DESIGN QUALITY PLAN

ABBOTSFORD HOSPITAL & CANCER CENTRE

Agreement Schedule 12 – Design Quality Plan

CONTENTS

1 INTRODUCTION

The Design Quality Plan details the procedure for post submission design development and review and summarizes responsibilities for the control of monitoring and verification.

The purpose of the design control plan is to provide a consistent approach to the management of the design process to ensure that Agreement requirements are met. The Design Quality Plan is the guide document which identifies the procedures comprising the design phase and describes the systems for control of the design output. It describes the methods for monitoring and verification, and provides samples of the documentation to be used for these processes.

In this document, the Key Individuals associated with the roles described herein are as follows:

ROLE	INDIVIDUAL
Project Co Representative	As per Agreement
AHA Project Director	Jim Cox
AHA Project Manager	Chris Coulter
PCL-Project Manager	Lorne Ebenal
PCL-Design Manager	Vince Tersigni
Primary Consultant Design Manager	Tony Read/John Marchant
Team Members (Prim Consultants) • STH Leader –Tony Read • MCM-JP Mahe	 –Tony Read -JP Mahe
PCL-QA/QC Manager	TBD

2 DESIGN ORGANISATION AND RESPONSIBILITIES

2.1 Key Personnel Responsibilities

The following lists summarize the responsibilities of the Key Individuals in relation to Design only.

2.2 PCL-Project Manager (Lorne Ebenal)

- To create and maintain as necessary the “team” approach of design personnel by exhibiting leadership and management skills.
- To foster excellent relationships with and between PCL (inclusive of its design team) , Project Co and Health Co
- To be the designated point of contact for all quality system related matters with Project Co. The designated point of contact for Health Co will be the Project Co Representative.
- To liaise with Project Co on the disposition of comments provided by Health Co pursuant to the Review Procedure or otherwise pursuant to the Agreement, and to ensure that appropriate remedial action is taken to remedy such comments.
- To manage the design process of the contract both personally and through delegation to the Design Manager. Liaise with Project Co, Health Co, consultants and authorities as necessary to resolve design, planning and coordination issues and problems.
- Attend and contribute to Health Co project control meetings to report on progress and resolve design, planning and coordination issues.
- Attend and contribute to the Bi-weekly site construction meetings.
- Prepare project monthly report in accordance with Agreement.
- Ensure all aspects of the project are managed in accordance with the requirements of the Agreement.

2.3 PCL-Design Manager-Vince Tersigni

- Review contract documentation closely to identify improvements in design.
- Convene design team meetings with consultants, take minutes and distribute same.
- Attend team meetings with construction team to maximise benefits from construction knowledge and experience of those individuals.
- Attend sub-contractor pre-commencement meetings to discuss alternative construction methods and materials, which may benefit the project.
- Ensure the project design phase is conducted and monitored in accordance with Design Management procedures.

- Prepare and monitor the design programme and ensure the timely production of drawings for issue to the construction team.
- Maintain a register of all drawings and specification amendments until these reach construction issue.
- Ensure documents are issued in accordance with Agreement requirements.
- Check all drawings and specifications for compliance with the Design Brief before issue to the Health Co; confirm consistency with Output Specifications and address queries from Health Co in this regard.
- After initial issue of construction documents, monitor issue amendments status for compliance with Health Co requirements.
- Ensure documents for “As Constructed” issue and O & M manuals are produced to standard and in a timely manner.

2.4 Primary Consultant Design Manager-STH/MCM Team

- Review and verify design brief documentation
- Liaise with PCL
- Manage sub-consultants and resources
- Implement design changes in accordance with process the Agreement.
- Disseminate information to Team consultants
- Facilitate reviews and coordination meetings with sub-consultants
- Identify and control all documents
- Maintain records and coordinate all design changes throughout the design & construct phase for the timely issue of documentation.

2.5 Team Leaders (Sub Consultants) Stantec/ RADA, RJC and Pomeroy

- Review the design brief documentation
- Facilitate design changes
- Direct design documentation teams
- Check documentation details
- Direct and coordinate their respective other sub-consultants
- Prepare specifications / schedules / sample boards

- Prepare review checklists
- Maintain records and coordinate all design changes throughout the design & construct phase for the timely issue of documentation.

2.6 Team Members (All Sub Consultants)

- Prepare design documentation
- Liaise with other sub-consultants
- Coordinate distribution of digital information

2.7 Register of Authorized Design Team Signatures

The following specimen signatures and signed initials are of Design Team personnel who may be called upon to witness or authorize elements of the Quality Assurance documents relating to the project:

Name	Organization	Signature	Initials	Date
John Marchant (Architect of Record and Coordinating Professional of Record)	MCM			
Tony Read/Aija Thomas	STH			
Ian Niven	Stantec-Mechanical, including Fire Protection & Hydraulics			
Doug Redmond	RADA			
Doug Sinclair	Pomeroy			
Jeff Corbett	RJC			
David Graham	GHL			
TBD	IT/Tel			
TBD	Interior Designer			
Vincent Lao	Equipment Consultant			
Margot Long	Landscape Consultant			

3 DESIGN MANAGEMENT PROCEDURES

3.1 Design Documents

The Agreement, including the Output Specifications and the Project Co Proposal Extracts shall be followed by the design team during the process of design development and verification.

3.2 Design Components

The various design components can be logically listed according to discipline. The following table describes these components and nominates the parties responsible during the four project phases

		PHASE			
Discipline	Involvement	Design	Construction	Commissioning	As Constructed
Architectural (including Building Envelope Professional	PCL Consultant-STH-MCM	✔ ✔	✔ ✔	✔ ✔	✔ ✔
Civil	PCL Consultant - Pomeroy	✔ ✔	✔ ✔	✔	✔ ✔
Structural	PCL Structural Consultant- RJC	✔ ✔	✔ ✔	✔ ✔	✔ ✔
Code	PCL Consultant-GHL	✔ ✔	✔ ✔	✔ ✔	✔ ✔
Hydraulics	PCL Consultant Stantec	✔ ✔	✔ ✔	✔ ✔	✔ ✔
Mechanical	PCL Consultant-Stantec	✔ ✔	✔ ✔	✔ ✔	✔ ✔
Electrical/ Fire Detection /Communications/ Security	PCL Consultant-RADA	✔ ✔	✔ ✔	✔ ✔	✔ ✔
Landscape	PCL consultant-PWL	✔ ✔	✔ ✔	✔ ✔	✔ ✔
IT/Tel	PCL IBM JCI	✔ ✔ ✔	✔ ✔ ✔	✔ ✔ ✔	✔ ✔ ✔
Authorities - Health Co		✔ ✔	✔ ✔	✔ ✔	✔ ✔

Authorities - Fire - Planning & Permits - Other	*PCL* *Consultant* *AHJ*	✔ ✔	✔ ✔	✔ ✔	

3.3 Design Review and Verification

This section describes the procedures undertaken during design development for the purposes of review and verification to ensure compliance with the Agreement.

The Design phase of the project can be divided into three main stages:

- **(Stage 1) Design Development and Documentation**: Where drawings are progressed from the date of the Agreement through 95-100% design review, co-ordination of trades approval and final issue of For Construction documents.

- **(Stage 2) Design Change during Construction**: Where during the course of construction, improvements in detailing may be identified or Variations may be incorporated into the project. It is anticipated that all major design issues will have been resolved during the normal course of design leading up to issue of documentation for construction.

- **(Stage 3) Preparation of "As Constructed" Documentation**: Final Completion is dependent upon the issue of "As Constructed" documentation.

Preparation of "As Constructed" documentation will progress with the relevant trade packages and this is particularly important for underground services.

The procedures to be followed for each of these three design stages will be described separately in this section.

3.3.1 Stage 1 - Design Development and Documentation

The Design Data as of date of the Agreement must be further developed by selected Consultants under contract to PCL into Design Development documents and "For Construction" documents.

Schematic Design Completion

The objectives of this process are summarized as follows;

Stage 1A

- User group meetings to be held for each department whose layout as proposed in the Agreement require reconfiguration and or amendments.

- These meetings will be lead jointly by PCL and STH-MCM working with the executive core team from Health Co along with selected department user group people. Tony Read and

Aija Thomas will be the lead Architects for clinical as well as non clinical discussions. JP Mahe of STH-MCM will also be a participant in the above user group discussions.

- Proposed changes/amendments, that if implemented would comprise a Variation, made in the user group meetings, are to be identified and priced. Such pricing is to be consistent with Schedule 25 - Variation Procedure inclusive of FM impacts, if any. The proposed pricing shall be forwarded to Health Co for review and decision pursuant to the Variation Procedure to facilitate completion of the Schematic Design stage. This will be in accordance with Schedule 11 - Review Procedure and Section 18 of the Agreement.

- Once approval of the above Variations is provided by the Health Co Representative as per Schedule 11 – Review Procedure, the 1:200 and 1:100 internal layouts will be completed. This will involve code reviews, compliances with Authorities Having Jurisdiction and include general refinement of walls and rooms design detail.

Stage 1B

- User group meetings to be held for room interiors layout and composition (Kit of Parts). PCL along with its consultants will provide baseline interior room layouts for all rooms found in the hospital inclusive of Category A and B1 equipment along with Category B2 furniture layout.

- User groups via executive core group to review and comment on proposed layout. Refinements inclusive of proposed Variations will be recorded for the respective room and department making the comment or request. To enable a productive process these changes, if any, will be grouped and packaged in three separate Submittals, namely one for clinical re-occurring rooms (i.e. room that have more than one occurrence) , one for clinical rooms that are one of type and one for non-clinical rooms (these may contain multi occurring and one of rooms).

- Proposed changes/amendments, that if implemented would comprise a Variation, made in the user group meetings, are to be identified and priced. Such pricing is to be consistent with Schedule 25 - Variation Procedure inclusive of FM impacts, if any. The proposed pricing shall be forwarded to Health Co for review and decision pursuant to the Variation Procedure to facilitate completion of the Schematic Design stage. This will be in accordance with Schedule 11 - Review Procedure and Section 18 of the Agreement.

- These meetings will be lead jointly by PCL and STH-MCM working with the executive core team from Health Co along with select department user group primes. Tony Read will be the lead Architects for clinical as well as non clinical discussions. JP Mahe of STH-MCM will also be a participant in the above user group discussions. Vince Tersigni, Jim Hebeler and or Lorne Ebenal will be the participants representing PCL. As well as select group of sub consultants along with the mechanical, electrical and information management subtrades will also participate in review and amendments to the generic room data sheets (Kit of Parts).

- Project Co will submit a set of 1:50 drawings to Health Co for review and sign-off in conformance with Schedule 11 - Review Procedure and the Submissions Schedule.

- Health Co to review proposed changes prior to design development work proceeding for the above work. This review will be in accordance with Schedule 11 - Review Procedure and as per Section 18 of the Agreement.

Stage 1C

- In parallel to stage 1A and 1B schematic design will be proceeding on the exterior envelope and both on site and offsite civil and landscape.

- PCL will work with Pomeroy group and Landscape architect to finalize the schematic design for civil work and all hard/soft landscaping on site and off-site. Health Co will be provided such design in Submittals in accordance with the Agreement for review at predetermined dates (according to the Submittal Schedule) for 50% and 95% drawing review.

- PCL and STH-MCM will hold schematic design development meetings weekly to finalize elements and material selection for the exterior envelope. These meetings will be held with MCM as the Architect of Record and Coordinating Professional for the entire facility during permitting and construction. STH will have advisory participation during this phase of development

- PCL and Landscape Architect will also partake in bi-weekly schematic and design development meetings to finalize materials, specifications and quantity of landscaping materials to be used. The lead Landscape architect has as yet not been defined but will be from the firm PWL.

- PCL and Pomeroy Group will also have bi-weekly meetings to further develop the schematic design and design development for civil work on site. The lead Engineer for this work will be Doug Sinclair of Pomeroy group.

- Health Co to review the above prior to design development work proceeding. This will be in accordance with Schedule 11- Review Procedure and as per Section 18 of the Agreement.

Design Development and Documentation

The objectives of this process are summarized as follows:

- the “For Construction” documents shall accurately reflect the amendments by the aforenoted Schematic Design and Design Development processes;

- the “For Construction” documents shall be free from errors, omissions and discrepancies;

- The designs and specifications shall satisfy and comply with requirements of Applicable Law, Section 18.3 and all other provisions of the Agreement.

- design development shall take into consideration the process of Quality Assurance in the construction phase and in accordance with PCL QA/QC plan

The following procedure shall be followed:

1. PCL shall arrange a Consultant's Induction Meeting to discuss protocols and administrative matters.

2. Regular design meetings shall be held and chaired by PCL with a representative of the Lead Consultant in attendance and Sub-consultants and Sub-contractors attending as requested. Minutes shall be prepared and copies issued to all consultants.

3. PCL Constructors West Coast Inc. shall prepare a documentation programme, which describes the sequence of documentation and completion times and this shall be provided to Health Co. This programme shall consider the requirements of the construction programme so that the project can benefit from a fast tracking approach.

Documentation will be completed on a building by building basis.

1. The PCL Design Manager shall be responsible for ensuring that the processes of design development are undertaken in a professional manner and that the objectives are met.

2. Coordination of designs between Consultants shall be the responsibility of the Lead Consultant (STH- MCM Joint Venture). Lines of communication between the design team shall be open with copies of correspondence to be forwarded to Design Manager Lead Consultants.

3. Review of details and layouts, as may be required shall be sought from Health Co using a standard format for request for review of submittal (RFR). A register of RFR's shall be kept by the Design Manager. These shall be forward to Health Co via AHA.

Document Register

1. All document amendments shall be recorded in a document Register by the Design Manager with changes in design documented, including the following detail:

    - Description of the revision
    - What generated the revision, eg.

        (i) change to Health Co requirement (Variance)

        (ii) coordination with other Consultant and with which Consultant

        (iii) rationalization of details

        (iv) completion of details

        (v) correction or errors, or

        (vi) Applicable Law requirement.

2. Health Co initiated Variations shall be initiated pursuant to the Agreement and these shall be forwarded to Project Co for implementation.

3. Registers of documentation including drawings, and RFR's shall be kept.

It is recognised that documentation issued for construction could require amendments pursuant to the Agreement after the date of issue of such documents. This may occur for one or more of the following reasons:

1. Misinterpretation of design brief,

2. Variations,

3. Identification of impractical detailing by construction teams during construction,

4. Minor details in documentation product which are not identified during the review process; and

5. Recognition of improved design.

PCL may pursuant to the Agreement request that a design change be instigated for one or more of the above reasons. The consultants will be requested to produce amended documentation. For small amendments the revised detail will be issued and appended to the original document. The original document will be marked as amended including a reference to amended document eg. RFR or PMI and signed by the Project Construction Manager. Design changes will be recorded in the design amendment register included as an appendix.

If there are numerous amendments to a document or if the amendment requires a major design change, then a new document (eg. drawings, specification section) will be issued.

The original document will be marked superseded and removed from circulation.

The amended document will be numbered in accordance with the appropriate alpha-numeric code and issued to the relevant sub-contractors.

The document register will be amended to reflect the changes.

Variations will be recorded in the variation register included as an appendix.

3.3.2 Stage 3 - Preparation of As Constructed Documentation

The PCL Design Manager shall impress upon the sub-contractors the importance of the timely submission of As Constructed documentation. Time should be allowed for those listed in the matrix at 3.2 above to review the As Constructed documentation.

The following sequence is recommended for the preparation and approval of As Constructed documentation, including drawings, specifications and operation and maintenance manuals.

1. The Design Manager shall prepare a program for preparation and submission of As Constructed documentation.

2. Trade Contractors prepare marked up draft operation and maintenance manuals, where appropriate, and submit to PCL.

3. PCL will check raw data for compliance with Agreement and subsequent amendments.

4. Marked up documentation is issued to consultants for preparation in accordance with Agreement and subsequent amendments.

5. Consultants issue As Constructed documents with relevant check lists.

6. Documentation is reviewed by PCL and submitted to the Health Co via Project Co.

7. After Health Co's review further amendment and re-submission may be required and sufficient time should be allowed for this process.

As Constructed documentation shall be prepared as soon as is practicable and generally in accordance with the following schedule:

Description of Document	Submit for Health Co review
1 Draft Services, Operating & Maintenance Manuals (excluding commissioning results) 5.1 Electrical Services 5.2 Mechanical Services 5.3 Hydraulic Services 5.4 Fire Services 5.5 Communications Services	) AS PER CONTRACT))
2 Completed services Operating & Maintenance manuals.	AS PER CONTRACT
3 Completed design documentation including drawings and specification for all disciplines. To be submitted in the following sequence: i) Civil ii) Structural iii) Architectural iv) Sprinklers v) Landscaping vi) Mechanical vii) Electrical and Communications	AS PER CONTRACT

Format of final, As Constructed documentation shall be submitted in accordance with Agreement requirements where applicable.

3.3.3 Design Review

At a stipulated time in the design process, and prior to sending a Submittal to Health Co for review, the design documentation shall be reviewed by the PCL, JCI, Sub-contractors, and the Consultants.

These reviews shall establish that the design meets the requirements of the Output Specifications and the requirements of the Agreement.

During the course of design development, a number of internal document reviews will be required before submission to the Health Co for review.

Health Co reviews of Submittals will be required and will be carried out as per,the Agreement.

Documentation is required to be submitted to Health Co in the following sequence for the listed disciplines.

Discipline	Sequence Of Documents For Review
Architectural	General Arrangement Drawings (ie. Plans, Elevations and Sections), followed by Specification Sections and Detail Drawings.
Civil	Site Arrangement Drawings, followed by Specification Sections and Detail Drawings.
Structural	Architectural General Arrangement Drawings, Specification Sections, “Standard” Structural Drawings and complete set of Structural Drawings for each building.
Electrical	Site Services Drawings, Architectural General Arrangement Drawings, Specification Sections and complete sets of electrical drawings for each building.
Communications	Architectural General Arrangement Drawings, Specification Sections and complete set of Communication Drawings.
Fire	Site Services Drawings, Architectural General Arrangement Drawings, Specification Sections and complete sets of fire services drawings for each building.
Plumbing	Site Services Drawings, Architectural General Arrangement Drawings, Specification Sections and complete sets of hydraulics drawings for each building.
Mechanical	Site Services Drawings, Architectural General Arrangement Drawings, Specification Sections, Structural General Arrangement Drawings, Internal Hydraulics Drawings and complete sets of drawings for each building.
Landscaping	Civil Drawings, Architectural General Arrangement Drawings, Specification Sections and complete set of Landscaping Drawings.

The following documentation reviews shall be undertaken by the project design team.

These reviews shall be completed by the parties described prior to submission of documentation to the Health Co for review. The individual discipline consultants shall review the requirements of the Design Brief and Output Specifications and allow for it in their documentation.

(i) The Lead Consultant shall review all documentation for compliance with the Agreement and subsequent changes before submission to PCL Design Manager.

(ii) The Lead Consultant shall review all documentation to coordinate for cross-disciplinary design errors.

(iii) The PCL Design Manager shall ensure that the relevant sub-contractors have the opportunity to review documentation at the earliest possible stage of design and prior to Project Co's Review and Sign off (RSO).

(iv) The PCL Design Manager shall review all documentation submitted via the Lead Consultant and check for compliance with the Agreement and subsequent changes and for inter-disciplinary conformity.

The review process shall be documented by the relevant parties, by using checklists. These checklists and the verification process are described further in section 4 of this document.

3.3.4 Verification

Verification of design documentation and associated checklists is required as a record that the review process has occurred.

The design documentation shall display the professional seal and names of the designer and draftsman in the title block. The documents shall be verified by personnel with qualifications and experience commensurate with the responsibility of verification. Verification shall serve as an independent check of the documents issued.

The following design processes will be verified for PCL's internal purposes in accordance with one or more of the following procedures.

(i) Documents submitted for internal review by PCL and their sub-contractors will be returned to the consultants with a completed document review checklist. This checklist will be verified by the PCL Design Manager and/or Project Construction Manager.

(ii) Documents issued by the consultants for RSO will be accompanied by the consultant's checklist signed by the consultant's verifier.

(iii) Documents issued to PCL for RSO will only be received after they have been crosschecked and verified by the Lead Consultant.

(iv) Documents issued to the Health Co for review must be accompanied by a PCL document review checklist and verified by the PCL Design Manager and Project Construction Manager.

(v) Documentation which is re-submitted to the Health Co for any reason shall be verified by PCL as having incorporated all corrections and approved design changes and addressed all items raised by Health Co in review comments.

(vi) Submission for major design items or issues which are submitted to Health Co shall be verified by the PCL Project Construction Manager.

(vii) When submitting Upgraded Construction Issue (UCI) documentation for preparation by the consultants, the sub-contractor shall verify that the details therein accurately reflect the As Constructed situation.

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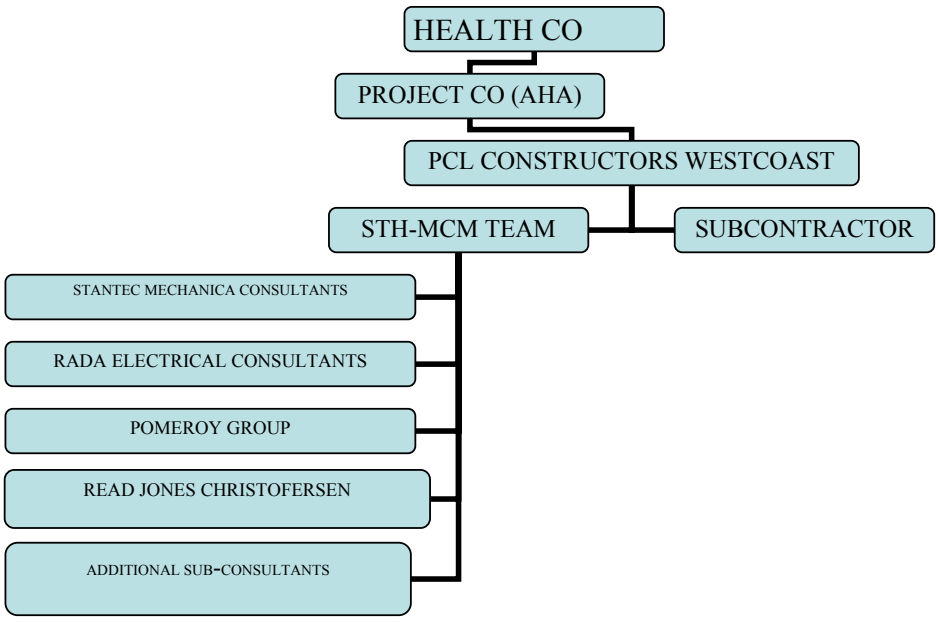
(viii) When documentation is issued to the Health Co, PCL shall submit an updated document register which reflects the latest document status.

3.4 Design Coordination

3.4.1 Organizational Chart



There is a design build agreement between PCL and AHA. PCL has a contractual arrangement with STH-MCM for all Architectural, Structural, Mechanical, and Electrical and Landscaping disciplines along with any specialty consultants required by STH-MCM. The lead designer in the STH-MCM team will be STH architects out of Australia. MCM will provide the certification for the

project. All other sub consultants will provide their respective certifications under the BC Building Code.

Interior Clinical layout and function design will be the responsibility of STH architects working in conjunction with MCM. STH will lead the design team with respect to interiors layout function and clinical requirements. MCM will provide the interior design product and colour pallet.

The PCL Project Construction Manager is responsible for maintaining the timely production of design and documentation in accordance with the Agreement.

The Lead Consultant is primarily responsible for coordination of the sub-consultants documentation, although there may be some unofficial lines of direct communication between sub-consultants and the PCL Design Manager.

PCL is responsible for coordinating the inputs from their construction team and sub-contractors to meet the requirements of the Agreement.

The meetings shall be convened to provide assistance in the coordination of the design process.

Name:

Period:

Attendees:

Convener/Minutes:

Activities:

4 APPENDICES (To be developed)

1. Document Review Checklist
2. Project Co internal process for managing Variations
3. Variation Quotation Request
4. Variation Register
5. Document Register