, and where required, revision of the submittals;
 - (ii) Construction Impact Assessment Report (CIAR):

- (A) Stage 2 – Report detailing the impact mitigation and geotechnical instrumentation requirements on a structure-specific basis. Specify groundwater drawdown limits. Include supporting calculations and design drawings. Provide documentation showing that the proposed mitigation is acceptable to the affected third party. Submit draft and final versions of the report(s).
- (B) Addenda to the CIAR as needed to reflect revisions to the protection of Structures design based on the collection of new data relevant to the anticipated ground movements and Structure responses.
- (iii) Damage Remediation Plan for Existing Adjacent Structures caused by Project Co's Actions, which shall include without limitation:
 - (A) A detailed plan for remedying damage to Existing Adjacent Structures caused by Project Co's actions; and
 - (B) A plan for interacting with Existing Adjacent Structures owners.
- (iv) all final design drawings;
- (v) a final geotechnical design report.

3.7 **Structural Design**

The first Pre-final, second Pre-final and Final Design Development Submittals shall, without limitation:

- (a) contain a description of aesthetic treatments for bridges and walls;
- (b) contain a description of all identified constraints and restrictions;
- (c) include proof of notification to all third party agencies;
- (d) include a Bridge Condition Report following OSIM guidelines with recommendations for all existing structures;
- (e) include a final design report for structures;
- (f) contain a description of maintenance considerations for all structures throughout the Maintenance Term;
- (g) include Construction Specifications;
- (h) include standards and non-standard drawings;
- (i) include Quality Control documentation for record; and

- (j) contain all signed and sealed final design drawings and corresponding calculations.

3.8 **Guideway**

The first Pre-final, second Pre-final and Final Design Development Submittals shall include at a minimum the following:

- (a) Confirmation that all applicable standards used, including names, date and reference have been satisfied
- (b) confirmation that PA and Output Specifications requirements have been incorporated;
- (c) narrative, drawings and calculations supporting the basis for design;
- (d) details of Special Trackwork;
- (e) all signed and sealed Guideway drawings; and
- (f) reduced size (11" x 17") drawings showing the Guideway alignment in plan and profile.

3.9 **Tunnel**

The first Pre-final, second Pre-final and Final Design Development Submittal shall demonstrate on a progressive basis that all equipment, materials, means and methods, and sequences have been selected and designed in accordance with the Project design criteria and that completed Tunnel Works shall satisfy all design and construction performance criteria.

- (a) The first Pre-final Submittal shall comprise a General Tunnel Design and Construction Report containing narrative, drawings and calculations supporting the basis for design for temporary and permanent works. Separate reports may be submitted for Tunnel reaches based on locations and construction methods. Amplify details for transitions from one design type to another. Integrate design of initial support or temporary excavation support with that of permanent linings. The report shall include, at a minimum, the following:
 - (i) Tunnel Excavation Plan, which shall contain at a minimum:
 - (A) Methods, systems, staging, and plant arrangement and sizing; preparation and layouts for launch and retrieval, including equipment hold points; excavation and sequencing of initial support or excavation support including detailed cycle times. Include commensurate detail for other major associated activities;

- (B) Muck handling plan, including narrative and working drawings for in-tunnel and portal, and haul routes; and
- (C) Preliminary temporary and initial support design including working drawings and sequencing.
- (ii) Permanent Lining:
 - (A) Precast concrete segmental lining details, including, calculations demonstrating compliance with specified requirements for segments and segment ring systems;
 - (B) Working drawings and calculations for cast-in-place and shotcrete permanent linings; and
 - (C) Preliminary details for waterproofing design including working drawings and typical layouts for each structure type.
- (iii) Cut and Cover Structures:
 - (A) Excavation support and temporary road deck plans and calculations;
 - (B) Temporary utility support plans and calculations for utilities no to be relocated;
 - (C) Temporary utility protection;
 - (D) Utility relocations.
- (b) The second Pre-final Design Development Submittal shall include a revised General Tunnel Design and Construction Report. The report will in addition to the items addressed in the first Pre-final Design Development Submittal include:
 - (i) Meeting and coordination plan, including:
 - (A) Tabulation of required meetings during design and construction and coordination efforts;
 - (B) Plan for interaction with CN/VIA Rail
 - (ii) Initial and Temporary Support Plan:
 - (A) Design calculations and analysis for initial and temporary support;
 - (B) Working drawings and sequencing.
 - (iii) Permanent Lining Plan:

- (A) Design calculation and analysis for all permanent linings;
- (B) Narrative report supplemented with Working Drawings showing methodology for sequencing, scheduling, staging, and performing construction activities for permanent linings. Include details of equipment and supporting plant, cycle times, geometries and dimensions;
- (C) Pre-Cast Concrete Segmental Lining:
 - (1) Product data for gaskets, bolts and/or dowels, lifting sockets, packer if used, and reinforcement;
 - (2) Joint details showing interaction and geometry of packing as related to gasket performance.
- (iv) Waterproofing Plan:
 - (A) Means and methods for installation;
 - (B) Product data for key components of the waterproofing system, including material test reports and certifications;
 - (C) Recommended repair procedures by manufacturer;
 - (D) Working drawings for Waterproofing, including plans, sections and details; which shall contain, without limitations:
 - (1) Sequence of waterproofing installation relative to construction sequence;
 - (2) Typical layouts for each type of Structure;
 - (3) Waterproofing terminations for each structure and between different waterproofing systems;
 - (4) Waterproofing at penetrations including electrical ducts, mechanical pipes and sleeves;
 - (5) Waterproofing at corners;
 - (6) Waterproofing connection to drainage systems; and
 - (7) Attachment assembly including rebar support details;
- (v) Orientation and training plan for excavation and support equipment, and other major plants.
- (vi) Tunnel Quality Plan, including:

- (A) Quality control plans for key Construction Activities;
- (B) Quality control measures and requirements for tunnel performance and other data acquisition and monitoring, remedial plans for quality defects and assuring that deficiencies do not reoccur;
- (C) Specific details of data acquisition and monitoring plans including locations, frequencies and Trigger and Action Levels; and remedial plans consistent with means and methods for quality defects and assuring that deficiencies do not reoccur;
- (D) Material, testing, manufacturer certifications, and construction specifications.
- (vii) Certifications for materials and equipment demonstrating compliance with specified requirements.
- (viii) Shop drawings for items fabricated specifically for Construction of the Works, including a schedule of Tunnel Shop Drawings to be submitted.
- (ix) Mix Designs including those for concrete, shotcrete and grout. Submittal to include trial and pre-production testing results for each proposed Mix design.
- (x) Test Reports, Inspection Reports, and Sampling Plans:
 - (A) Requirements for test and inspection reports and sampling plans required to verify design basis;
 - (B) Requirements for sampling plans for generated spoils and other materials; and factory tests, site tests, grouting and other required documented analyses;
 - (C) Requirements for inspection reports, such as weld testing.
- (xi) Contingency plans for lost ground, misalignment, inundation events, power loss, loss of communications, fire or injury and any other relevant event.
 - (A) Report addressing the approach for accommodating the proposed 3000mm CSO at Kent Street. The report shall include a narrative, working drawings, and calculations that addresses the following:
 - (1) The anticipated impacts of OLRT Tunnel construction on the future CSO tunnel construction.

- (2) Analysis demonstrating that the performance and maintenance of the proposed CSO tunnel will not be impacted by the OLRT Tunnel.
 - (3) Details required for mitigation work or modifications to the OLRT Tunnel design to accommodate the proposed CSO tunnel.
 - (4) Anticipated loads imposed by the OLRT Tunnel on the proposed CSO tunnel.
- (B) If Project Co elects to design the Tunnel Structure below the Vertical Alignment Envelope limit of 50.0 meters at this location, a technical and cost analysis report will be required. The report shall include a narrative and working drawings and design calculations.
- (1) The report shall demonstrate that the lower design elevation is technically feasible. The analysis shall be based on numerical analysis methods.
 - (2) The report shall provide the anticipated impacts of OLRT Tunnel construction on the future CSO tunnel construction.
 - (3) The report shall demonstrate that the performance and maintenance of the proposed CSO tunnel will not be impacted by the OLRT Tunnel.
 - (4) The report shall include details required for mitigation work or modifications to the OLRT Tunnel design to accommodate the proposed CSO tunnel.
 - (5) The report shall provide anticipated loads imposed by the OLRT Tunnel on the proposed CSO tunnel.
 - (6) The report shall address all cost and/or economic considerations.
- (xii) Tunnel ventilation design:
- (A) Overall approach to design and construction of the emergency ventilation systems;
 - (B) System operation and control, in normal and emergency operation modes;
 - (C) Site drawings indicating the location of the smoke ventilation shafts and their relationship to Station entrances, Station air intakes and openings of adjacent buildings, and other objects;

- (D) Results of smoke dispersion/recirculation analysis;
- (E) Details of the system, including but not limited to: SCADA system, the axial flow and jet fans, and ventilation dampers;
- (F) Fire Life Safety protocol.
- (xiii) Tunnel Commissioning Report.
- (c) The Final Design Submittal shall include a revised General Tunnel Design and Construction Report. The report will in addition to the items addressed in the Second Pre-Final Submittal include:
 - (i) Tunnel Boring Plan:
 - (A) Tunnel Boring Machine (TBM):
 - (1) Detailed description for TBM and trailing gear, including drawings and plans for equipment layout, calculations, and back-up information;
 - (2) Detailed narrative supported with sketches demonstrating the ability of the TBM and trailing gear to perform in the anticipated ground conditions;
 - (3) Provide details of gas detection and guidance systems;
 - (4) Test reports for factory tests and on-site tests demonstrating compliance with performance requirements;
 - (5) Site layout and staging plans during mobilization and excavation.
 - (B) Plan for start-up/launching of the TBM.
 - (C) Tail void grouting:
 - (1) Working Drawings and method statements.
 - (2) Certifications of compliance for materials and calibration of gauges and meters.
 - (3) Quality control plans for assuring grout quality and placement performance.
 - (D) Precast concrete segmental lining:

- (1) Working Drawings and method statements for key components and segment production, including back-up calculations when applicable;
 - (2) Shop Drawings including geometry of details of segments, segment sizes, orientation, tapers, reinforcement, gasket groove geometry, joint details, packing, inserts, joint connections, and segment identification;
 - (3) Shop Drawings for segment molds, fully dimensioned, including fabrication tolerances;
 - (4) Certifications of compliance for materials, and that segments meet design criteria;
 - (5) Quality control plans for segment casting, including maintaining tolerances, testing and sampling for strengths for stripping and demolding, controlling shrinkage and temperature cracks, evenly distributing fibers or other reinforcement, methods for curing, record keeping, repair procedures and records, ensuring that segment production does not impact tunnel excavation rates, segment protection during handling and transport, and ring mockups for verifying dimensional tolerances;
 - (6) Plans for storage of tunnel liners prior to placement including, heating of tunnel liners, as determined necessary by Project Co.
- (ii) Mined Structures Plan:
- (A) Means and methods supplemented by Working Drawings for:
 - (1) Excavation of soil and rock;
 - (2) Installation of initial support including supplemental measures, and measures for profile control and groundwater control; and
 - (3) Underpinning of or installation of protection systems for Existing Adjacent Structures;
 - (B) Work plan for cross passage excavation, including temporary bracing of segmental lining during break-out;
 - (C) Product data, mix designs, and quality control test reports for materials used.

- (iii) Cut and Cover Structures Plan:
- (A) Working Drawings and staging plans, including calculations as required for:
- (1) Temporary track modification and temporary bridges for rail operations;
 - (2) Sequencing of work while maintaining required building access, traffic with temporary traffic moves and detours, and live rail operations. Provide schedules of traffic and rail work periods as appropriate and identify work operations which must be accomplished within including mobilization and demobilization efforts and allowances for material cure or set times and protection of the work outside work periods. Coordinate with other required submittals, such as traffic management and circulation plans;
 - (3) Lift drawings for concrete pours showing details for each pour including control joints, construction joints, keyways, waterstops, waterproofing, required embedments, and falsework;
 - (4) Details of backfill above cut-and-cover structures, including provisions for utilities and other subsurface infrastructure, and details of track support.
- (B) Means and methods for:
- (1) Excavation of soil and rock, construction of excavation support systems and road deck structure;
 - (2) Installing temporary support for live rail service;
 - (3) Installation of temporary utility supports;
 - (4) Control of ground water. Include working drawings and calculations demonstrating compliance with specified requirements;
 - (5) Concrete construction, including type and arrangement of formwork;
 - (6) Structure underpinning and special support plans and calculations coordinated with requirements of Protection of Existing Adjacent Structures.

3.10 Vehicles and Systems

The first Pre-final, second Pre-final and Final Design Development submittals shall demonstrate, on a progressive basis, that all vehicles, equipment and systems have been selected, designed, procured, manufactured, installed, inspected and tested to function in accordance with the requirements of the OLRT project. Each submittal shall include, but not be limited to consideration of the following:

- (a) Integration of all Systems elements including inter relationship between:
 - (i) Communications;
 - (ii) Train Control;
 - (iii) Vehicles (revenue and non revenue);
 - (iv) Traction power and distribution;
 - (v) Electrical;
 - (vi) Mechanical;
 - (vii) Corrosion Control/Stray Current/EMI/Noise and Vibration;
 - (viii) Ventilation;
 - (ix) SCADA Systems (including BAS/BMS Systems);
 - (x) Fare Collection;
 - (xi) BCC/YCC/TSCC;
 - (xii) Civil/Guideway/Tunnel Infrastructure;
 - (xiii) Any other relevant systems.

The design submittals shall demonstrate that the design and implementation of all systems, subsystems and facilities are compatible between disciplines including, but not limited to, the following:

- (a) Implementation of a work breakdown structure encompassing all Vehicles and systems components and sub components.
- (b) System interface matrices among and across all disciplines.
- (c) Interface control catalogues and other interface control documents that are necessary to demonstrate a comprehensive approach has been utilized for system integration, detailing electrical and software performance.

- (d) System safety analysis and system safety program plan.

The first Pre-final, second Pre-final and Final Design Development submittals shall demonstrate, on a progressive basis, that all vehicles, equipment and systems have been selected, designed, procured, manufactured, installed, inspected and tested to function in accordance with the requirements of the Project. Each submittal shall include, but not be limited to consideration of the following:

- (a) All applicable standards used, including names, date and reference.
- (b) Concessions and approvals.
- (c) Identified safety risks and close-out of risks.
- (d) Identified threats and vulnerabilities.
- (e) Supporting construction drawings and diagrams, including high level general arrangements and block diagrams of interconnections.
- (f) Configuration strategy for all systems and subsystems used.
- (g) Interface control matrix identifying interfaces between systems, equipment and components, responsibility for managing the interface and interface control document.
- (h) Confirmation that PA and Output Specifications requirements have been incorporated.
- (i) Simulation and supporting calculations to support any design assumptions.
- (j) Identification of systems and subsystems.
- (k) Description of intended functionality.
- (l) Identification of human factors required.
- (m) Statutory obligations, legal and jurisdictional requirements.
- (n) Compliance to environmental constraints.
- (o) Intended test strategy and pass fail criteria for acceptance.
- (p) Operating and maintenance requirements to support the systems over the Maintenance Term.
- (q) Provision of data to support public information and marketing.
- (r) The Canadian Content Certificate updated with effect as of the date of submission, together with any necessary or desirable back-up information

reasonably necessary to support the contents thereof, which shall demonstrate to the satisfaction of the City that the Vehicles are expected to meet the Canadian Content Requirements as of the date of the delivery of Vehicles to the City, including:

- (i) evidence of equipment type and place of manufacture
- (ii) detailed parts list and manufacturer of the parts
- (iii) contact details for each manufacturer proposed
- (iv) sub-supplier certificates of conformity
- (v) baselined breakdown of Canadian Content Requirements calculated in accordance with the Canadian Content Policy
- (vi) details of any deviations from the prior Canadian Content Certificate and the resulting adjustment to Canadian content

The Final Design Development Submittals shall contain without limitation, the following:

- (a) Traction power submittals shall include, without limitation:
 - (i) First Pre-final Submission:
 - (A) a Load Flow Study;
 - (B) TPSS Site Locations and Site Plans;
 - (C) electrification single line diagram;
 - (D) TPSS Equipment interior Arrangement Drawing;
 - (E) results of preliminary TPSS site resistivity surveys;
 - (F) protective relaying and transfer trip concept of operation;
 - (G) auxiliary and emergency trip systems concept of operations and riser diagrams;
 - (H) preliminary TPSS SCADA points list; and
 - (I) TPSS Civil Structural drawings.
 - (ii) Second Pre-final Submission:
 - (A) without limitation, all items included in the First Pre-final Submission;

- (B) AC & DC circuit breaker control schematic diagrams;
 - (C) fire and smoke detection, security and intrusion detection concept of operations and riser diagrams;
 - (D) DC house power (battery charger, battery bank, load study);
 - (E) AC house power (auxiliary transformer, panelboard, load study);
 - (F) ground grid design calculations and designs for each traction power substation;
 - (G) TPSS site plans;
 - (H) TPSS elevations and details (indicating architectural treatment);
 - (I) communications interface drawings and details;
 - (J) AC/DC and rectifier plans, elevations and details;
 - (K) guideway plans, elevations and details;
 - (L) cable and conduit schedules;
 - (M) protective relaying schematics;
 - (N) traction feeder schedule;
 - (O) TPSS civil and structural drawings;
 - (P) yard and shop DC distribution plan and details;
 - (Q) HVAC calculations; and
 - (R) prefabricated substation structural calculations.
- (iii) Final Design Development Submittal:
- (A) without limitation, all items included in the first Pre-final Submission and second Pre-final Submission;
 - (B) final Load Flow Study;
 - (C) final TPSS site locations and site plans;
 - (D) final electrification single line drawings;
 - (E) final TPSS equipment arrangement drawings;

- (F) final TPSS civil and structural drawings;
 - (G) final panelboard schedules (AC and DC);
 - (H) final relaying and coordination study;
 - (I) final system start-up and commissioning plan; and
 - (J) Description of system including normal and abnormal operational modes.
- (b) Train Control Submittals shall include, without limitation:
- (i) System Safety Program Plan;
 - (ii) CBTC Network Design including network redundancy design and latency;
 - (iii) Location of Access Points;
 - (iv) Environmental Qualifications of Access Points;
 - (v) Transponder locations;
 - (vi) Loading of Zone Controllers and expected cycle times;
 - (vii) Redundancy and failover schemes for all equipment;
 - (viii) Power redundancy at every level;
 - (ix) Yard Proposal;
 - (x) Broken Rail Protection method;
 - (xi) Interlocking Route and Aspect Charts;
 - (xii) Switch heater design and layout;
 - (xiii) Safety analysis of gas storage and/or distribution if gas switch heaters are proposed;
 - (xiv) TSCC HMI layout;
 - (xv) Local Control Panel Layout and hardware;
 - (xvi) Cable and fibre routing;
 - (xvii) CIH layout, power and HVAC;

- (xviii) Portable Emergency Generators and UPS;
 - (xix) Vehicle CBTC reaction times and safe braking model;
 - (xx) Vehicle CBTC System Redundancy and failover;
 - (xxi) Vehicle CBTC Antenna Placement;
 - (xxii) CBTC frequencies and compatibility with the Public Safety Service Radio and the high speed Data Radio;
 - (xxiii) CBTC Vehicle Location System design, durability, accuracy and operational description;
 - (xxiv) Method for dealing with spins and slides;
 - (xxv) Vehicle to Vehicle Network used by CBTC (WTB or separate CBTC network);
 - (xxvi) Operator's CBTC Panel Layout;
 - (xxvii) Automatic Station Stopping Algorithm;
 - (xxviii) Approach to Degraded Modes of Operation;
 - (xxix) Zone Controller and Interlocking Controller interface;
 - (xxx) ATS and Interlocking Controller interface;
 - (xxxi) Interlocking test procedures;
 - (xxxii) CBTC system test procedures; and
 - (xxxiii) Environmental and EMI/EMC test reports.
- (c) Overhead Catenary Systems Submittals shall include, without limitation:
- (i) OCS Overlap Chart and Tension Lengths;
 - (ii) OCS Sectionalizing, Manual or Remote Control Type;
 - (iii) Conductor Particulars, Typical Tension and Sags;
 - (iv) Typical Loading Tables; Wind, Ice and Radial Loads and Calculations;
 - (v) Hanger Lengths: Standard Spans, Overlap and Termination Spans;
 - (vi) Along Track Movement, Stagger Change and Effect, Auto-Tension Catenary;

- (vii) Vehicle Pantograph Clearance;
- (viii) OCS Profiles and Calculations for Clearances underneath Overhead Bridges and Structures;
- (ix) Typical OCS Arrangements, Overlap, Crossover, etc.;
- (x) Typical OCS Detail Drawings;
- (xi) Feeder and Jumper Details;
- (xii) Typical OCS Pull-Off and Push-Off Cantilevers with Calculations;
- (xiii) Headspan Assemblies with Calculations;
- (xiv) Downguy and Headguy Assemblies;
- (xv) Midpoint Anchor Assemblies;
- (xvi) Balance Weight Assembly with Calculations;
- (xvii) Fixed Termination Assemblies;
- (xviii) OCS Mounting Details in Tunnel and Calculations;
- (xix) Section Insulator Hardware and Type;
- (xx) Wire Splice and Contact Bridge Assemblies;
- (xxi) Catenary Hangers and Suspension Assemblies;
- (xxii) Contact Wire and Messenger Knuckles;
- (xxiii) Lightning Arrestors and Connection Details;
- (xxiv) Switch Heater Connection Details;
- (xxv) OCS Feeder Assemblies;
- (xxvi) By-Pass Disconnect Switch Assembly and Type;
- (xxvii) OCS Foundation and Pole Design Calculations;
- (xxviii) OCS Layout Plans and Schedules;
- (xxix) OCS Yard Wiring Plans and Schedules;
- (xxx) OCS Door Bridge Details and Type;
- (xxxi) Rail Isolation Joints Plan in the Storage and Maintenance Buildings;

- (xxxii) Design Reports;
 - (xxxiii) OCS Specifications;
 - (xxxiv) OCS Acceptance Measurements Procedures;
 - (xxxv) Electrical Equipment and Material Testing Procedures;
 - (xxxvi) OCS Integration Testing Procedures; and
 - (xxxvii) Standard Operating Procedures.
- (d) Vehicle Design Submittals shall contain, without limitation:
- (i) A Work breakdown structure (WBS) for vehicle and its associated subassemblies;
 - (ii) Passenger capacity calculations/approach;
 - (iii) Passenger flow modeling at 12,000 PPHPD and 24,000 PPHPD;
 - (iv) Applicability of design for OLRT passenger load (quick boarding/alighting/short dwell time);
 - (v) Applicability of design for OLRT climatic conditions (such as heating capacity, sleet scraper, snow plow, threshold heaters, temperature rating of components, derating for humidity, etc.) including worst case failure modes;
 - (vi) Overall vehicle dimensions and vehicle dynamic envelope;
 - (vii) Basic design parameters – acceleration, deceleration, top speed;
 - (viii) Experience with multiple car consists;
 - (ix) RAMS data for proposed vehicle;
 - (x) Carbody details;
 - (xi) Propulsion details;
 - (xii) Truck details;
 - (xiii) Communication system details;
 - (xiv) Brake system details;
 - (xv) Proportioning valve requirements (oil cleanliness, maintenance tasks, failure rate);

- (xvi) Passenger door system details;
- (xvii) Auxiliary/LVPS/battery system details;
- (xviii) HVAC and heating system details;
- (xix) HVAC heating and cooling calculations;
- (xx) Friction brake and propulsion thermal calculations;
- (xxi) Pantograph design and interface with catenary;
- (xxii) Wheel profile and interface with rail;
- (xxiii) Vehicle dynamics modeling results;
- (xxiv) Vehicle electrical modeling results;
- (xxv) Cab layout/ergonomics;
- (xxvi) Passenger seating/stanchions/level of comfort;
- (xxvii) On board CBTC system;
- (xxviii) Emergency lighting and signage;
- (xxix) FMECA and hazard analyses;
- (xxx) Waiver requests;
- (xxxi) Compression test results;
- (xxxii) FEA results & stress analyses;
- (xxxiii) Crashworthiness analyses;
- (xxxiv) Climate room test results;
- (xxxv) Noise test results;
- (xxxvi) Flange lubrication/wayside squeal suppression;
- (xxxvii) Load leveling functional description;
- (xxxviii) Diagnostics and monitoring functional description;
- (xxxix) Operator's display functional description;
- (xl) Bench test units and portable test unit details;

- (xli) Spin/Slide control functional description;
- (xlii) Cab mock up;
- (xliii) Passenger compartment mock up;
- (xliv) Vehicle electrical schematics;
- (xlv) Ride Quality Plan;
- (xlvi) Ride Quality Test Report;
- (xlvii) Train to Wayside Emissions Safety Analysis;
- (xlviii) Fatigue Allowable Stresses;
- (xlix) FEA Models and Load Cases;
 - (l) FEA Results;
 - (li) Carbody Clearances;
 - (lii) Hostler Panel Layout drawings;
 - (liii) Battery load Calculations;
 - (liv) Battery Load Shed Schedule; and
 - (lv) Tow Mode Performance Simulations.
- (e) Communications Systems Submittals shall include, without limitation:
 - (i) Network equipment interface details:
 - (A) Bandwidth Calculations including optical power budgets and losses(if required) for LAN elements;
 - (B) Bandwidth Calculations, including optical power budgets and losses (if required) for WAN elements;
 - (C) Network diagram; and
 - (D) Network security analysis.
 - (ii) SCADA system diagram and input/output list:
 - (A) Traction Power SCADA;
 - (B) Train Control SCADA.

- (iii) Building Management System (BMS):
 - (A) Building Automation System (BAS);
 - (B) MSF BMS.
- (iv) BMS system diagram and input/output list;
- (v) Typical station field equipment layouts to include but not limited to cable and conduit schedules and Communication room equipment layouts:
 - (A) CTS;
 - (B) PA;
 - (C) PIDS;
 - (D) CCTV;
 - (E) IAC;
 - (F) Telephone, E Phone and Intercom Systems;
 - (G) Train-to-Wayside Wireless System; and
 - (H) Radio equipment locations and spatial envelopes.
- (vi) TSCC room layouts and modifications:
 - (A) Overview display layout;
 - (B) Wiring diagrams for new TSCC equipment;
 - (C) Data room equipment layouts and modifications.
- (vii) MSF Communication room equipment layouts:
 - (A) BCC equipment layouts, including desks and displays;
 - (B) YCC equipment layouts, including desks and displays;
 - (C) Wiring diagrams for interconnection of MSF communication elements.
- (viii) GUI interface layouts for TSCC, BCC, and YCC consoles;
- (ix) CCTV camera coverage layouts;

- (A) Interface details for Transit Law systems.
- (x) Fiber Optic backbone routing and termination details;
- (xi) Duct bank configuration, maintenance holes, access points, termination boxes and duct capacity allocations;
- (xii) Fare collection interface provisions.

3.11 **Stations**

Submissions to include all proposed manufacture information on proposed materials and products. The first Pre-final, second Pre-final and Final Design Development Submittals shall, without limitation contain the following:

- (a) Landscaping:
 - (i) A description of the proposed approach to meeting the hard and soft landscaping requirements of the Project Agreement including approach to salvaging and reuse of any existing plant material;
 - (ii) Landscape drawings:
 - (A) landscape plans in accordance with the City of Ottawa's Guide to Preparing Plans and Studies available at the following link: http://www.ottawa.ca/residents/planning/dev_review_process/guide/index_en.html;
 - (B) conceptual landscape plan drawings showing significant utility conflicts and relocation proposals;
 - (C) details of any relevant drainage;
 - (D) detail planting plan;
 - (E) planting details;
 - (F) hard Landscape plans and details;
 - (G) landscape accessories details, e.g. site furniture, bicycle; and
 - (H) lighting details.
- (b) Station architectural design:

Project Co shall provide sufficient information to demonstrate the ability of the proposed station and station services to meet the functional requirements and performance standards as set out in this Project Agreement and the objectives set out below:

- (i) how well the stations serves the Transit users, particularly in terms of ease of access, comfort, usability and safety and security;
 - (ii) how well the stations serve OC Transpo and Project Co staff in carrying out their roles and responsibilities in terms of: customer service; maintenance, and services;
 - (iii) how well the Stations will complement the profile of the community and the City of Ottawa as the capital and a vital part of Ottawa, Ontario, and Canada’s history and culture;
 - (iv) how well the stations meet the standards and functional requirements specified herein;
 - (v) how well the proposed design response (as outlined in the written description) fulfills the objectives set out above as well as the standards for the OLRT as described in this Project Agreement;
 - (vi) Project Co must address the Station design at an appropriate level of detail, as set out in or otherwise referenced in Article 15.2 of this Project Agreement, and is to include the following:
 - (A) Provide written statement describing Project Co’s architectural design intent with respect to the following subjects. The statement should be organized as follows:
 - (1) Design response to the general design principles must be addressed in detail, and in terms of the design concept proposed for the NCC Stations.
- (c) General architectural description:
- General architectural design description, including reference to the following subjects:
- (i) the functional layout of all the spaces as per the Functional Program. All horizontal and vertical relationships and adjacencies shall be indicated;
 - (ii) the arrival and movement within the facility of the public, staff and all transit vehicles;
 - (iii) the exterior and interior appearance of the proposed premises;
 - (iv) special enhancements or features;
 - (v) servicing;
 - (vi) building construction;

- (vii) relationship / separations;
 - (viii) design response to the existing site and existing buildings;
 - (ix) description of the overall platform design, functional and technical requirements;
 - (x) description of design response to the interface between the station, platform edge doors (or other platform edge track protection systems) and vehicle operations;
 - (xi) response to future adaptability requirements;
 - (xii) design description of building image, including selection and use of materials in the building elevations;
 - (xiii) response to the requirements for natural daylight where possible, throughout the building;
 - (xiv) design response to stated objectives for the design of the public spaces of the station;
 - (xv) description of Art integration with detailed drawings; and
 - (xvi) description of Signage and Wayfinding with detail drawings.
- (d) Materials and finishes:
- (i) provide a detailed description of the proposed use of materials and finishes and how these selections serve to enhance the station design and contribute to the durability of the building, life cycle considerations, etc.; and
 - (ii) provide Room Finish Schedules identifying all spaces with proposed materials for floor, wall and ceiling finishes, ceiling height(s),etc.
- (e) Life cycle analysis:
- Provide a report describing life cycle approach to all building components, systems and major pieces of equipment including but not limited to:
- (i) building envelope, exterior finishes & components;
 - (ii) interior finishes; and
 - (iii) mechanical and electrical equipment.
- (f) Code analysis:

Provide a Code Analysis as per Article 6 – Code Analysis and Life Safety for each submission.

(g) Accessibility analysis:

Provide a description of how the proposed design complies with universal accessibility requirements including the Accessibility for Ontarians with Disabilities Act and associated regulations and standards, the Ontario Building Code, CSA Publication B651-04 “**Accessible Design for the Built Environment**”, and the City of Ottawa Accessibility Design Guidelines.

(h) Acoustical design:

Provide a report from an acoustical design specialist describing in detail how the acoustical requirements of this Project Agreement are proposed to be achieved and identifying measures proposed to control the sound environment in the station.

(i) Net and gross floor area summary:

Provide a final floor area summary chart consistent with the chart format submitted during the Design Consultation Process indicating:

(i) final summary listing individual space requirements identified in the Agreement articles and Project Co-proposed measured areas by element and individual space. Analysis shall also identify final building gross areas on a floor by floor basis and total building gross area.

(j) Architectural drawings including, but not limited to:

(i) Context Plan scale: 1:1000 or larger;

(ii) Site plan scale – 1:400 or larger in accordance with the City of Ottawa’s Guide to Preparing Plans and Studies available at the following link: http://www.ottawa.ca/residents/planning/dev_review_process/guide/index_en.html;

(iii) floor plans – scale 1:100, showing all rooms/areas numbered. List additional rooms not previously identified. Include:

(A) all existing and new walls and partitions in actual thickness;

(B) doors, windows, sidelights and interior glazing;

(C) structural grid lines and references cross-referenced on all drawings;

(D) all millwork/casework, built-in and modular;

- (E) all furniture and equipment;
- (F) all room equipment and systems and accessories;
- (G) integration of structural, mechanical, electrical and information & communications technology systems, in terms of columns, service shafts, risers, etc., in sufficient detail to demonstrate that functional and net area requirements are compliant; and
- (H) connection(s) and layout for the future building elements;
- (iv) Reflected Ceiling Plans – scale 1:100 of all levels indicating ceiling materials, configuration of lighting, mechanical diffusers and grilles;
- (v) Detailed drawings:
 - (A) 1:100 and 1:50 scale floor plans including roof plan(s), interior elevations and reflected ceiling plans indicating development of design intent and showing resolution of material and finish use, special floor treatments, furnishings/millwork, special features such as, ornamental, iconographic and/or commemorative features, stairs, escalator, and elevators, lighting and all other security, electrical and mechanical items for the platform. Demonstrate details including allowance for future interface and installation of platform edge doors in underground stations;
- (vi) Plan detailing how Stations platform width has been maximized;
- (vii) Plan detailing how the Stations platform is sloped to match the vertical profile of the LRT Tracks alongside the station;
- (viii) Exterior Building Elevations – scale 1:200:
 - (A) all building elevations including all hidden or partial elevations with a legend describing the extent of all glazing and cladding materials;
- (ix) Building Sections – scale 1:100 through entire building indicating relative location of grade. Sections. Building sections to be taken through the main platform space, and any other special conditions;
- (x) Exterior Wall Assembly Details – scale 1:50, representative wall sections and plan details through principal facade elements on the platform elevations. Details will indicate proposed components of exterior wall assemblies and will be referenced to other drawings;
- (xi) Provide material and finish sample boards of:

- (A) All exterior finish materials; and
 - (B) All interior finishes of platform and service rooms.
- (k) Engineering design:

Provide a written statement describing the engineering design intent for the construction of the facility with respect to the following subjects. The statement shall include:

- (i) Structural:

Provide a written description of the proposed structural system. Demonstrate how each component will comply with the Structural Standards specified in this Project Agreement. Include design criteria and references to the applicable standards.

Provide a structural design brief, including outline specifications and drawings or sketches as appropriate. Describe the main structural elements in a preliminary manner, including but not limited to the following:

- (A) Foundations, floor, roof and wall framing systems, including materials and spans;
- (B) lateral load resisting system;
- (C) design dead and live loads for all areas in which records may be found;
- (D) design or specification measures to meet serviceability criteria;
- (E) special or unique structural framing or features; and
- (F) column spacing and layout.

For retrofit, provide a written description of the investigation completed to assess the suitability of the existing structure. Verify that the existing structures are capable of supporting the required floor loads and meeting current OBC requirements for earthquake resistance, and/or describe the strengthening measures proposed in order to make the structure comply with these requirements.

Provide a written description of the lateral load resisting system, its capability to resist live loads due to earthquakes, and an estimate of the equivalent seismic importance.

- (ii) Structural drawings:

Structural floor plans – scale 1:100, of every level and roof showing connections to the existing substructure, structural systems, framing and lateral force resisting systems and typical sections and details. (scale 1:50).

(iii) Mechanical:

Provide a written description and design summary for the mechanical systems demonstrating how they will meet the required performance standards set out in this Project Agreement.

Provide drawings and diagrams that fully illustrate how the mechanical systems, including HVAC, fire protection, plumbing and drainage will meet the required performance standards as set out in this Project Agreement. Drawings shall include:

- (A) heating system flow diagram including primary and secondary systems;
- (B) humidification system schematic/flow diagram;
- (C) air handling unit drawings illustrating all as follows:
 - (1) specialized smoke ventilation unit;
 - (2) air handling unit for air conditioning purposes;
- (D) fire protection system schematics to illustrate sprinklers as intended for the applications, and a system descriptive brief;
- (E) BAS description and description of sensor layout;
- (F) General design approach to mechanical systems including HVAC, plumbing and drainage systems, equipment selection, etc. with specific references to the Agreement articles requirements;
- (G) Product cuts for primary equipment and fixtures including all public space diffusers, grilles and sprinklers, and plumbing fixtures, etc.; and
- (H) Main mechanical equipment schedules including, air handlers, pumps, domestic hot water systems, etc.

(iv) Mechanical drawings:

- (A) Mechanical floor plans - scale 1:100, of every level including mechanical room(s) and roof(s) showing location and basic layout of primary mechanical equipment, routing of main feeds and

associated shafts and risers, and preliminary sizing of the primary mechanical equipment;

- (B) System schematics for all major systems including, but not limited to:
- (1) Incoming water and fire protection systems;
 - (2) Plumbing distribution systems including domestic cold, domestic hot and recirculation systems; and
 - (3) Air handling and air distribution systems; Controls Storm drainage systems; and
- (C) Zoning diagrams showing zoning for standpipe systems, sprinkler systems and air distribution systems.
- (v) Electrical:
- Provide a written description and design summary for the electrical systems demonstrating how they will meet the required performance standards set out in this Project Agreement.
- Provide drawings and diagrams that fully illustrate how the electrical systems, including power, lighting, life safety and emergency services will meet the required performance standards as set out in the agreement articles. Drawings and documentation shall include:
- (A) layout drawings (scale 1:100);
 - (B) single line diagrams;
 - (C) schematic diagrams;
 - (D) Panel and motor control schedules;
 - (E) Operation descriptions;
 - (F) General design approach to electrical systems including redundancy and emergency power, equipment selection, etc. with specific references to the agreement articles requirements;
 - (G) Product cuts for primary equipment and fixtures; and
 - (H) General design approach to provision of CCTV, PA, etc.
- (vi) Electrical drawings:

- (A) Floor plans - scale 1:100, of every level showing location and basic layout of electrical and communications rooms, routing of main feeds and associated risers and routing for equipment removal;
 - (B) Single line diagram, preliminary sizing of equipment and feeders to provide a clear understanding of the electrical distribution, emergency and critical power systems along with the expected station electrical demand load calculations;
 - (C) Life safety system riser diagram including sequence of operation;
 - (D) Lightning protection and grounding systems if required;
 - (E) Site electrical plans; and
 - (F) Exterior photometric plans.
- (vii) Civil:
- (A) Provide a Servicing Study for each station in accordance with the City of Ottawa’s “**Servicing Study Guidelines for Development Applications**” available at the following link: http://www.ottawa.ca/residents/planning/dev_review_process/guide/servicing_study_en.html;
 - (B) Provide an Erosion and Sediment Control Plan for each station in accordance with the City of Ottawa’s Guide to Preparing Plans and Studies available at the following link: http://www.ottawa.ca/residents/planning/dev_review_process/guide/index_en.html;
 - (C) Provide a comprehensive Pavement Design Report for the Roadways, Bus Terminals and Laybys in accordance with the requirements of Schedule 15.2 Part1 Article 5; and
 - (D) Street lighting Design together with the lighting calculation summary shall be submitted in accordance with requirements of Schedule 15.2 Part 1 Article 5.
- (viii) Civil Drawings:
- (A) Grade control and drainage plans in accordance with the City of Ottawa’s “**Servicing and Grading Plan Requirements**” available at the following link: http://www.ottawa.ca/residents/planning/dev_review_process/guide/servicing_grading_en.html;
 - (B) Site servicing plans in accordance with the City of Ottawa’s “**Servicing and Grading Plan Requirements**” available at the

following link: http://www.ottawa.ca/residents/planning/dev_review_process/guide/servicing_grading_en.html;

- (C) Composite utility plans in accordance with the City of Ottawa's Composite Utility Plan requirements available at the following link: http://www.ottawa.ca/residents/planning/dev_review_process/guide/cup_en.html;
 - (D) Pavement Marking and Signing CAD drawings shall be prepared and submitted by Project Co at a 1:250 scale in accordance with City of Ottawa Standard requirements as specified in Schedule 15.2 Part 1 Article 5;
 - (E) Permanent signing plan and a permanent signing table a minimum of 30 calendar days prior to the implementation of the plan. The permanent signing table shall include, but not be limited to information detailing sign location (station of final location, removal location and on which side of the road to be installed in relation to the direction of travel), height to bottom of sign, lateral offset to post, support type with dimensions, alpha-numeric sign code with dimensions and the message/description, etc;
 - (F) prepare sign details for the following types of ground-mounted guide Signs: Roadway identification, direction & destination, and location identification. Project Co shall Design and provide all overhead Sign Structures, ground-mounted sign break-away steel supports and associated Sign footings;
 - (G) Temporary signing plan and a temporary signing table a minimum of 30 calendar days prior to the implementation of the plan. The temporary signing table shall include, but, not be limited to information detailing sign location (station of final location, removal location and on which side of the road to be installed in relation to the direction of travel), height to bottom of sign, lateral offset to post #1, support type with dimensions, alpha numeric sign code with dimensions and the message/description;
 - (H) Roadways, Bus terminal and Layby design review documents and drawings submissions to be done at first Pre-final, second Pre-final and Final Design Development Submittals. Drawings shall be prepared in accordance with City of Ottawa CADD Standards for Contract Drawings.
- (ix) Transportation Impact Assessment
- (A) Provide a Transportation Impact Assessment for each station and prepare a roadway modification plan for any proposed roadway modifications in accordance with the "City of Ottawa

Transportation Impact Assessment Guidelines” available at the following link: http://www.ottawa.ca/residents/planning/dev_review_process/guide/tia/index_en.html.

(x) Planning Rationale

- (A) Provide a Planning Rationale including a Design Statement and an Integrated Environmental Review Statement for each station in accordance with the City of Ottawa’s Guide to Preparing Plans and Studies available at the following link: http://www.ottawa.ca/residents/planning/dev_review_process/guide/index_en.html.

(xi) Tree Conservation Report

- (A) Provide a Tree Conservation Report for each station in accordance with the “City of Ottawa Tree Conservation Report Guidelines” available at the following link: http://www.ottawa.ca/env_water/tlg/trees/preservation/guidelines_en.html.

3.12 Maintenance and Storage Facility

First Pre-final, second Pre-final and Final Design Development Submittal are to include all proposed manufacture information on proposed materials and products.

(a) Landscaping:

- (i) A description of the proposed approach to meeting the hard and soft landscaping requirements of the Project Agreement including approach to salvaging and reuse of any existing plant material;
- (ii) Landscape drawings in accordance with the City of Ottawa’s Guide to Preparing Plans and Studies available at the following link:

http://www.ottawa.ca/residents/planning/dev_review_process/guide/index_en.html

- (A) conceptual landscape plan drawings showing significant utility conflicts and relocation proposals;
- (B) details of any relevant drainage;
- (C) detail planting plan;
- (D) planting details;
- (E) hard Landscape plans and details;
- (F) landscape accessories details (e.g. site furniture, bicycle); and

- (G) lighting details.
- (iii) Tree Conservation Report
- (A) Provide a Tree Conservation Report in accordance with the City of Ottawa Tree Conservation Report Guidelines available at the following link:
- http://www.ottawa.ca/en/env_water/tlg/trees/preservation/guidelines/index.html
- (b) MSF architectural design:
- Project Co shall provide sufficient information to demonstrate the ability of the proposed MSF to meet the functional requirements and performance standards as set out in this Project Agreement and the objectives set out below.
- (i) how well the MSF serves the maintenance of vehicles, particularly in terms of industrial function, sustainability, usability and safety and security;
- (ii) how well the MSF serves Project Co and OC Transpo staff in carrying out their roles and responsibilities;
- (iii) how well the MSF will complement the profile of the community and the City of Ottawa as the capital and a vital part of Ottawa, Ontario, and Canada's history and culture;
- (iv) how well the MSF meet the standards and functional requirements specified herein;
- (v) how well the proposed design response (as outlined in the written description) fulfills the objectives set out above as well as the standards for the OLRT as described in this agreement articles;
- (vi) Project Co must address the MSF design at an appropriate level of detail, as set out in or otherwise referenced in Article 15.2 of this Project Agreement, and is to include the following:
- (A) Provide written statement describing Project Co's architectural design intent with respect to the following subjects. The statement should be organized as follows:
- (1) Design response to the general design principles must be addressed in detail;
- (2) Design response to LEED® certification goal.

(c) General architectural description:

General architectural design description, including reference to the following subjects:

- (i) the functional layout of all the spaces as per the Functional Program. All horizontal and vertical relationships and adjacencies shall be indicated;
- (ii) the arrival and movement within the facility of the public, staff and all transit vehicles;
- (iii) the exterior and interior appearance of the proposed premises;
- (iv) special enhancements or features;
- (v) servicing;
- (vi) building construction;
- (vii) relationship / separations;
- (viii) design response to the existing site and existing buildings;
- (ix) description of the overall facility design, functional and technical requirements;
- (x) response to future expansion requirements;
- (xi) design description of building image, including selection and use of materials in the building elevations; and
- (xii) response to the requirements for sustainability, throughout the property.

(d) Materials and finishes:

- (i) provide a detailed description of the proposed use of materials and finishes and how these selections serve to enhance the MSF design and contribute to the durability of the building, life cycle considerations, etc.; and
- (ii) provide Room Finish Schedules identifying all spaces with proposed materials for floor, wall and ceiling finishes, ceiling height(s), etc.

(e) Life cycle analysis:

Provide a report describing life cycle approach to all building components, systems and major pieces of equipment including but not limited to:

- (i) building envelope, exterior finishes & components;

- (ii) interior finishes; and
- (iii) industrial, mechanical and electrical equipment.
- (f) Code analysis:
Provide a Code Analysis as per Article 6 – Code Analysis and Life Safety for each submission.
- (g) Accessibility analysis:
Provide a description of how the proposed design complies with the AODA and CSA accessibility requirements.
- (h) Acoustical design:
Provide a report from an acoustical design specialist describing in detail how the acoustical requirements of this Project Agreement are proposed to be achieved and measures proposed to control the sound environment throughout the MSF, particularly as relates to neighbouring properties.
- (i) Net and gross floor area summary:
Provide a final floor area summary chart consistent with the chart format submitted during the Design Consultation Process indicating:
 - (i) final summary listing individual space requirements identified in the Agreement articles and Project Co-proposed measured areas by element and individual space. Analysis shall also identify final building gross areas on a floor by floor basis and total building gross area.
- (j) Architectural drawings including, but not limited to:
 - (i) context Plan scale: 1:1000 or larger;
 - (ii) site plan scale – 1:400 or larger in accordance with the City of Ottawa’s Guide to Preparing Plans and Studies available at the following link:
http://www.ottawa.ca/residents/planning/dev_review_process/guide/index_en.html;
 - (iii) floor plans – scale 1:100, showing all rooms/areas numbered. List additional rooms not previously identified. Include:
 - (A) all existing and new walls and partitions in actual thickness;
 - (B) doors, windows, sidelights and interior glazing;

- (C) structural grid lines and references cross-referenced on all drawings;
 - (D) all millwork/casework, built-in and modular;
 - (E) all furniture and equipment;
 - (F) all room equipment and systems and accessories;
 - (G) integration of structural, mechanical, electrical and information and communications technology systems, in terms of columns, service shafts, risers, etc., in sufficient detail to demonstrate that functional and net area requirements are compliant; and
 - (H) connection(s) and layout for the future building elements.
- (iv) Reflected Ceiling Plans – scale 1:100 of all levels indicating ceiling materials, configuration of lighting, mechanical diffusers and grilles.
- (v) Detailed drawings:
- (A) 1:100 and 1:50 scale floor plans including roof plan(s), interior elevations and reflected ceiling plans indicating development of design intent and showing resolution of material and finish use, special floor treatments, furnishings/millwork, special features such as equipment, lighting and all other security, electrical and mechanical items.
 - (B) Plan detailing how the operational flexibility of the MSF has been maximized.
 - (C) Exterior Building Elevations – scale 1:200:
 - (1) all building elevations including all hidden or partial elevations with a legend describing the extent of all glazing and cladding materials;
 - (D) Building Sections – scale 1:100 through entire building indicating relative location of grade. Building sections to be taken through the industrial service areas (pits and equipment), and any other special conditions.
 - (E) Exterior Wall Assembly Details – scale 1:50, representative wall sections and plan details through principal facade elements on the platform elevations. Details will indicate proposed components of exterior wall assemblies and including references to other drawings.

- (F) Provide material and finish sample boards of:
- (1) All exterior finish materials; and
 - (2) All interior finishes of Driver occupied rooms.
- (k) Engineering design:
- Provide a written statement describing the engineering design intent for the construction of the MSF including the following:
- (i) Structural
- Provide a written description of the proposed structural system. Demonstrate how each component will comply with the Structural Standards specified in this Project Agreement. Include design criteria and references to the applicable standards.
- Provide a structural design brief, including outline specifications and drawings or sketches as appropriate. Describe the main structural elements in a preliminary manner, including but not limited to the following:
- (A) Foundations, floor, roof and wall framing systems, including materials and spans;
 - (B) lateral load resisting system;
 - (C) design dead and live loads for all areas in which records may be located;
 - (D) design or specification measures to meet serviceability criteria;
 - (E) special or unique structural framing or features;
 - (F) column spacing and layout; and
 - (G) Provide a written description of the lateral load resisting system, its capability to resist live loads due to earthquakes, and an estimate of the equivalent seismic importance.
- (ii) Structural drawings:
- Structural floor plans - scale 1:100, of every level and roof showing connections to the existing substructure, structural systems, framing and lateral force resisting systems and typical sections and details. (scale 1:50).
- (iii) Mechanical:

Provide a written description and design summary for the mechanical systems demonstrating how they will meet the required performance standards set out in this Project Agreement.

Provide drawings and diagrams that fully illustrate how the mechanical systems, including HVAC, fire protection, plumbing and drainage will meet the required performance standards as set out in this Project Agreement. Drawings shall include:

- (A) heating system flow diagram including primary and secondary systems;
 - (B) humidification system schematic/flow diagram;
 - (C) air handling unit drawings illustrating all as follows:
 - (1) specialized shop ventilation units;
 - (2) air handling unit for air conditioning purposes; and
 - (3) separation of shop and vehicle washer.
 - (D) fire protection system schematics and design brief to illustrate sprinklers as intended for the applications;
 - (E) BAS description and description of sensor layout;
 - (F) General design approach to mechanical systems including HVAC, plumbing and drainage systems, equipment selection, etc. with specific references to the functional requirements and performance standards set out in the Project Agreement;
 - (G) Product cuts for primary equipment and fixtures including all public space diffusers, grilles and sprinklers, and plumbing fixtures, etc.; and
 - (H) Main mechanical equipment schedules including, air handlers, pumps, domestic hot water systems, etc.
- (iv) Mechanical drawings:
- (A) Mechanical floor plans – scale 1:100, of every level including mechanical room(s) and roof(s) showing location and basic layout of primary mechanical equipment, routing of main feeds and associated shafts and risers, and preliminary sizing of the primary mechanical equipment;

- (B) System schematics for all major systems including, but not limited to:
- (1) Incoming water and fire protection systems;
 - (2) Plumbing distribution systems including domestic cold, domestic hot and recirculation system, industrial water treatment systems; and
 - (3) Air handling and air distribution systems; Controls Storm drainage systems.
- (C) Zoning diagrams showing zoning for standpipe systems, sprinkler systems and air distribution systems.
- (v) Electrical:
- Provide a written description and design summary for the electrical systems demonstrating how they will meet the required functional requirement and performance standards set out in this Project Agreement.
- Provide drawings and diagrams that fully illustrate how the electrical systems, including power, lighting, life safety and emergency services, including emergency back-up power systems, will meet the required functional and performance standards as set out in this Project Agreement. Drawings and documentation shall include:
- (A) layout drawings (scale 1:100);
 - (B) single line diagrams;
 - (C) schematic diagrams;
 - (D) Panel and motor control schedules;
 - (E) Operation descriptions;
 - (F) General design approach to electrical systems including redundancy and emergency power, equipment selection, etc. with specific references to the agreement articles requirements;
 - (G) Product cuts for primary equipment and fixtures; and
 - (H) General design approach to provision of CCTV, PA, etc.
- (vi) Electrical drawings:

- (A) Floor plans - scale 1:100, of every level showing location and basic layout of electrical and communications rooms, routing of main feeds and associated risers and routing for equipment removal;
 - (B) Single line diagram, preliminary sizing of equipment and feeders to provide a clear understanding of the electrical distribution, emergency and critical power systems along with the expected MSF electrical demand load calculations;
 - (C) Life safety system riser diagram including sequence of operation;
 - (D) Lightning protection and grounding systems if required as per NFPA 780;
 - (E) Site Electrical plan; and
 - (F) Exterior photometric plan.
- (vii) Civil:
- (A) Provide a Servicing Study in accordance with the City of Ottawa’s “Servicing Study Guidelines for Development Applications” available at the following link:

http://www.ottawa.ca/residents/planning/dev_review_process/guide/servicing_study_en.html;
 - (B) Provide an Erosion and Sediment Control Plan in accordance with the City of Ottawa’s Guide to Preparing Plans and Studies available at the following link:

http://www.ottawa.ca/residents/planning/dev_review_process/guide/index_en.html;
- (viii) Civil Drawings:
- (A) Grade control and drainage plan in accordance with the City of Ottawa’s “Servicing and Grading Plan Requirements” available at the following link:

http://www.ottawa.ca/residents/planning/dev_review_process/guide/servicing_grading_en.html;
 - (B) Site servicing plan in accordance with the City of Ottawa’s “Servicing and Grading Plan Requirements” available at the following link:

http://www.ottawa.ca/residents/planning/dev_review_process/guide/servicing_grading_en.html;

- (C) Composite utility plan in accordance with the City of Ottawa's Composite Utility Plan requirements available at the following link:

http://www.ottawa.ca/residents/planning/dev_review_process/guide/cup_en.html;

- (ix) Transportation Impact Assessment

- (A) Provide a Transportation Impact Assessment and prepare a roadway modification plan for any proposed roadway modifications in accordance with the "City of Ottawa Transportation Impact Assessment Guidelines" available at the following link:

http://ottawa.ca/residents/planning/dev_review_process/guide/tia/index_en-04.html

3.13 **Traffic and Transit Management Plan**

- (a) General Requirements

- (i) No later than 60 days following Financial Close, and in accordance with the requirements of Part 7 of Schedule 15-2, Project Co shall submit an initial TTMP to the City. The initial TMP shall document how Project Co plans on managing traffic during the Initial Works.
- (ii) Detailed TCPs complete with traffic control layout drawings and fully integrated with the approved Project schedule, shall be submitted outlining the provision of all forms of traffic control required throughout the duration at the Project.
- (iii) For each stage of the Work that affects traffic, Project Co shall submit drawings that address stage-specific activities and requirements.
- (iv) Prior to the closure of Rideau Street to vehicular traffic, shall submit a Traffic Study with detailed intersection and network modelling to identify LOS, queue lengths, turning movements, and traffic signal requirements. The Study shall identify all provisions required to maintain a LOS of "E" or better at all intersections within the limits of the detour.
- (v) A pedestrian study for Rideau Street shall be submitted to confirm the pedestrian movements, location for the crosswalk(s) and crosswalk width requirements.

- (b) Submission Requirements
- (i) Design Review documents and drawings submissions to be done at first Pre-final, second Pre-final and Final Design Development Submittals.
 - (ii) The Final Design Development Submittals shall contain, without limitation, the following:
- (c) The following sub-plans for Project Co's TMP are required and shall be submitted as part of the Works Submittals:
- (i) Traffic Control Plan;
 - (ii) Emergency Traffic Plan;
 - (iii) Incident Management Plan;
 - (iv) Implementation Plan;
 - (v) Transit Management Plan;
 - (vi) Advisory Temporary Signing Plan;
 - (vii) Risk Assessment Plan; and
 - (viii) Traffic and Transit Management Communications Plan.
- (d) Traffic Control Plans
- (i) Project Co shall prepare Project specific TCPs in accordance with the OTM, City of Ottawa Policies, Procedures and Guidelines and other Reference Documents for all activities that affect traffic operations, including but not limited to:
 - (A) identify hours of Work;
 - (B) identify the Work zone location and direction and distance to nearest landmarks;
 - (C) identify the size of the Work zone;
 - (D) identify lanes affected by the Works;
 - (E) identify lane configuration in the Work zone;
 - (F) indicate whether accesses or intersections will be affected by the Work zone or by traffic control devices;
 - (G) identify traffic volume capacity during Project;

- (H) identify proposed delays or closure times; and
 - (I) include scale drawing(s) identifying:
 - (1) the location of the Work zone using landmarks and LKI where applicable;
 - (2) accesses or intersections affected by the Work zone or by traffic control devices;
 - (3) traveled lanes affected;
 - (4) resultant lane configuration including widths;
 - (5) location of restricted width lanes;
 - (6) posted speeds;
 - (7) location of hazardous areas created by road geometry or local geography;
 - (8) the location of vehicle storage areas if delays are anticipated;
 - (9) any local roads used for a detour route;
 - (10) the design speed and the design vehicle for each road used as a detour route; and
 - (11) any traffic signal changes required by the detour route or Project Works.
 - (J) include scale custom traffic control layouts showing the placement of all traffic control devices and traffic control persons.
- (ii) Custom traffic control layouts shall:
- (A) show schematically the placement of all TCDs;
 - (B) place all TCDs in accordance with the standards contained in the OTM;
 - (C) follow symbol conventions for identifying TCDs as per the OTM;
 - (D) have all dimensions and explanatory notes on the drawing; and
 - (E) show traffic operations at all phases of the Project.

- (iii) Traffic analysis for each Construction stage of the Design and Construction within each phase where traffic operations are affected.
- (iv) The TCP shall include engineered Designs for each detour route, diversion and lane closure. The locations and details of all signs, PVMS, Pavement Markings, barriers, and protective works shall be indicated on the drawings.
- (e) Emergency Traffic Plan
 - (i) Project Co shall prepare and submit an Emergency Traffic Plan. The Emergency Traffic Plan shall specify how Project Co shall facilitate access for emergency vehicles to and through affected sites based on consultation with local municipalities and Emergency Service Providers.
- (f) Incident Management Plan
 - (i) Project Co shall prepare and submit an Incident Management Plan in accordance with City of Ottawa Emergency Management Plan. The plan shall specify how Project Co will provide access for emergency vehicles and assistance to emergency personnel.
- (g) Implementation Plan
 - (i) Project Co shall prepare and submit an Implementation Plan that identifies the Traffic Control Supervisor, Traffic Engineer and Traffic Manager, along with the qualifications and experience of those named individuals. This plan shall also define processes to ensure that the Traffic Control Plans and the Emergency Traffic Plan are developed and implemented efficiently and appropriately, and that they are kept up-to-date with necessary modifications during the Project.
- (h) Transit Management Plan
 - (i) Project Co shall submit a Transit Management Plan that is integrated with the TTMP. The Transit Management Plan shall outline how the quality of transit services shall be maintained during all phases of Construction. The Transit Management Plan shall contain the following information with respect to how Project Co intends to maintain transit service routes and comply with the requirements:
 - (A) Accommodation of transit service routes as detailed in Part 7 of Schedule 15-2;
 - (B) Accommodation of the requirements of Part 7 Article 5, existing BRT of Schedule 15-2;

- (C) Overall strategy and approach that Project Co intends to implement to maintain the quality of transit service routes throughout the Construction Period and minimize disruption to the City users;
 - (D) Identify Project Co's scheduled Construction activities, closures, full closures, detour routes, lane shifts and diversions that have an impact on the existing BRT; and
 - (E) Identify all temporary passenger platforms, bus laybys and passenger shelters, to current the City standards,. The location and Design of the temporary platforms and shelters shall be provided in drawing format.
- (i) Temporary Signage Plan
 - (i) Project Co shall submit a Temporary Signing Plan. The primary objective of a Temporary Signing Plan is to notify the City, the City and other stakeholders in advance of scheduled Construction activities, closures, full closures, detour routes, lane shifts and diversions.
 - (j) Risk Assessment Plan
 - (i) Project Co shall submit an independent assessment to identify any risks that could have an impact on traffic management or special conditions that shall be addressed through Project Co's Risk Assessment Plan. Project Co shall identify all risks and state the measures to be implemented to manage, reduce or eliminate the risks.
 - (k) Traffic Management Communications Plan
 - (i) Project Co shall submit a Traffic and Transit Management Communications Plan to apply throughout the Project Term. The Traffic and Transit Management Communications Plan shall describe clearly how Project Co shall communicate to the City, the City and other stakeholders about all matters relating to traffic flow, including, specifically, how it shall provide timely notice of Construction related delays, closures, detours, traffic incidents and emergencies.
 - (ii) Project Co shall submit a narrative outlining the process which will be integrated with the City's communication procedures for traffic management to keep major user groups informed of planned an unplanned traffic pattern changes, including, but not limited to the following: hauling and truck routes, transit impacts, detours, lane shifts, lane closures, sidewalk closures, access restrictions, schedule changes, and other traffic control procedures.

3.14 Environmental Design

The first Pre-final, second Pre-final and Final Design Development Submittals shall contain, without limitation, the following:

- (a) applicable construction drawings that include:
 - (i) extent of impacts to and mitigation of known contaminated sites;
 - (ii) quantity and location of re-used excavated material;
 - (iii) all built heritage and cultural landscape features along alignment;
 - (iv) all Project Co identified noise and vibration Sensitive Receivers along the alignment;
 - (v) all noise and vibration mitigation measures such as track design and noise barrier and/or berm locations;
 - (vi) location of all drainage facilities;
 - (vii) location and function of stormwater management facilities; and
 - (viii) areas of archaeological potential where monitoring by a licenced archaeologist is required;
- (b) erosion and sediment control features during both the construction and maintenance phases;
- (c) environmental design drawings that show environmental mitigation and compensation features and any environmental features to be constructed;
- (d) environmental design documentation including:
 - (i) all licences, notifications, permits, authorisations and approvals specific to the work designed; and
 - (ii) all assessments, studies, surveys, monitoring reports, and plans specific to the work designed;
- (e) an environmental design criteria checklist that lists general environmental commitments and assurances, including the commitments from the Environmental Assessments, environmental design commitments, site specific environmental features and environmental mitigation/compensation plans including all commitments, assurances and plans; and
- (f) Resolution of all issues identified during Design Review Meetings and reviews of the first Pre-final Design Development Submittals and the second Pre-final Design Development Submittals.

4. CONSTRUCTION DOCUMENT SUBMISSIONS, REVIEW AND REPORTS**4.1 General**

- (a) Final Construction Document Submittals (Pre-Final and Final) shall be prepared and shall have indexes and sectional dividers. The design folders shall contain pertinent correspondence, shall be arranged by subject matter in chronological order, and shall include design calculations and backup information. Construction Document submissions shall include, without limitation, copies of all approvals, design reports, correspondence and calculations.
- (b) Final Construction Document Submittals shall include all items contained with the Design Development Submittals, further refined into Construction Documents that set forth, in detail, requirements for the construction of the Project.
- (c) Final Construction Document Submittals drawings and reports shall be signed and sealed by the responsible engineer, who shall be a Professional Engineer.
- (d) For proprietary systems, the responsible engineer, who shall be a duly experienced Professional Engineer of the appropriate discipline, shall certify the design and construction of the systems.

4.2 Issued for Construction Drawings

Project Co shall submit copies of all drawings that are “Issued for Construction”, together with manuals, instructions to the Construction Contractor and other relevant information as requested by the City Representative, to the City Representative and to the Independent Certifier.

5. SHOP DRAWINGS

- (a) Project Co shall, in accordance with Schedule 26, provide the City with an electronic copy of all shop drawings for information purposes.
- (b) Notwithstanding a) above, the following shop drawings will be submitted to the City for review in accordance with this Schedule 10:
 - (i) Implementation/integration of the fare collection system
 - (ii) Implementation/integration of the Public System safety radio system
 - (iii) Station interior/exterior signage
 - (iv) Modifications to existing private buildings to implement integrated station entrances, particularly as it relates to electrical/mechanical systems between the OLRT stations and adjacent developments.

- (v) Substitution of finishes/materials that have been previously submitted for information to the City
- (vi) Details related to the attachment of Systems Infrastructure to an existing structure
- (vii) Integration of the TSCC/BCC particularly as it relates to common areas
- (viii) Materials/work that are considered new municipal infrastructure including, but not limited to, the following:
 - (A) Concrete pressure pipe,
 - (B) Butterfly and tapping valves (400 mm and greater), and
 - (C) Valve chambers (non-standard chambers only).
- (c) It is the intention of the Sponsor to discuss the shop drawing process for the above items with Project Co post PPN and mutually agree on an acceptable procedure for these items.

6. CHECKING OF STRUCTURAL DESIGN

- 6.1 For relevant design submissions submitted in accordance with the Review Procedure, Project Co shall submit an Independent Structural Design Check Certificate, in the form provided as Attachment 3 to this Appendix A.

ATTACHMENT 1

SAMPLE CONTENTS FOR A STRUCTURAL TAF

SAMPLE CONTENTS FOR A STRUCTURAL TAF

Ref. No.....

1. PROJECT DESCRIPTION

1.1 Name and location of structure.

1.2 Permitted traffic speed (for a Bridge give over and/or under).

2. PROPOSED STRUCTURE

2.1 Description of Structure.

2.2 Structural type. (Include reasons for choice)

2.3 Foundation type. (Include reasons for choice)

2.4 Span arrangements. (Include reasons for choice)

2.5 Barrier type.

2.6 Proposed arrangements for inspection and maintenance.

2.7 Materials and finishes.

3. DESIGN/ASSESSMENT CRITERIA

3.1 Live Loading, Clearances.

3.1.1 Bridge code loading;

3.1.2 Design vehicle;

3.1.3 Other live loading;

3.1.4 Provision for exceptional abnormal loads:

3.1.4.1 Gross weight;

3.1.4.2 Axle load and spacing; and

3.1.4.3 Location of vehicle track on deck cross-section;

3.1.5 Any special loading not covered above;

3.1.6 Minimum clearances provided (vertical and horizontal); and

3.1.7 Authorities consulted and any special conditions required.

3.2 List of relevant design documents.

4. **STRUCTURAL ANALYSIS**

4.1 Methods of analysis proposed for superstructure, substructure and foundations.

4.2 Description and diagram of structure to be used for analysis.

4.3 Assumptions intended for calculation of structural element property and stiffness.

4.4 Proposed earth pressure coefficients (ka, ko, or kp) to be used in design of earth retaining elements.

5. **GROUND CONDITIONS**

5.1 Acceptance of interpretative recommendations of the soils report to be used in the design and reasons for any proposed departures.

5.2 Describe foundations fully including the reasons for adoption of allowable and proposed bearing pressures/pile loads, strata in which foundations are located, provision for skin friction effects on piles and for lateral pressures due to compression of underlying strata, etc.

5.3 Differential settlement to be allowed for in design of structure.

5.4 Anticipated ground movements or settlement due to embankment loading, flowing water, and measures proposed to deal with these defects as far as they affect the structure.

5.5 Results of tests of ground water (e.g. pH value, chloride or sulphate content) and any counteracting measures proposed (as applicable).

5.6 Anticipated ground movements or settlement due to seismic loading, measures proposed to deal with these impacts as far as they affect the structure.

6. **DRAWINGS AND DOCUMENTS**

6.1 List of drawings (including numbers) and documents accompanying the submission. To include (without limitation):

6.1.1 a location plan;

6.1.2 a preliminary general arrangement drawing; and

6.1.3 relevant parts of the ground investigation report.

7. **THE ABOVE DESIGN AND CONSTRUCTION PROPOSALS ARE SUBMITTED FOR REVIEW**

Signed:

Design/Construction Manager

Name:

Engineering Qualifications:.....

Date:

Professional Registration Number:

Affix Professional Seal

Signed:

Project Co Representative

Name:

Date:

Professional Registration Number:

Affix Professional Seal

ATTACHMENT 2

SAMPLE CONTENTS FOR A TUNNEL TAF

SAMPLE CONTENTS FOR A TUNNEL TAF

Ref. No.....

1. PROJECT DESCRIPTION

1.1 Name and location of Tunnel.

2. PROPOSED TUNNEL STRUCTURE

2.1 Brief description of Tunnel including discussion of:

2.1.1 Temporary excavation or initial support system

2.1.2 Permanent Linings including waterproofing

2.1.3 Short-term and long-term ground water control system(s)

2.1.4 Proposed work site access

2.2 List of any proprietary materials and finishes.

2.3 Details of arrangements for long-term inspection and maintenance

2.4 Details of the Tunnel's emergency communication and escape facilities

2.5 Details of landscaping above Tunnel and protection of the Tunnel

3. TUNNEL GEOMETRY AND SPACEPROOFING DETAILS

3.1 Structural form of Tunnel

3.2 Geometry for both Temporary and Permanent Works

3.2.1 Horizontal and vertical Alignment of the Tunnel and Tunnel approaches

3.2.2 Dimensioned cross-section(s) clearly indicating spatial design envelopes

3.2.3 Plan and profile drawing showing set-out of the Tunnel with respect to the Right-of-Way and Adjacent Structures.

3.2.4 Accommodation of mechanical and electrical services in Tunnel

3.3 Spaceproofing of Tunnel

3.3.1 Compatibility with other adjacent projects

3.3.2 Multi-disciplinary design interfaces

4. DESIGN/ASSESSMENT CRITERIA

- 4.1 A summary of assumptions used for both Temporary works and Permanent Works. Assumptions to include:
- 4.1.1 Design Loads
 - 4.1.2 Design standards, codes and reference guidelines
 - 4.1.3 Performance and technical requirements (including fire and seismic)

5. GROUND CONDITIONS

- 5.1 Summary of geotechnical information and data used to validate basis of design/assessment.
- 5.2 Summary of the relevant geotechnical design parameters for each Tunnel Structure.
- 5.3 Summary of groundwater conditions (e.g. pH value, chloride or sulphate content) and any counteracting measures proposed
- 5.4 Summary of hydrogeological impacts and any control measures required.
- 5.5 Summary of the potential geological / geotechnical risks

6. STRUCTURAL ANALYSIS

- 6.1 Methods of analysis used
- 6.2 Assumptions of structural elements (strength, stiffness, etc). Provide a summary of key design properties and parameters used (including for example bond stress interaction assumptions for ground anchoring systems)

7. TUNNEL SUPPORT SYSTEM AND METHOD OF CONSTRUCTION

- 7.1 Basis of the design of the Tunnel's support system for Temporary and Permanent conditions and any proposals for ground treatment
- 7.2 Describe the construction sequence and methods. Provide information that demonstrates the Construction Activities will meet the Project's environmental requirements (noise/overpressure, lighting, vibration and groundwater contamination).
- 7.3 Provide details of predicted settlements of Existing Adjacent Structures and ground surface above and adjacent to the Tunnel and provide planned mitigation measures

7.4 State methods to be adopted to monitor and control the effects of Tunnel construction to ensure compliance with any criteria imposed to limit impacts to Existing Adjacent Structures (including environmental monitoring and Trigger and Action Levels for key monitoring points)

8. DRAINAGE AND WATERPROOFING

8.1 Details of proposed/existing drainage

8.1.1 Ground water seepage and run off

8.1.2 Accidental spillage, water carried in by vehicles

8.1.3 Fire main burst

8.1.4 Tunnel washing

8.1.5 Long-term maintenance of system

8.2 Details of proposed waterproofing

8.3 List special requirements of local drainage authority

9. DRAWINGS AND DOCUMENTS

9.1 List of drawings (including numbers) and documents accompanying the submission. To include (without limitation):

9.2 a location plan;

9.3 a general arrangement drawing;

9.4 geotechnical data or relevant parts of the geotechnical and hydrogeological reports

10. THE ABOVE DESIGN AND CONSTRUCTION PROPOSALS ARE SUBMITTED FOR REVIEW

Signed:

Design/Construction Manager

Name:

Engineering Qualifications:

Date:

Professional Registration Number:

Affix Professional Seal

Signed:

Project Co Representative

Name:

Date:

Professional Registration Number:

Affix Professional Seal

ATTACHMENT 3

Certificate Form

Certificate Ref. No []

INDEPENDENT STRUCTURAL DESIGN CHECK CERTIFICATE

Defined terms and expressions used in this Certificate have the same meanings as given to them in the agreement between the City and Project Co dated February 12, 2013 (“the Project Agreement”) relating to the Project.

Form of certificate to be used by the Checking Team for certifying the design of structures incorporated in the System, in accordance with Schedule 15-2 – Design and Construction Requirements, to the Project Agreement.

1. We certify that we have the requisite professional qualifications, skill and experience to perform an independent check of the Design Data referred to herein in accordance with the requirements of the Project Agreement.

2. We certify that we have performed an independent check (as required by the Project Agreement for significant and complex Structures) of the Design Data for [.....] **[Name of the Structure and list of all elements of the Structure included in the Design Data]** listed in the Schedule hereto and utilizing the standards of care, skill and diligence that, in accordance with the standards of our profession, are required of experienced professionals undertaking such an independent check, and that in our professional opinion:
 - i. the said Design Data meets performance expectations outlined in the Project Agreement, **[including Technical Appraisal Form]** No. [.....] dated [.....], as amended by the following:

[List, if any, the changes made and any addenda to the foregoing Technical Appraisal Form]; and

 - ii. the design, methodologies and assumptions are consistent with Good Industry Practice.

SCHEDULE

[Include here drawing numbers and titles and reports, calculations, etc.]

Signed:

Checking Team (Principal)

Name:

Title:

Date:

Professional Registration Number:

Affix Professional Seal

Signed:

Project Co Representative

Name:

Date:

SCHEDULE 10
REVIEW PROCEDURE

APPENDIX B
OTHER MINIMUM SUBMISSIONS BY PROJECT CO

1. GENERAL

- 1.1 The provisions of Appendix B of this Schedule 10 shall apply to Works Submittals to be submitted by Project Co only once, and shall apply without limitation to the Design Development Submittals, the Construction Document Submittals, the Design Data and any and all items, documents and anything else required or specified by this Project Agreement, including all Works Submittals listed in Appendix B to this Schedule 10, in respect of the Design and Construction Works to be submitted to, reviewed or otherwise processed by the City in accordance with the Review Procedure prior to or after Substantial Completion in respect of the completion of Minor Deficiencies, including any and all subsequent revisions, amendments and changes thereto (collectively and individually, “Other Submissions” as applicable in Appendix B of this Schedule 10).

2. OTHER SUBMISSIONS BY PROJECT CO

Table 2.1 – Other Submissions Requirements

<u>Deliverable Name</u>	<u>Due Date</u>	<u>Submitted under the Review Procedure</u>	<u>Reference Section</u>
<u>Pre- and Post-Construction Condition Surveys</u>	<u>Pre construction surveys: at least 30 days and not more than 60 days prior to the relevant construction as indicated in Schedule 15-2 Part 1 Article 20.</u> <u>Post-construction surveys: within 60 days of completion of the relevant construction.</u>	<u>Yes</u>	<u>2.1</u>
<u>Blasting Plan</u>	<u>60 days prior to blasting operations</u>	<u>Yes</u>	<u>2.2</u>
<u>Project Management Plan (PMP)</u>	<u>30 days after Financial Close and updated as required throughout the Project Term</u>	<u>Yes</u>	<u>2.3</u>
<u>Risk Management Plan (RMP)</u>	<u>30 days after Financial Close and updated as required</u>	<u>Yes</u>	<u>2.4</u>

<u>Deliverable Name</u>	<u>Due Date</u>	<u>Submitted under the Review Procedure</u>	<u>Reference Section</u>
	<u>throughout the Project Term</u>		

2.1 Pre- and Post-Construction Condition Surveys, which shall include, without limitation:

- (a) Standard forms to be used when performing condition surveys.
- (b) Schedule of Structures and Properties requiring condition surveys.
- (c) Pre- and Post-Construction condition surveys reports for each Structure in the Zone of Influence consisting, at a minimum, of the completed standard form, photograph with photo description log sheet, and DVD of digital video and digital photographs.

2.2 Blasting Plans in accordance with City of Ottawa Standard Tender Documents for Unit Price Contracts Special Provisions F-1201 Use of Explosives.

2.3 Project Management Plan

- (a) Project Co shall include the following sections under Project Management Plan:
 - (i) Overall Approach to Partnering, Communications and Integration;
 - (A) Plan for developing and maintaining a successful long-term partnership with the City for the purpose of achieving their vision, mission and core values;
 - (B) Managing technical interface structures and interdisciplinary relations, with a description of proposed reporting mechanisms and communications protocols with the City, core stakeholders, government agencies and the public;
 - (C) Maximizing integration of the activities of Project Co team members during the Design and Construction phase of the Project and the Maintenance and Rehabilitation Term of the Project, so as to validate and verify that the requirements of the Project are met;
 - (D) Approach to the design development process and issue resolution process including working in collaboration with user groups, design teams and stakeholders;

- (E) Approach to incorporating stakeholder input into the Design Data submitted in accordance with the Project Agreement;
 - (F) Approach to achieving a fully co-ordinated and integrated design and construction phase in collaboration with the City, other agencies and third parties including local utility companies;
 - (G) Approach to achieving effective coordination of the Works Committee within the parameters of the Project Agreement; and
 - (H) Approach to resolving Disputes within the parameters of Schedule 27 – Dispute Resolution Procedure of the Project Agreement.
- (ii) Team Structure and Processes;
- (A) List of Key Individuals for the Design and Construction Works and the Maintenance and Rehabilitation Term of the Project;
 - (B) Organization chart clearly indicating the Project Co’s team structure and lines of communication with the City. The organizational chart shall include the names of all staff and their reporting relationships for all Project activities;
 - (C) Approach to managing Project Co’s staffing resources, staff substitution and replacement; and
 - (D) Approach to managing external stakeholder and approval bodies and internal decision making.
- (iii) Design, Construction, Maintenance and Rehabilitation Quality Management Plan specific to the OLRT Project which reasonably demonstrates that Project Co will satisfy the requirements of International Standard ISO 9001:2008, ISO 9001 quality management principles and the minimum requirements stated in Schedule 11 of the Project Agreement. The Quality Management Plan shall include the following:
- (A) General approach and statement describing Project Co’s quality policy and philosophy;
 - (B) Required qualifications of Quality Managers and Quality Directors as stated in Schedule 11 of the Project Agreement;
 - (C) Training, education and other measures to be taken to ensure Project Co Parties compliance with all relevant management plans;

- (D) Project Co's quality policy and quality control regime for design quality management, construction quality management, maintenance and rehabilitation quality management, as well as their respective integration;
 - (E) Processes for Non-Conformance review and disposition, including the approach for the development of the Non-Conformance Tracking System and its required components and corrective and preventative action response strategies for Non-Conformances; and
 - (F) An outline of how the key management activities (such as Project Co's controls, design, construction, maintenance and rehabilitation, traffic and transit management and mobility and environmental management) will interface with each other and with the Quality Management System including the reporting and internal governance within and between all activities.
- (iv) Construction Safety Plan; and
- (A) A description of the approach and process Project Co will undertake to provide a safe work site for all persons on Site (e.g. trades, supervisory and delivery personnel, visitors);
 - (B) Statement from the construction team emphasizing a commitment to the principles of construction safety;
 - (C) Valid corporate health and safety policy as prescribed in the Occupational Health and Safety Act, R.S.O. 1990 c.O.1 ("OHSA");
 - (D) Initial and ongoing safety training plans for the construction team's personnel including any site specific training necessary for issues related to the Site;
 - (E) The approach for dealing with Site specific hazards on the Project during the Design and Construction Works and the Maintenance and Rehabilitation Term;
 - (F) A description of the safety monitoring, inspection and record keeping process;
 - (G) Project Co shall provide an organizational chart and narrative that fully describes the roles, responsibilities, qualifications and experience of each member of the staff dedicated to site safety; and
 - (H) Process for accident and incident reporting and response including procedure for responding to occupational health and safety issues.

- (v) Approvals strategy including a detailed description of Project Co's approach to obtaining required Proponent Permits, Licences and Approvals in time for successful completion of the Project and the key team members and agencies involved in the process.

2.4 Risk Management Plan Submission Requirements

- (a) Project Co shall include the following sections under the Risk Management Plan (RMP):

- (i) Overall Approach to Risk Management

- (A) Project Co shall provide a narrative that outlines Project Co's risk management approach and methodologies. The narrative shall address, but is not limited to the following:

- (1) How risks will be identified, assessed, responded to, and monitored throughout the Project;
- (2) Categorizations and definitions to be used in support of qualitative analysis of risks;
- (3) Tools and techniques to be used for quantitative analysis of risks;
- (4) How contingency and/or mitigation plans will be developed, implemented, and monitored;
- (5) How Project reserves will be allocated to handle risks; and
- (6) How Project Co's Risk Management process will be integrated with Proponent Team Members

- (ii) Initial Risk Assessment Planning

- (A) Project Co shall provide a narrative that outlines Project Co's understanding of the risks and challenges specific to the Project. Project Co shall identify and describe features of Project Co's Design and Construction Plan that Project Co considers unique and/or innovative relative to reducing or eliminating Project risk.

- (iii) Risk Register

- (A) Project Co shall provide a detailed risk register that identifies:
 - (1) Project risk items;
 - (2) Probability/likelihood of such risks manifesting themselves on the Project;

- (3) Potential severity of impact to Project objectives should such risks occur;
- (4) Allocation to work breakdown, activities, or groups/types of activities;
- (5) Triggering events or root causes;
- (6) Ability to predict or control occurrence;
- (7) Timeline horizon (i.e. near-term, mid-term, or long-term);
- (8) Response strategy and plans for managing each risk;
- (9) Residual risk assessment after implementation of response plan; and
- (10) Regularity of reassessment (i.e. monthly, quarterly, annually; or after a particular Project event or milestone).

SCHEDULE 10
REVIEW PROCEDURE

APPENDIX C
ADDITIONAL SPECIFIC SUBMISSIONS BY PROJECT CO

1. GENERAL

- 1.1 The provisions of Appendix C of this Schedule 10 shall apply to Works Submittals to be submitted by Project Co without limitation to the Design Development Submittals, the Construction Document Submittals, the Design Data and any and all items, documents and anything else required or specified by this Project Agreement, including all Works Submittals listed in Appendix C to this Schedule 10, in respect of the Design and Construction Works to be submitted to, reviewed or otherwise processed by the City in accordance with the Review Procedure prior to or after Substantial Completion in respect of the completion of Minor Deficiencies, including any and all subsequent revisions, amendments and changes thereto (collectively and individually, “Additional Specific Submissions” as applicable in Appendix C of this Schedule 10). Project Co shall submit the Additional Specific Submissions, without limitation, per occurrence unless otherwise noted.

2. ADDITIONAL SPECIFIC SUBMISSIONS BY PROJECT CO

Table 2.1 – Other Submissions Requirements

<u>Deliverable Name</u>	<u>Reference Section in this Project Agreement</u>	<u>Submitted under the Review Procedure</u>
<u>Dwell time Calculations</u>	<u>Schedule 15-2, Part 1, Article 2 – Operational Performance Requirements</u>	<u>Yes</u>
<u>Requests for Legal Surveys</u>	<u>Schedule 15-2, Part 1, Article 4 – Design and Construction</u>	<u>Yes</u>
<u>Pavement design report(s)</u>	<u>Schedule 15-2, Part 1, Article 5 – Roadways, Bus Terminals and Laybys</u>	<u>Yes</u>
<u>Traffic Control Plans</u>	<u>Schedule 15-2, Part 1, Article 5 – Roadways, Bus Terminals and Laybys</u>	<u>Yes</u>
<u>Temporary signing plan and temporary signing table</u>	<u>Schedule 15-2, Part 1, Article 5 – Roadways, Bus Terminals and Laybys</u>	<u>Yes</u>

<u>Deliverable Name</u>	<u>Reference Section in this Project Agreement</u>	<u>Submitted under the Review Procedure</u>
<u>Lighting design and lighting calculation summary</u>	<u>Schedule 15-2, Part 1, Article 5 – Roadways, Bus Terminals and Laybys</u>	<u>Yes</u>
<u>Safety Management Plan (SMP)</u>	<u>Schedule 15-2, Part 1, Article 9 – Safety Management Plan</u>	<u>Yes</u>
<u>Design Criteria Conformance Checklist</u>	<u>Schedule 15-2, Part 1, Article 10 – Safety and Security Certification</u>	<u>Yes</u>
<u>Construction Specification Conformance Checklist</u>	<u>Schedule 15-2, Part 1, Article 10 – Safety and Security Certification</u>	<u>Yes</u>
<u>Safety-Related Testing Conformance Checklist</u>	<u>Schedule 15-2, Part 1, Article 10 – Safety and Security Certification</u>	<u>Yes</u>
<u>Preliminary Hazard Analysis (PHA)</u>	<u>Schedule 15-2, Part 1, Article 10 – Safety and Security Certification</u>	<u>Yes</u>
<u>Hazard Tracking Matrix (HTM)</u>	<u>Schedule 15-2, Part 1, Article 10 – Safety and Security Certification</u>	<u>Yes</u>
<u>Threat Vulnerability Analysis (TVA)</u>	<u>Schedule 15-2, Part 1, Article 10 – Safety and Security Certification</u>	<u>Yes</u>
<u>Vulnerability Tracking Matrix (VTM)</u>	<u>Schedule 15-2, Part 1, Article 10 – Safety and Security Certification</u>	<u>Yes</u>
<u>Reliability, Availability, Maintainability and Safety (RAMS) Analysis/Report</u>	<u>Schedule 15-2, Part 1, Article 10 – Safety and Security Certification</u>	<u>Yes</u>
<u>Emergency Response Plan (ERP)</u>	<u>Schedule 15-2, Part 1, Article 11 – Emergency Response Plan</u>	<u>Yes</u>
<u>Developers Guide</u>	<u>Schedule 15-2, Part 1, Article 19 – Future Adjacent Construction Requirements</u>	<u>Yes</u>

<u>Deliverable Name</u>	<u>Reference Section in this Project Agreement</u>	<u>Submitted under the Review Procedure</u>
<u>Pedestrian Access Plan</u>	<u>Schedule 15-2, Part 1, Article 21 – Implementation Constraints</u>	<u>Yes</u>
<u>Reliability Demonstration Plan</u>	<u>Schedule 15-2, Part 4, Article 3 – Revenue Vehicles</u>	<u>Yes</u>
<u>Preliminary Hazard List (PHL)</u>	<u>Schedule 15-2, Part 4, Article 3 – Revenue Vehicles</u>	<u>Yes</u>
<u>System Hazard List (SHL)</u>	<u>Schedule 15-2, Part 4, Article 3 – Revenue Vehicles</u>	<u>Yes</u>
<u>Subsystem Hazard List</u>	<u>Schedule 15-2, Part 4, Article 3 – Revenue Vehicles</u>	<u>Yes</u>
<u>EMC Management Plan</u>	<u>Schedule 15-2, Part 4, Article 9 – EMI/EMC</u>	<u>Yes</u>
<u>Traffic and Transit Management Plan (TTMP)</u>	<u>Schedule 15-2, Part 7 – Traffic Management and Construction Access</u>	<u>Yes</u>
<u>All sub-plans related to the TTMP</u>	<u>Schedule 15-2, Part 7 – Traffic Management and Construction Access</u>	<u>Yes</u>
<u>All plans, reports and submission requirements identified in Section 3.9 of Schedule 17 – Environmental Obligations</u>	<u>Schedule 17 – Environmental Obligations</u>	<u>Yes</u>