



**CFIA Laboratory Renovation
2301 Midland Ave., Toronto
Project # R.0961999.001**

**Mechanical & Electrical System
Commissioning Plan [REDACTED]**

Rev: 2

Project No: V14061

Date: February 07, 2015



Commissioning Plan [REDACTED]
CFIA GTA Laboratory Renovation 2301 Midland Ave.
PWGSC Project No. R.061999.001

Commissioning Plan Draft Revision Control

| Draft # | Draft Date | Description/Revision |
|---------|-------------------|---|
| 01 | November 23, 2014 | Draft issued to Client for review and comment |
| 02 | December 15, 2014 | Draft issued to Client & Design Team for review and comment |

| Rev # | Revision Date | Description/Revision |
|-------|---------------------------------|--|
| 0 | January 15 th , 2015 | Issued to PWGSC to include in Tender document. |
| 1 | February 03, 2015 | Issued to PWGSC incorporated additional design documents e-mailed to VSC on or about Jan 28, 2015 |
| 2 | February 07, 2015 | Issued to PWGSC includes all appendixes attached Revisions as per conference call on Feb 06, 2015 |
| | | |

Draft Commissioning Plan;

The Commissioning Plan will be in “draft” form and updated as required.

The Commissioning Plan is a dynamic document, revised to reflect the correct and actual site conditions.

All commissioning activities for other disciplines such as but not limited to; civil, architectural and structural to be completed by others and are not included as part of this document.



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Appendix “A” Extent of Commissioning Mechanical and Electrical List

Issued based on IFT CD and Addendum 01 and 02

Appendix “B” Project Contact List

Issued based on IFT CD and Addendum 01 and 02

To be updated following contract award and during construction phase

Appendix “C” Commissioning CPM

Issued based on IFT CD and Addendum 01 and 02

To be finalized during Construction Phase

Appendix “D” Commissioning PI Forms

Issued based on IFT CD and Addendum 01 and 02

To be finalized during Construction Phase

Appendix “E” Commissioning PV Forms

Issued based on IFT CD and Addendum 01 and 02

To be finalized during Construction Phase

Appendix “F” Commissioning Milestones

Issued based on IFT CD and Addendum 01 and 02

To be finalized during Construction Phase

Reference Publications;

1. CP-03 Model Commissioning Plan - Nov 2003 – English
2. CP.4: Guide to the development of Building Management Manuals 3rd. edition - Nov. 2003

The Commissioning Plan for this project is based on the Consultant Terms of Reference Commissioning Manager Services PWGSC Project No. R.061999.001 dated 20109-10. The Commissioning Plan Draft has been updated based on the additional design documents issued to the Commissioning Manager during the Design Phase.



1.0 Introduction and Content

1.1 Purpose of the Commissioning Plan:

The Commissioning Plan (Cx Plan) is to provide guidance for the commissioning process for this specific project. The Cx Plan is focused on verifying and documenting the facility has fulfilled the functional and the performance criteria of the final design and the Owner's Project Requirements (OPR). Project specific specifications and construction documents will supersede commissioning plan, construction team and contractors responsible for most stringent requirements.

1.2 Importance of the Commissioning Plan:

The Commissioning Plan contains the general method, activities and processes for the planning of an orderly accountable commissioning program. The Commissioning Plan is to be used by all members of the Commissioning Team. The Commissioning Plan is the master planning, management and communication tool. It defines the commissioning scope, standards, roles and responsibilities, expectations and deliverables for all members of the Commissioning Team.

1.3 Risk Assessment:

Risk associated with the commissioning process will be identified and monitored throughout the process by all team members involved in the commissioning activities. Identified risks will be incorporated into the Commissioning Plan where required.

1.4 Revisions to this Commissioning Plan:

This Commissioning Plan will be reviewed, revised, refined and updated as detailed design and production of the Working / Construction Documents proceeds and, during construction process and project phases.

2.0 Objectives of Commissioning Process:

The overall objectives of the Commissioning Process are to:

- .1 Ensure the M & E design meets the Owners Project Requirements.
- .2 Provide a fully functional fit out.
- .3 Ensure the M & E design and selection of assets provides the correct balance of first time to life cycle costs.
- .4 Ensure the M & E system can be properly commissioned and serviced during the life of the facility.
- .5 Ensure the Construction Documents contain the appropriate information and direct the Commissioning Process for the Construction Team.
- .6 Verify that the building components and systems provide the design intent performance.
- .7 To demonstrate that the CFIA's and PWGSC's design and operational requirements are satisfied during the identification and delivery stages of the project and to support quality management of construction and installation through verification of building components, systems and environments at each phase of occupancy.
- .8 To document the operational, maintenance and building management requirements.
- .9 To minimize O&M costs through the careful selection of design solutions (for economy, reliability, durability, accessibility and, maintainability), construction materials, installation practices and, performance verification procedures.



- .10 To verify that selected design solutions and the resultant built works to protect the safety, health, welfare and comfort of the building occupants and O&M personnel.
- .11 To define responsibility areas for meeting these operational requirements in the contract documents and include a process to demonstrate compliance.
- .12 To document the design intent of the overall project and the proposed building systems and components and to verify and demonstrate that all functional and operational requirements have been correctly interpreted in the design solution.
- .13 To verify and demonstrate that all systems operate efficiently under all normal load conditions.
- .14 To maintain operations of labs where portions are being decommissioned and re-commissioned during the construction phases.
- .15 To provide comprehensive documentation of the operational, maintenance and building management.
- .16 To implement a comprehensive training program.
- .17 To transfer the completed works to the qualified and trained facility operators.
- .18 To meet the owner's CL2 testing and documentation requirements.

3.0 Commissioning Procedures

3.1 General;

The procedures for commissioning will be developed by the Commissioning Manager and performed by the Construction Team that relate to start-up, functional performance testing, documentation, schedule, commissioning process, and final acceptance at the end of the project.

3.2 Documentation Flow;

The commissioning program shall be planned, managed and controlled through the flow of documentation for each commissioning activity and project phase. A documentation package will be presented to the Owner at the conclusion of the commissioning program. The Owners comments for the required parties will be provided throughout the design and construction processes and phases.

3.3 Documentation;

Commissioning forms are as follows:

.1 Product Information (PI) Report Forms:

All product information relating to new equipment and components supplied and installed on this project will be reported on PWGSC reviewed PI report forms. This applies only to new components and equipment. PI forms will not be completed for existing components, equipment assets and systems.

.2 Installation Check Lists (ICL) Report Forms:

This document is used to identify which system is ready for commissioning by ensuring that each system has been reviewed and that all the components, equipment and systems have been installed in accordance with the contract documents. Installation review observations and findings are documented on Installation Check List report forms reviewed by the Design Consultant and PWGSC.

.3 Performance Verification (PV) Report Forms:



All functional performance verification test results for all components, equipment and sub-systems and systems will be documented on Design Consultant and PWGSC reviewed PV report forms.

3.4 Safety;

It is the responsibility of all personnel involved in any commissioning activities to follow the General Contractor's, Project Health and Safety Policies and their Company's Safety Policies, Safety Program, Safety Manual and "lock-out" procedures and to be adequately trained prior to the start of any commissioning being performed.

3.5 Meetings;

A commissioning kick off meeting will be held at the start of the project. The construction commissioning meetings will start up when the construction phase reaches 60% for each phase / stage and will continue until the completion and turnover of the systems to the Owner. Commissioning Meetings are at the call of the Commissioning Manager.

3.6 Commissioning Schedule;

Commissioning activities and milestones (including duration) will be provided by the Commissioning Manager to the General Contractor. The General Contractor shall coordinate, include and incorporate into the construction critical path schedule prior to issuing for review. The schedule will be submitted to the Design Consultant, Commissioning Manager and PWGSC Project Manager for review and approval.

Include all commissioning activities, milestones, any phasing in of systems, client move, risks and tasks in overall schedule.

3.7 Clients Move;

The Clients move for the existing accommodations to the new facility though not part of commissioning should be given consideration by the Construction Team and Commissioning Team to ensure minor interruption in the commissioning schedule. If the clients move impacts the commissioning process the commissioning plan and schedule shall accommodate and clearly detail the impacts.

3.8 Commissioning Issues / Deficiencies;

Commissioning Issues will be generated for incomplete commissioning documentation submissions or generated during inspections and testing generally indicating non-compliance to the design or design intent.

If any check or test cannot be completed because of system issues deficiencies, these issues / deficiencies shall be documented on the appropriate test form and then corrected by the General Contractor. After the necessary corrective action, the issue / deficiency shall then be re-verified, by check or re-test and the results should be documented accordingly. The General Contractor shall individually review and sign off on each commissioning issue or deficiency prior to re-inspection or verification. Re-verification will be repeated until specified requirement is achieved or it is determined that specified performance cannot be achieved.

The effort and costs of re-working and correcting commissioning related issues / deficiencies generally far exceeds the cost of doing the work or completing the documentation correctly the first time. Commissioning Manager recommends taking an approach to minimize or eliminate commissioning issues and deficiencies.



3.9 Design Changes with Respect to Cx Process;

Prior to Cx activities all design modifications, maintenance and equipment replacement shall be completed as to not affect the integrity of the testing of the commissioning work. Repeat checks or testing after the necessary corrective action has taken place is both expensive and time consuming.

3.10 Contractors Substantial Performance Completion;

The following actions for commissioning shall be completed prior to the Contractors' Substantial Performance Completion.

- .1 Witness and sign the start-up test scripts accepting the test results complete.
- .2 Witness and sign the functional performance test scripts and accepting the test results complete.
- .3 System Performance Tests and Review of Performance Test Scripts have been completed. Includes all TAB documented performance.
- .4 All commissioning deficiency reports have been reviewed and corrective action has been completed.
- .5 Operations and Maintenance Manuals and Warranties have been submitted and accepted.
- .6 Presentation of design intent training sessions by design team has been completed and accepted.

3.11 Turnover;

Partial Phased Turnover Requirements

Interim TAB Report
Sub set of PI Forms
Partial PV Testing

Partial O&M Submission
(this will only be required electronically, final hard copies to be provided at the end of the project)

Partial Training Reports
Partial Training Plans & Materials

Updated Commissioning Schedule following each phase
Draft Commissioning Report incorporating each phase completed (living document) [electronically only, final hard copies at the end of the project]

Turnover shall occur following a formal walk around which includes but is not limited to; Design Consultant, Commissioning Manger, PWGSC Project Manager, Client, Property Manager and User groups. Owner to confirm all attending formal walks and required specific discipline formal walk around required. Systems shall only be turned over upon approval of the commissioning reports by Commissioning Manager. Requirements for approval include all reports are up to date and all design modifications, maintenance and equipment replacement have been completed, checked and tested, and incorporated into the commissioning documentation. The General Contractor shall coordinate the turnover process.



4.0 Introduction

Commissioning is a team effort among all parties involved in the project. It demands full co-operation in all stages of planning, design, construction, installation, activation and performance verification and operation. It also requires clear communications among all parties to achieve understanding of all requirements. This includes full documentation of major decisions and activities.

4.1 Roles and Responsibilities

The commissioning team for this project shall include Commissioning Manager, Design Consultant Representative, PWGSC Departmental Representative (Project Manager), PWGSC Design and Quality Assurance Authority, Building Operator Commissioning Representative, General Contractor and his sub-contractors and testing agencies. The roles and responsibilities of the commissioning team are listed as follows:

.1 Commissioning Manager

A qualified professional, the Cx. Manager represents both PWGSC and CFIA's interests who schedules and coordinates all commissioning activities during project delivery stage as well as post-occupancy commissioning. The Commissioning Manager is also responsible for the preparation of the Commissioning Plan, input dates to the commissioning schedule, and the preparation and completion of all applicable commissioning forms which include the Product Information (PI) Forms and Performance Verification (PV) Report Forms for the systems/equipment to be commissioned; review of applicable shop drawings; witnessing of all commissioning testing including start-ups and functional performance verification testing and post-occupancy testing for the systems/equipment to be commissioned; the timely submission of completed commissioning forms to PWGSC Project Manager for review and approval; preparation and submission of the Final Commissioning Reports.

.2 Design Consultant

Provides all design information required for commissioning to meet CFIA's functional requirements and maintain design intent of the base building systems, prepares the Design Intent Brief and Commissioning Brief and submits to Cx. Manager for coordination of the Commissioning Plan. The Design Consultant will verify that the base building and CFIA's functional requirements are correctly interpreted during the design stage and contract documents, and that the building systems operate consistently at peak efficiencies, under all normal load conditions. The Design Consultant will liaise with the Cx. Manager and incorporate the commissioning requirements and standards into the design and construction contract documents.

.3 PWGSC Departmental Representative (Project Manager)

Overall responsibility of the project delivery including approval of commissioning budget and schedule, resolution of contract disputes, approval of commissioning report and certification of final completion.

.4 PWGSC Design and Quality Assurance Authority

Reviews all aspects of design from the development of the RFP to the conceptual design report, proposed design solutions, detailed design and working documents and provides



in-house technical support to the Project Manager on quality assurance and quality control to ensure conformity to department's standards and code requirements.

.5 Building Operator Commissioning Representative

Represents Health Canada's (Building Owner's) base building interests, provides operational requirements that affect base building systems and is responsible for reviewing and providing inputs on all commissioning activities during the development, implementation and post construction stage of the project to conform to PWGSC's commissioning standards.

Provides building access for construction and commissioning related works, implements appropriate building safety measures and informs building occupants on progress of work, co-ordinates temporary interruptions or shut-downs of the various building systems during construction or testing; participates in commissioning testing and O & M training sessions; co-ordinates equipment identification.

.6 General Contractor

The General Contractor shall co-ordinate with the Cx Manager to arrange personnel, sub-contractor(s) and qualified testing agencies for conducting pre-start up tests, equipment start-up and testing, system start up and testing, TAB, functional performance verification, post-occupancy testing, O&M training sessions; submission of shop drawings, test results, as-built drawings and the operating and maintenance (O&M) manuals.

4.2 Commissioning Representative: (The General Contractor's Commissioning Representative)

Commissioning Representative will have a minimum 5 years' experience. The following describes their responsibility on this project:

- .1 The Commissioning Representative directs and coordinates all commissioning activities and reports to the General Contractor. All members work together to fulfill their contracted responsibilities and meet the objectives of the contract documents. The Commissioning Representative shall document all site and off-site checks and witness all test results for all components, equipment, sub-systems and systems.
- .2 The Commissioning Representative will work with the General Contractor to schedule the commissioning activities. The Commissioning Representative will provide sufficient notice (generally two (2) weeks' notice) to the General Contractor for scheduling commissioning activities. The General Contractor will integrate all commissioning activities into the master schedule. All parties will address scheduling problems and make necessary notifications in a timely manner in order to expedite the commissioning process.
- .3 The Commissioning Representative will provide the initial schedule of primary commissioning events, or commissioning milestones as per the specifications, at the initial commissioning kick-off meeting. As construction progresses and more detailed schedules are available from the General Contractor, the Commissioning Representative will adjust the commissioning schedule accordingly.
- .4 Organize construction team commissioning meetings as required, preparing meeting agenda, chair meetings, prepare minutes and distribute them to entire commissioning team,
- .5 Provide and maintain the schedules related to all commissioning activities as well as reporting and monitoring. Present updated commissioning schedule at all commissioning



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- meetings. Identify any variances and issues to be addressed at those commissioning meetings;
- .6 The Commissioning Representative will manage the process of developing the testing and performance verification. The Commissioning Representative will prepare PV / FPT forms and make them Project specific. All forms / check lists / plans will be submitted to the Design Consultant and Commissioning Manager for review and comment. Update the forms as required. During testing the Commissioning Representative will record all results and report any variances to the Commissioning Manager and Design Consultant.
 - .7 Ensure all required commissioning activities are identified in construction documents;
 - .8 Develop and implement a site quality assurance program to minimize delays as a result of poor workmanship or sub-contractor error; to reduce deficiencies and call backs during warranty periods; to reduce long-term risk to PWGSC arising from poor workmanship;
 - .9 Confirm in writing the contractor and sub-contractors' work is sufficiently complete as per the contract requirements prior to start up so that installation checks are carried out. Deficiencies identified by the Design Consultant / Commissioning Manager are to be corrected by the contractor and sub-contractors;
 - .10 Collect project start-up reports, review format and content against manufacturer's instructions prior to start-up, ensuring that forms reflect the procedures listed in the manufacturer's instructions;
 - .11 Witness and ensure all testing and commissioning of equipment is witnessed and inspected by the Design Consultant/Commissioning Manager and the required authorities;
 - .12 Ensure seasonal commissioning activities are detailed within the project schedule, are completed on time, and with the proper documentation and or follow-up action;
 - .13 Direct sub-contractors to complete, repair, adjust or rebuild portions of the work which do not meet the verification standards. Includes monitoring deficiencies and ensuring that they are corrected;
 - .14 Complete and sign-off all verification reports and compile into a comprehensive Commissioning Manual as the project progresses. Commissioning Manual updates to include seasonal commissioning activities;
 - .15 Undertake all actions required to close-out subcontracts including final warranty reviews and contract close-outs;
 - .16 Coordinating the training of PWGSC operational staff and the equipment/system handovers;
 - .17 Monitor and report to PWGSC on the progress of the commissioning process against the plan;
 - .18 Commissioning Representative to be available for emergency and troubleshooting service during the first year of occupancy requested by the Client / User for adjustments and modifications outside the responsibility of the O&M personnel.



5.0 Commissioning Participants:

The following commissioning participants are employed to verify performance of specific and special equipment and systems. Refer to the Specification Section 01 91 31 Commissioning (Cx) Plan 1.6. for greater detail:

5.1 Installing contractor or subcontractor:

All equipment and systems.

5.2 Original Equipment Manufacturer (OEM):

- .1 Perform factory testing as specified
- .2 Equipment specified to be installed and started up by the OEM.
- .3 Manufacturer may be also required to complete performance verification.

5.3 Specialist subcontractor:

- .1 Equipment and systems supplied by a specialized subcontractor, such as BAS and fire alarm systems.

5.4 Specialist Commissioning Agency:

- .1 Classified as possessing specialist qualification such as environmental space conditions, indoor air quality (IAQ) and other installations providing specialized environments essential to the Client's program.
- .2 Qualifications outside the scope or expertise of other commissioning specialists on the project.
- .3 If not specified in the commissioning specifications, the identity of this specialist will be provided at a later date.

5.5 Contractor's Testing, Adjusting and Balancing (TAB) agency:

- .1 Equipment and systems involving the measurement and adjusting of flow rates and pressures to meet indicated or specified values.
- .2 TAB systems and equipment includes, but may not be limited to, ducted air and hydronic systems, fans and pumps.
- .3 TAB is a construction contractor's activity which permits the Design Consultant to certify the performance verification results of the installed design to the satisfaction of the Commissioning Manager.
- .4 TAB Contractor to ensure compliance with phased system and space turnover requirements including physical testing and supporting documentation.
- .5 Re-verify phased TAB results as specified



5.6 Client:

Intrusion and access security systems.

5.7 Each commissioning participant will possess the following requirements:

- .1 Be equipped with a work force large enough to complete the scope of work, including all necessary remedial work, within the scheduled time frame.
- .2 Be available for emergency and troubleshooting service during the first year of occupancy by the User for adjustments and modifications outside the responsibility of the O&M personnel. Includes changes to:
 - Ventilation rates to meet changes in off-gassing.
 - Heating and cooling loads beyond ranges of the BAS
 - BAS control strategies beyond the level of training provided to the O&M personnel.
 - Re-balancing of electrical distribution services.
 - Fire alarm systems.
- .3 Provide names of participants to Commissioning Manager within three (3) weeks of award of contract for review and approval.
- .4 Provide commissioning procedures to be followed three (3) weeks prior to starting date of commissioning for review and approval.

6.0 Commissioning Process and Deliverables:

The Commissioning Process is a disciplined quality control process designed to check and verify various project aspects such as; receipt of the proper equipment thru to performance testing and intellectual property transfer. All references in this document to commissioning shall include all commissioning aspects for the validation of all components, equipment, subsystems, systems and integrated systems for a fully functional facility as per the design intent.

The Commissioning Process includes the following information and system deliverables:

- .1 Commissioning will be performed by the specified Commissioning Representative and the Construction Team using procedures developed by the Commissioning Manager approved by the PWGSC Departmental Representative (Project Manager).
- .2 Commissioning activities will be witnessed by Commissioning Representative, at a minimum, as well as the PWGSC and Design Consultant.
- .3 All reported results shall be reviewed by the Design Consultant and PWGSC Design and Quality Assurance Authority.
- .4 Upon satisfactory completion of all final commissioning documentation, the Commissioning Representative will provide the required final commissioning documentation for review by the Design Consultant. The commissioning documentation shall then be forwarded to the PWGS Design and Quality Assurance Authority for recommendation to the PWGSC Project Manager.
- .5 The PWGSC Design and Quality Assurance Authority will monitor all commissioning activities and deliverables.
- .6 The Final Commissioning Report shall be prepared by the Commissioning Representative. The PWGSC Project Manager reviews and accepts the Final



Commissioning Report.

6.2 Extent of Commissioning:

Systems to be commissioned refer to “Appendix “A” Extent of Commissioning Mechanical and Electrical List” but not limited to what is provided in the Mechanical and Electrical specifications.

6.3 Submittal Process:

All M & E “Reviewed / Approved” shop drawings are to be provided to the Commissioning Manager. The Commissioning Manager will review the submitted material and compare the content to the project specifications.

All “Variances” will be flagged and forwarded in writing to the Design Team for review. If the design requires different results the construction process may be used to make the required changes. All revisions shall be documented.

If performance and / or other specifications are impacted, documentation changes are required. The information provided on the shop drawings will be entered and verified by the Contractors.

During the commissioning submittal process the Commissioning Representative will issue updated Shop Drawings Requests.

6.4 Commissioning Test Equipment:

The hardware and software, standard testing equipment required to perform Start-Up and Initial Checkout, Functional Performance Testing shall be provided by the respective Contractor.

For example, the Mechanical Contractor shall ultimately be responsible for all standard testing equipment for the HVAC system and controls system in Mechanical Specification, includes sub-contractor, Commissioning Responsibilities. Similarly, the Electrical Contractor of the Electrical Specification shall be responsible for standard testing equipment for the lighting and electrical equipment.

6.5 Test Instrument Accuracy:

All testing equipment and instruments shall be calibrated annually and shall be of sufficient quality and accuracy to test and measure equipment performance within the tolerances specified within the Construction documents. Provide details of instruments and calibration certificates three (3) weeks prior to starting date of commissioning for review and approval.

6.6 Pre-commissioning activities:

Review performed by the Commissioning Team, equipment manufacturers representatives shall check each components, equipment, subsystem, system and integrated system installed prior to any checking/commissioning/testing being performed on systems being installed in the facility. Ensure all requirements are met and documented on all check lists prior to commissioning activities is to begin.

6.7 Pre-Start-up Tests:

These will include, pressure, static, flushing; cleaning and “bumping” conducted during construction and will be performed by the Contractor and witnessed by the Commissioning



Representative at a minimum and certified by the Design Consultant. The completed documentation will be included in the Commissioning Report.

6.8 Start-Up Tests:

This shall be completed by the Contractor / OEM original, equipment manufacturer, supplier and/or installing specialist sub-contractor under the direction of the Contractor. It will also include rectification of all start-up deficiencies by the Contractor to the satisfaction of the Design Consultant and PWGSC Design and Quality Assurance Authority. The complete documentation will be included in the O&M manuals.

6.9 TAB and Performance Verification:

TAB to be completed by the Contractor's TAB agency and witnessed when required by the Design Consultant.

Performance verification to be performed by the Commissioning Manager, repeated where necessary until results are acceptable to the Design Consultant. Performance verification procedures may have to be modified to suit project requirements. Reported results will be witnessed and certified by the Design Consultant using approved PV forms.

The completed TAB and PV reports will be approved by the Design Consultant and provided to PWGSC Design and Quality Assurance Authority who reserves the right to verify up to thirty percent (30%) of all reported results. Any failure of randomly selected item shall result in the rejection of the TAB or the report of system start-up and testing. All activities will be monitored by the Commissioning Manager.

6.10 Tests to be performed only by the Client/User:

The access security systems are to be commissioned by the Owners forces after substantial completion. Other systems will be identified at a later stage in the project development.

6.11 Commissioning Verification Resolution Procedure:

Process to resolve commissioning process verification that does not meet Owner Project Requirements to be determined based on contract documents and commissioning team review.

6.12 Training:

The General Contractor is to deliver training as per the approved Commissioning Training Plan. Training will be under the direction of the Commissioning Manager and monitored by the PWGSC Project Manager.

The Commissioning Manager will prepare the Training Plan. Videotaping of training sessions by Contractor will be completed upon the written request of PWGSC or as per specification. The Commissioning Representative is responsible to witness training, record attendance and content, and report any issues and recommendations. The contractor shall repeat the training as required. Refer to the Commissioning Training Plan document.

6.13 Final Commissioning Report:

The Commissioning Representative is responsible for preparing and assembling the final Commissioning Report. The report will use the Commissioning Plan as its template. The Commissioning Representative will ensure the Final Commissioning Report includes all



documentation required to allow for re-commissioning in the future. The report is to include the following:

- .1 Executive Summary of findings and recommendations
- .2 Detail description of findings and recommendations
- .3 Systems or assemblies whose performance is not in accordance with construction documents
- .4 Test procedures and results
- .5 Deferred testing complete with schedule
- .6 Start-up check lists for all equipment, assemblies and systems
- .7 Factory test reports complete with Commissioning Representatives review comments
- .8 All commissioning Site Inspection Review Reports
- .9 All Commissioning Progress Reports
- .10 Construction phase training records
- .11 Final version of the Commissioning Plan

The owner and the design team will review the Final Commissioning Report to determine completion of the Commissioning Plan.

The Final Commissioning Report will include recommendations for any additional commissioning activities as well as feedback information for use in future similar projects.

6.14 Post Construction Testing, Observation, and Warranty:

While all commissioning activities must be completed before specified completion process, it is anticipated that certain commissioning activities will be necessary during the Occupancy Period, including but not limited to:

- .1 Fine tuning of controls and operations to meet the various needs.
- .2 Adjustment of controls and operations to meet the various needs.
- .3 Seasonal testing.
- .4 Fine tuning and set-point adjustments are made,
- .5 Calibration of Lab (Pressure / Volume) Controllers

Monitoring and inspecting the Work with the Design Consultant during the warranty period and during seasonal commissioning activities to ensure defects are corrected. The frequency of monitoring and inspection is expected to occur twice during the occupancy/warranty period – at three (3) and eleven (11) months.

6.15 Operating and Maintenance (O&M) Manual:

This will be produced by the General Contractor as construction / installation progresses and shall be reviewed by the Design Consultant. The O&M Manual should be 90% complete prior to start-up inspections. During the commissioning stage, all commissioning support data will be added, so it will be 100% complete prior to issuance of the Interim Certificate. The O&M Manual will be available at all times during commissioning and training of the O&M personnel. During the Warranty Period, it will be refined as required. This manual will be organized so that keeping it up-to-date will require minimum time and resources.

6.16 Warranties



A complete inventory will be provided by the General Contractor to the Design Consultant who will review same before submission to the PWGSC, who, in turn, recommends acceptance by the PWGSC Project Manager.

6.17 “As-Built” Drawings and Specifications:

Contractor to provide from the project record “**Issued for Construction**” documents maintained on the site and kept up-to-date with all changes marked thereon by the Contractor. Accuracy will be verified by the Design Consultant and the Commissioning Manager before preparation and after submission to the Design Consultant. They shall be completed in time to be used during functional performance testing and PV testing inspections.

6.18 Inventory of Spare Parts, Special Tools, Maintenance Materials:

Inventory will be identified during the design stage by the Design Consultant and with input from the Commissioning Manager, based upon consideration of the complexity of the project and immediacy of availability; specified by the Design Consultant; checked by the Contractor immediately upon delivery to ensure each is complete with instructions for use; inventoried, packaged and identified by the Contractor; and stored by the Contractor in facilities to be designated by the PWGSC Project Manager.

6.19 Identification:

The PWGSC MMS (Maintenance Management System) identification system will be incorporated into the working documents and implemented on all brand new systems, equipment and components. This will be done upon written request of PWGSC.

7.0 Commissioning Training Plan

Refer to the Commissioning Training Plan and Commissioning Specification documents.

- .1 A Preliminary Commissioning Training Plan is developed by the Commissioning Team and is provided to the General Contractor. The Commissioning Representative manages and refines the Commissioning Training Plan throughout the construction process to provide a final version. The Final Commissioning Training Plan is provided for review to the Design Consultant and Commissioning Manager.
- .2 The General Contractor compiles the O & M Manual in advance of the scheduled training sessions.
- .3 The Contractor supplying each piece of equipment shall be responsible for providing complete and satisfactory training on that piece of equipment. The Contractor, Supplier, Manufacturer or others may perform training as the Contractor decides the party best able to provide that training as per Specifications and Commissioning Requirements.
- .4 Training will meet all identified qualification requirements of installed equipment and systems. Training will include:
 - An overview of how each system is intended to operate.
 - A description of design parameters and operating requirements.
 - Detailed maintenance, troubleshooting, regular, preventive and emergency maintenance.
 - Information to assist in troubleshooting system operating problems.
- .5 The Commissioning Representative shall be responsible for training coordination and scheduling. Training sessions are to be video recorded and supplied in DVD format to the Commissioning Representative and the PWGSC upon written request or as per project specifications.



- .6 The training is to comprise of both hands on and classroom training on all systems, components and equipment and all commissioning procedures explained.
- .7 Training sessions on design intent shall be given by the Design Consultant will include:
 - Overview of how each system is intended to operate.
 - Description of design parameters and operating requirements.
 - Description of operating strategies.
 - Information to assist in troubleshooting system operating problems.
- .8 The General Contractor shall prepare all systems descriptions, sequence of operation documents, schematic diagrams, control schematics, catalogue cuts, wiring diagrams and similar training documents required to impart training. Documents should be the same as those used in the O & M Manuals. Documents are made available for the Owner's personnel prior to training sessions.
- .9 The General Contractor is to deliver training as per the approved plan. The Commissioning Representative is responsible for witnessing training, recording attendance and content. The Design Consultant is to witness selected training sessions. The Commissioning Representative/ Cx Manager reports any issues and recommendations and the contractor will repeat the training as required.
- .10 The Commissioning Representative and Building Operation Commissioning Representative sign off on the Training Check Sheets.
- .11 Training shall be imparted during normal working hours and the duration should meet the Owner's requirements.
- .12 All training will be completed prior to issuance of the Interim Certificate.

End of Commissioning Plan Draft



Appendix "A" Extent of Commissioning Mechanical & Electrical List

Mechanical Components, Equipment and Systems

Division 21 - Fire Suppression

Division 22 - Plumbing

Division 23 - Heating, Ventilating and Air Conditioning (HVAC)

Division 25 - Integrated Automation

Electrical Components, Equipment and Systems

Division 26 - Electrical

Division 27 - Communications Systems

Division 28 – Fire Detection & Alarm

See Contract Documents (specifications and drawings) and all Cx Plan Appendix for lists of actual project specific components, equipment and systems

Additional project detail may be included in Addendum



Appendix "B" Project Contact List

CFIA Lab Renovations

Project Contacts

| | | | | |
|----------------------|--------------------|--|---------------|---------------------|
| Owner: PWGSC | Address: | 4900 Yonge Street 11 th Floor Toronto, ON M2N 6A6 | Fax: | 416 512-5535 |
| | Individual: | Daniella Mavroudis | Phone: | 416 512-5969 |
| | Email: | Daniella.Mavroudis@pwgsc-tpsgc.gc.ca | Cell: | |
| | Role: | Project Manager | | |
| Client: CFIA | Address: | 2301 Midland Avenue Scarborough, ON M1P 4R7 | Fax: | 416 954-5154 |
| | Individual: | Chris Dawson | Phone: | 613 773-7308 |
| | Email: | Christopher.Dawson@inspection.gc.ca | Cell: | |
| | Role: | Project Leader | | |
| Health Canada | Address: | 2301 Midland Avenue Scarborough, ON M1P 4R7 | Fax: | |
| | Individual: | Brian Carrington | Phone: | 416 952-6068 |
| | Email: | Brian.Carrington@hc-sc.gc.ca | Cell: | |
| | Role: | | | |
| Health Canada | Individual: | Tony Zilli | Phone: | 416 952-0016 |
| | Email: | Tony.Zilli@hc-sc.gc.ca | Cell: | |
| | Role: | | | |



Appendix “B” Project Contact List

| | | | | |
|---|--------------------|--|---------------|---------------------------|
| FM: SNC Lavalin OM | Address: | 2301 Midland Avenue Scarborough, ON M1P 4R7 | Fax: | |
| | Individual: | Mo Mohsenzadeh | Phone: | 416 540-3717 |
| | Email: | Mo.Mohsenzadeh@snclavalinom.com | Cell: | 416 540-3717 |
| | Role: | Commissioning Manager | | |
| | Individual: | Jule Benedict | Phone: | 416 921-4331 |
| | Email: | Jule.Benedict@snclavalinom.com | Cell: | 416 896-2761 |
| | Role: | Property Services Coordinator | | |
| | Individual: | Dave Lazaros | Phone: | 416 991-4929 |
| | Email: | Dave.Lazaros@snclavalinom.com | Cell: | |
| | Role: | Facilities Manager | | |
| | Individual: | Steve McGuire | Phone: | 416 952-8703 |
| | Email: | Steve.McGuire@snclavalinom.com | Cell: | 416 677-6628 |
| | Role: | Maintenance Supervisor | | |
| Architect: Rebanks Pepper Littlewood | Address: | Suite 402, 1491 Yonge Street Toronto, ON M4T 1Z4 | Fax: | 416-964-5817 |
| | Individual: | John Pepper | Phone: | 416-964-7163 x 231 |
| | Email: | jpepper@rpla.ca | Cell: | 416-567-6719 |
| | Role: | Project Director | | |
| | Individual: | Gail Littlewood | Phone: | 416-964-7163 x 229 |
| | Email: | glittlewood@rpla.ca | Cell: | 416 985-0060 |
| | Role: | Project Architect | | |
| | Individual: | Lee Taylor | Phone: | 416-964-7163 x 233 |
| | Email: | ltaylor@rpla.ca | Cell: | 416-723-6621 |
| | Role: | Lab Specialist/Site Services | | |
| | Individual: | Winsome Wright | Phone: | 416-964-7163 x 224 |
| | Email: | wwright@rpla.ca | Cell: | |
| | Role: | Technologist/Site Services | | |
| | Individual: | Lutful Kabir | Phone: | 416-964-7163 x 222 |
| | Email: | lkabir@rpla.ca | Cell: | |
| | Role: | Technologist | | |



Appendix “B” Project Contact List

| | | | | |
|-------------------------------------|--|--|---------------------------|---------------------------|
| Mechanical / Electrical: MCW | Address: | 207 Queen’s Quay West, Suite 615 Toronto, ON M5J 1A7 | Fax: | 416-598-5394 |
| | Individual: | Mahesh Dissanayake | Phone: | 416-598-2920 x 301 |
| | Email: | mdissanayake@mcw.com | Cell: | |
| | Role: | Electrical Designer | | |
| | Individual: | Karin Schembri | Phone: | 416-598-2920 x 243 |
| | Email: | kschembri@mcw.com | Cell: | |
| | Role: | Electrical Design Engineer | | |
| | Individual: | John Sloan | Phone: | 416-598-2920 x 226 |
| | Email: | jsloan@mcw.com | Cell: | |
| Role: | Electrical Project Engineer, Partner | | | |
| Individual: | James Raven | Phone: | 416-598-2920 x 285 | |
| Email: | jraven@mcw.com | Cell: | 647-448-9001 | |
| Role: | Commissioning Engineer | | | |
| Individual: | Tim Jantzi | Phone: | 416-598-2920 | |
| Email: | tjantzi@mcw.com | Cell: | 416-453-7151 | |
| Role: | Mechanical Project Engineer, Partner | | | |
| Individual: | David Riley | Phone: | 416-598-2920 x 287 | |
| Email: | driley@mcw.com | Cell: | | |
| Role: | Mechanical Project Engineer, PM | | | |
| Individual: | Sharl Guirguis | Phone: | 416-598-2920 | |
| Email: | sguirguis@mcw.com | Cell: | | |
| Role: | Mechanical Design Engineer | | | |
| Cost: A.W. Hooker | Address: | 2265 Upper Middle Road East Suite 400, Oakville, ON L6H 0G5 | Fax: | 905 823-5111 |
| | Individual: | Malcolm Yates | Phone: | 905 823-8111 |
| | Email: | myates@awhooker.com | Cell: | 416-527-7340 |
| Role: | Senior Cost Estimating Specialist | | | |
| Individual: | Tim Moore, PQS Partner | Phone: | 905 823-8111 x 233 | |
| Email: | tmoore@awhooker.com | Cell: | 905 599-1382 | |
| Role: | Senior Cost Estimating Specialist | | | |
| Specs: DGS | Address: | 21 Goodrich Road, Unit 6 Toronto, ON M8Z 6A3 | Fax: | 416-244-4528 |
| | Individual: | Don Shortreed | Phone: | 416-244-6322 x 210 |
| | Email: | dshortreed@dgsconsulting.ca | Cell: | |
| Role: | Project Manager, Specification Writer | | | |



Appendix “B” Project Contact List

C

| | | | | |
|---|--------------------|--|---------------|---------------------|
| Commissioning Arch: Taylor Hazell Architects | Address: | 333 Adelaide Street West Fifth Floor, Toronto, ON M5V 1R5 | Fax: | |
| | Individual: | Jill Taylor | Phone: | 416 862-2694 |
| | Email: | jtaylor@taylorhazell.com | Cell: | 416 862-8401 |
| | Role: | Project Leader | | |
| Commissioning Agent: VSC Group | Individual: | Barbara Lush | Phone: | 416 862-2694 |
| | Email: | blush@taylorhazell.com | Cell: | |
| | Role: | | | |
| | Individual: | | Phone: | |
| Commissioning Agent: VSC Group | Email: | | Cell: | |
| | Role: | | | |
| | Individual: | | Phone: | |
| | Email: | | Cell: | |
| Commissioning Agent: VSC Group | Role: | | | |
| | Individual: | | Phone: | |
| | Email: | | Cell: | |
| | Role: | | | |

Project Commissioning Team including contractors will be updated following award of contract and issue of IFC contract documents



Appendix "C" Commissioning CPM

Complete CPM will be provided after issue of IFC contract documents

CFIA Laboratory Renovation Commissioning Matrix

| Phase | MMS # | Tag # | Description | Room # | Shop Dwg | Draft PI ² | PI ² | Draft ICL | ICL | TAB | Draft PV | PV FPT | O&M | Trg |
|-------|-------|-----------|------------------------|---------|----------|-----------------------|-----------------|-----------|-----|-----|----------|----------------|-----|-----|
| 1 | tbd | SP-3AA | Splitter | MPR | Y | Y | Y | Y | Y | n/a | n/a | n/a | Y | n/a |
| 1 | tbd | DISC-01 | Disconnect | MPR | Y | Y | Y | Y | Y | n/a | n/a | n/a | Y | Y |
| 1 | tbd | TX-3AA | Transformer | MRP | Y | Y | Y | Y | Y | n/a | n/a | n/a | Y | Y |
| 1 | tbd | EP-3EEA | Panel | 319 | Y | Y | Y | Y | Y | n/a | Y | Y | Y | Y |
| 1 | tbd | UPS | UPS | Level 0 | Y | Y | Y | Y | Y | n/a | Y | Y | Y | Y |
| 1 | tbd | DP-UPS | Distribution Panel | Level 0 | Y | Y | Y | Y | Y | n/a | Y | Y | Y | Y |
| 1 | tbd | LCS P1 | Lighting Controls | | - | Y | - | - | - | - | Y | Y | - | Y |
| 1 | tbd | ELS P1 | Emergency Lighting | | - | - | - | - | - | - | Y | Y | - | Y |
| 1 | tbd | RDS P1 | Room Data Sheets | | - | - | - | - | - | - | - | Y | - | Y |
| 2 | tbd | LCS P2 | Lighting Controls | | - | Y | - | - | - | - | Y | Y | - | Y |
| 2 | tbd | ELS P2 | Emergency Lighting | | - | - | - | - | - | - | Y | Y | - | Y |
| 2 | tbd | RDS P2 | Room Data Sheets | | - | - | - | - | - | - | - | Y | - | Y |
| 3 | tbd | LCS P3 | Lighting Controls | | - | Y | - | - | - | - | Y | Y | - | Y |
| 3 | tbd | ELS P3 | Emergency Lighting | | - | - | - | - | - | - | Y | Y | - | Y |
| 3 | tbd | RDS P3 | Room Data Sheets | | - | - | - | - | - | - | - | - | - | - |
| 1 | tbd | FA P1 | Fire Alarm | | tbd | tbd | tbd | tbd | tbd | n/a | tbd | tbd | Y | Y |
| 2 | tbd | FA P2 | Fire Alarm | | tbd | tbd | tbd | tbd | tbd | n/a | tbd | tbd | tbd | Y |
| 3 | tbd | FA P3 | Fire Alarm | | tbd | tbd | tbd | tbd | tbd | n/a | tbd | tbd | tbd | Y |
| 1 | tbd | FD-### SA | Fire Dampers | tbd | Y | Y | Y | Y | Y | n/a | n/a | n/a | Y | Y |
| 2 | tbd | FD-### SA | Fire Dampers | tbd | - | Y | Y | Y | Y | n/a | n/a | n/a | - | Y |
| 3 | tbd | FD-### SA | Fire Dampers | tbd | - | Y | Y | Y | Y | n/a | n/a | n/a | - | Y |
| 1 | tbd | FPS P1 | Fire Protection System | | - | Y | Y | Y | Y | n/a | n/a | n/a | - | Y |
| 2 | tbd | FPS P2 | Fire Protection System | | - | Y | Y | Y | Y | n/a | n/a | n/a | - | Y |
| 3 | tbd | FPS P3 | Fire Protection System | | - | Y | Y | Y | Y | n/a | n/a | n/a | - | Y |
| 1 | tbd | FHC-01 | Fire Hose Cabinet | 333 | Y | Y | Y | Y | Y | n/a | n/a | n/a | Y | Y |
| 1 | tbd | FH-01 | Fume Hood 347 | 328 | tbd | n/a | n/a | tbd | Y | Y | - | Y ¹ | - | n/a |
| 1 | tbd | FH-02 | Fume Hood 348 | 328 | tbd | n/a | n/a | tbd | Y | Y | - | Y ¹ | - | n/a |
| tbd | tbd | FH-03 | Fume Hood 271 | 341 | tbd | n/a | n/a | tbd | Y | Y | - | Y ¹ | - | n/a |
| 1 | tbd | FH-01 VV | FH Venturi Valve | | Y | Y | Y | Y | Y | Y | - | - | Y | Y |
| 1 | tbd | FH-02 VV | FH Venturi Valve | | Y | Y | Y | Y | Y | Y | - | - | Y | Y |
| tbd | tbd | FH-03 VV | FH Venturi Valve | | Y | Y | Y | Y | Y | Y | - | - | Y | Y |
| tbd | tbd | Auto-01 | Autoclave | 345 | n/a | n/a | n/a | tbd | Y | n/a | - | - | - | n/a |
| tbd | tbd | Auto-02 | Autoclave | 345 | n/a | n/a | n/a | tbd | Y | n/a | - | - | - | n/a |
| tbd | tbd | Auto-03 | Autoclave | 345 | n/a | n/a | n/a | tbd | Y | n/a | - | - | - | n/a |
| tbd | tbd | BSC-01 | Bio Safety Cabinet(s) | | n/a | tbd | tbd | tbd | Y | tbd | tbd | tbd | tbd | n/a |

CFIA Laboratory Renovation Commissioning Matrix

| Phase | MMS # | Tag # | Description | Room # | Shop Dwg | Draft PI ² | PI ² | Draft ICL | ICL | TAB | Draft PV | PV FPT | O&M | Trg |
|-------|-------|-----------|--|--------|----------|-----------------------|-----------------|-----------|-----|-----|----------|--------|-----|-----|
| 3 | tbd | CH-01 | Canopy Hood | 345 | Y | tbd | tbd | tbd | tbd | tbd | tbd | tbd | tbd | tbd |
| 3 | tbd | CH-02 | Canopy Hood | 345 | Y | tbd | tbd | tbd | tbd | tbd | tbd | tbd | tbd | tbd |
| 3 | tbd | CH-03 | Canopy Hood | 345 | Y | tbd | tbd | tbd | tbd | tbd | tbd | tbd | tbd | tbd |
| 3 | tbd | CH-04 | Canopy Hood | 347 | Y | tbd | tbd | tbd | tbd | tbd | tbd | tbd | tbd | tbd |
| 3 | tbd | GD-01 | Hood | 347 | Y | tbd | tbd | tbd | tbd | tbd | tbd | tbd | tbd | tbd |
| tbd | tbd | AC-01 | A/C Unit | 327 | Y | Y | Y | Y | Y | Y | Y | Y | Y | Y |
| tbd | tbd | CU-01 | Condensing Unit | Roof | Y | Y | Y | Y | Y | n/a | n/a | n/a | Y | Y |
| tbd | tbd | AC-02 | A/C Unit | 345 | Y | Y | Y | Y | Y | Y | Y | Y | n/a | n/a |
| tbd | tbd | CU-02 | Condensing Unit | Roof | Y | Y | Y | Y | Y | n/a | n/a | n/a | n/a | n/a |
| 1 | tbd | BMS P1 | BMS System Phase 1 | tbd | Y | n/a | n/a | Y | Y | n/a | n/a | n/a | Y | Y |
| 2 | tbd | BMS P2 | BMS System Phase 2 | tbd | Y | n/a | n/a | Y | Y | n/a | n/a | n/a | Y | Y |
| 3 | tbd | BMS P3 | BMS System phase 3 | tbd | Y | n/a | n/a | Y | Y | n/a | n/a | n/a | Y | Y |
| F | tbd | BMS Final | BMS System Final & interconnections | tbd | Y | n/a | n/a | Y | Y | n/a | n/a | n/a | Y | Y |
| tbd | tbd | EX MD-03 | Exhaust Air Damper | 325 | - | - | - | - | - | Y | - | - | - | - |
| tbd | tbd | EX MD-04 | Exhaust Air Damper | 323 | - | - | - | - | - | Y | - | - | - | - |
| tbd | tbd | EX MD-05 | Exhaust Air Damper | 321 | - | - | - | - | - | Y | - | - | - | - |
| tbd | tbd | EX MD-06 | Exhaust Air Damper | 321 | - | - | - | - | - | Y | - | - | - | - |
| tbd | tbd | EX MD-07 | Exhaust Air Damper | 321 | - | - | - | - | - | Y | - | - | - | - |
| tbd | tbd | EX MD-08 | Exhaust Air Damper | 317B | - | - | - | - | - | Y | - | - | - | - |
| tbd | tbd | EX MD-09 | Exhaust Air Damper | 317A | - | - | - | - | - | Y | - | - | - | - |
| tbd | tbd | EX MD-12 | Exhaust Air Damper | 337 | - | - | - | - | - | Y | - | - | - | - |
| tbd | tbd | EX MD-14 | Exhaust Air Damper | 341 | - | - | - | - | - | Y | - | - | - | - |
| tbd | tbd | EX MD-21 | Exhaust Air Damper | 355A | - | - | - | - | - | Y | - | - | - | - |
| tbd | tbd | EX MD-22 | Exhaust Air Damper | 355B | - | - | - | - | - | Y | - | - | - | - |
| tbd | tbd | EX MD-23 | Exhaust Air Damper | 365 | - | - | - | - | - | Y | - | - | - | - |
| tbd | tbd | EX MD-24 | Exhaust Air Damper | 355C | - | - | - | - | - | Y | - | - | - | - |
| tbd | tbd | EX MD-25 | Exhaust Air Damper | 327 | - | - | - | - | - | Y | - | - | - | - |
| tbd | tbd | EX MD-27 | Supply Air Damper | 325 | - | - | - | - | - | Y | - | - | - | - |
| tbd | tbd | EX MD-28 | Supply Air Damper | 325 | - | - | - | - | - | Y | - | - | - | - |
| tbd | tbd | EX MD-29 | Supply Air Damper | 325 | - | - | - | - | - | Y | - | - | - | - |
| tbd | tbd | EX MD-31 | Supply Air Damper | 321 | - | - | - | - | - | Y | - | - | - | - |
| tbd | tbd | EX MD-32 | Supply Air Damper | 317B | - | - | - | - | - | Y | - | - | - | - |
| tbd | tbd | EX MD-36 | Supply Air Damper | 337 | - | - | - | - | - | Y | - | - | - | - |
| tbd | tbd | EX MD-37 | Supply Air Damper | 335 | - | - | - | - | - | Y | - | - | - | - |
| tbd | tbd | EX MD-38 | Supply Air Damper | 341 | - | - | - | - | - | Y | - | - | - | - |
| tbd | tbd | EX MD-40 | Supply Air Damper | 345 | - | - | - | - | - | Y | - | - | - | - |
| tbd | tbd | EX MD-41 | Supply Air Damper | 345 | - | - | - | - | - | Y | - | - | - | - |
| tbd | tbd | EX MD-42 | Supply Air Damper | 368 | - | - | - | - | - | Y | - | - | - | - |
| tbd | tbd | EX MD-43 | Supply Air Damper | 347 | - | - | - | - | - | Y | - | - | - | - |
| tbd | tbd | EX MD-44 | Supply Air Damper | 366 | - | - | - | - | - | Y | - | - | - | - |
| tbd | tbd | EX MD-46 | Supply Air Damper | 355A | - | - | - | - | - | Y | - | - | - | - |
| tbd | tbd | EX MD-47 | Supply Air Damper | 355B | - | - | - | - | - | Y | - | - | - | - |
| tbd | tbd | EX MD-48 | Supply Air Damper | 355 | - | - | - | - | - | Y | - | - | - | - |
| tbd | tbd | EX MD-49 | Supply Air Damper | 355C | - | - | - | - | - | Y | - | - | - | - |

CFIA Laboratory Renovation Commissioning Matrix

| Phase | MMS # | Tag # | Description | Room # | Shop Dwg | Draft Pl ² | Pl ² | Draft ICL | ICL | TAB | Draft PV | PV FPT | O&M | Trg |
|-------|-------|-----------|--------------------|--------|----------|-----------------------|-----------------|-----------|-----|-----|----------|--------|-----|-----|
| tbd | tbd | EX RHC-02 | Reheat Coil | 325 | - | - | - | - | - | Y | - | - | - | - |
| tbd | tbd | EX RHC-03 | Reheat Coil | 325 | - | - | - | - | - | Y | - | - | - | - |
| tbd | tbd | EX RHC-04 | Reheat Coil | 325 | - | - | - | - | - | Y | - | - | - | - |
| tbd | tbd | EX RHC-06 | Reheat Coil | 321 | - | - | - | - | - | Y | - | - | - | - |
| tbd | tbd | EX RHC-07 | Reheat Coil | 317B | - | - | - | - | - | Y | - | - | - | - |
| tbd | tbd | EX RHC-11 | Reheat Coil | 337 | - | - | - | - | - | Y | - | - | - | - |
| tbd | tbd | EX RHC-12 | Reheat Coil | 335 | - | - | - | - | - | Y | - | - | - | - |
| tbd | tbd | EX RHC-13 | Reheat Coil | 341 | - | - | - | - | - | Y | - | - | - | - |
| tbd | tbd | EX RHC-15 | Reheat Coil | 345 | - | - | - | - | - | Y | - | - | - | - |
| tbd | tbd | EX RHC-16 | Reheat Coil | 345 | - | - | - | - | - | Y | - | - | - | - |
| tbd | tbd | EX RHC-17 | Reheat Coil | 368 | - | - | - | - | - | Y | - | - | - | - |
| tbd | tbd | EX RHC-18 | Reheat Coil | 347 | - | - | - | - | - | Y | - | - | - | - |
| tbd | tbd | EX RHC-19 | Reheat Coil | 366 | - | - | - | - | - | Y | - | - | - | - |
| tbd | tbd | EX RHC-24 | Reheat Coil | 355C | - | - | - | - | - | Y | - | - | - | - |
| tbd | tbd | MD-01 | Exhaust Air Damper | 327 | Y | Y | Y | Y | Y | Y | - | - | Y | Y |
| tbd | tbd | MD-02 | Exhaust Air Damper | 325 | Y | Y | Y | Y | Y | Y | - | - | - | - |
| tbd | tbd | MD-11 | Exhaust Air Damper | 318 | Y | Y | Y | Y | Y | Y | - | - | - | - |
| tbd | tbd | MD-13 | Exhaust Air Damper | 341 | Y | Y | Y | Y | Y | Y | - | - | - | - |
| tbd | tbd | MD-15 | Exhaust Air Damper | 342 | Y | Y | Y | Y | Y | Y | - | - | - | - |
| tbd | tbd | MD-16 | Exhaust Air Damper | 345 | Y | Y | Y | Y | Y | Y | - | - | - | - |
| tbd | tbd | MD-17 | Exhaust Air Damper | 345 | Y | Y | Y | Y | Y | Y | - | - | - | - |
| tbd | tbd | MD-18 | Exhaust Air Damper | 348 | Y | Y | Y | Y | Y | Y | - | - | - | - |
| tbd | tbd | MD-19 | Exhaust Air Damper | 347 | Y | Y | Y | Y | Y | Y | - | - | - | - |
| tbd | tbd | MD-20 | Exhaust Air Damper | 347 | Y | Y | Y | Y | Y | Y | - | - | - | - |
| tbd | tbd | MD-26 | Supply Air Damper | 327 | Y | Y | Y | Y | Y | Y | - | - | - | - |
| tbd | tbd | MD-30 | Supply Air Damper | 323 | Y | Y | Y | Y | Y | Y | - | - | - | - |
| tbd | tbd | MD-33 | Supply Air Damper | 317A | Y | Y | Y | Y | Y | Y | - | - | - | - |
| tbd | tbd | MD-34 | Supply Air Damper | 316 | Y | Y | Y | Y | Y | Y | - | - | - | - |
| tbd | tbd | MD-35 | Supply Air Damper | 328 | Y | Y | Y | Y | Y | Y | - | - | - | - |
| tbd | tbd | MD-39 | Supply Air Damper | 342 | Y | Y | Y | Y | Y | Y | - | - | - | - |
| tbd | tbd | MD-45 | Supply Air Damper | 347A | Y | Y | Y | Y | Y | Y | - | - | - | - |
| tbd | tbd | RHC-01 | Reheat Coil | 327 | Y | Y | Y | Y | Y | Y | - | - | Y | Y |
| tbd | tbd | RHC-05 | Reheat Coil | 323 | Y | Y | Y | Y | Y | Y | - | - | - | - |
| tbd | tbd | RHC-08 | Reheat Coil | 317A | Y | Y | Y | Y | Y | Y | - | - | - | - |
| tbd | tbd | RHC-09 | Reheat Coil | 316 | Y | Y | Y | Y | Y | Y | - | - | - | - |
| tbd | tbd | RHC-10 | Reheat Coil | 328 | Y | Y | Y | Y | Y | Y | - | - | - | - |
| tbd | tbd | RHC-14 | Reheat Coil | 342 | Y | Y | Y | Y | Y | Y | - | - | - | - |
| tbd | tbd | RHC-20 | Reheat Coil | 347A | Y | Y | Y | Y | Y | Y | - | - | - | - |
| tbd | tbd | RHC-21 | Reheat Coil | 355A | Y | Y | Y | Y | Y | Y | - | - | - | - |
| tbd | tbd | RHC-22 | Reheat Coil | 355B | Y | Y | Y | Y | Y | Y | - | - | - | - |
| tbd | tbd | RHC-23 | Reheat Coil | 355 | Y | Y | Y | Y | Y | Y | - | - | - | - |

CFIA Laboratory Renovation Commissioning Matrix

| Phase | MMS # | Tag # | Description | Room # | Shop Dwg | Draft PI ² | PI ² | Draft ICL | ICL | TAB | Draft PV | PV FPT | O&M | Trg |
|-------|-------|---------------|---------------------------|--------|----------|-----------------------|-----------------|-----------|-----|-----|----------|--------|-----|-----|
| tbd | tbd | DPM-001 | DP Monitoring Station(s) | tbd | Y | Y | Y | Y | Y | Y | Y | Y | Y | Y |
| tbd | tbd | DPM-002 | DP Monitoring Station(s) | tbd | Y | Y | Y | Y | Y | Y | Y | Y | Y | Y |
| tbd | tbd | DPM-003 | DP Monitoring Station(s) | tbd | Y | Y | Y | Y | Y | Y | Y | Y | Y | Y |
| tbd | tbd | DPM-004 | DP Monitoring Station(s) | tbd | Y | Y | Y | Y | Y | Y | Y | Y | Y | Y |
| tbd | tbd | DPM-005 | DP Monitoring Station(s) | tbd | Y | Y | Y | Y | Y | Y | Y | Y | Y | Y |
| tbd | tbd | S-01 | Sink | tbd | Y | Y | Y | Y | Y | n/a | - | - | Y | Y |
| tbd | tbd | EW-02 | Eye Wash Station & Shower | tbd | Y | Y | Y | Y | Y | n/a | - | - | Y | Y |
| tbd | tbd | | Eye Wash Station | tbd | Y | Y | Y | Y | Y | n/a | - | - | Y | Y |
| tbd | tbd | | Emergency Shower | tbd | Y | Y | Y | Y | Y | n/a | - | - | Y | Y |
| 3 | tbd | | Eye Wash Station | tbd | Y | Y | Y | Y | Y | n/a | - | - | Y | Y |
| 3 | tbd | | Emergency Shower | tbd | Y | Y | Y | Y | Y | n/a | - | - | Y | Y |
| 3 | tbd | DF-01 | Drinking Fountain | tbd | Y | Y | Y | Y | Y | n/a | - | - | Y | Y |
| 2 | tbd | | Vacuum Outlets | tbd | | | | | | | | | | |
| 2 | tbd | | Gas Connections | tbd | | | | | | | | | | |
| tbd | tbd | | Compressed Air | tbd | tbd | tbd | tbd | tbd | tbd | tbd | tbd | tbd | tbd | tbd |
| tbd | tbd | | Steam | tbd | tbd | tbd | tbd | tbd | tbd | tbd | tbd | tbd | tbd | tbd |
| tbd | tbd | | RO Water | tbd | tbd | tbd | tbd | tbd | tbd | tbd | tbd | tbd | tbd | tbd |
| 1 | n/a | Room Data -01 | Quiet Room | 336 | n/a | n/a | n/a | n/a | n/a | Y | Y | Y | n/a | n/a |
| 1 | n/a | Room Data -02 | Open Workstations | 329 | n/a | n/a | n/a | n/a | n/a | Y | Y | Y | n/a | n/a |
| 1 | n/a | Room Data -03 | Extraneous Lab | 328 A | n/a | n/a | n/a | n/a | n/a | Y | Y | Y | n/a | n/a |
| 1 | n/a | Room Data -04 | Extraneous Lab | 328 | n/a | n/a | n/a | n/a | n/a | Y | Y | Y | n/a | n/a |
| 1 | n/a | Room Data -05 | Sample Reception | 327 | n/a | n/a | n/a | n/a | n/a | Y | Y | Y | n/a | n/a |
| 1 | n/a | Room Data -06 | Microscopy Room | 337 | n/a | n/a | n/a | n/a | n/a | Y | Y | Y | n/a | n/a |
| 1 | n/a | Room Data -07 | Vestibule | 316 | n/a | n/a | n/a | n/a | n/a | Y | Y | Y | n/a | n/a |
| 1 | n/a | Room Data -08 | Corridor | 321A | n/a | n/a | n/a | n/a | n/a | Y | Y | Y | n/a | n/a |
| 1 | n/a | Room Data -09 | Tel | 363 | n/a | n/a | n/a | n/a | n/a | Y | Y | Y | n/a | n/a |
| 2 | n/a | Room Data -10 | Incubation Room | 323 | n/a | n/a | n/a | n/a | n/a | Y | Y | Y | n/a | n/a |
| 2 | n/a | Room Data -11 | Microbiology Lab | 325 | n/a | n/a | n/a | n/a | n/a | Y | Y | Y | n/a | n/a |
| 2 | n/a | Room Data -12 | Extraction Room Lab | 355B | n/a | n/a | n/a | n/a | n/a | Y | Y | Y | n/a | n/a |
| 2 | n/a | Room Data -13 | Vestibule | 355 | n/a | n/a | n/a | n/a | n/a | Y | Y | Y | n/a | n/a |
| 2 | n/a | Room Data -14 | Pre PCR Lab | 355A | n/a | n/a | n/a | n/a | n/a | Y | Y | Y | n/a | n/a |
| 2 | n/a | Room Data -15 | Post PCR Lab | 355C | n/a | n/a | n/a | n/a | n/a | Y | Y | Y | n/a | n/a |
| 2 | n/a | Room Data -16 | Link | 335 | n/a | n/a | n/a | n/a | n/a | Y | Y | Y | n/a | n/a |
| 3 | n/a | Room Data -17 | Method Development | 317 B | n/a | n/a | n/a | n/a | n/a | Y | Y | Y | n/a | n/a |
| 3 | n/a | Room Data -18 | Corridor | 317 | n/a | n/a | n/a | n/a | n/a | Y | Y | Y | n/a | n/a |
| 3 | n/a | Room Data -19 | Biohazard Room | 317A | n/a | n/a | n/a | n/a | n/a | Y | Y | Y | n/a | n/a |
| 3 | n/a | Room Data -20 | Tranfser Lab | 321 | n/a | n/a | n/a | n/a | n/a | Y | Y | Y | n/a | n/a |
| 3 | n/a | Room Data -21 | Media Preparation Room | 345 | n/a | n/a | n/a | n/a | n/a | Y | Y | Y | n/a | n/a |
| 3 | n/a | Room Data -22 | Wash Up | 347 | n/a | n/a | n/a | n/a | n/a | Y | Y | Y | n/a | n/a |
| 3 | n/a | Room Data -23 | Chemistry Lab | 341 | n/a | n/a | n/a | n/a | n/a | Y | Y | Y | n/a | n/a |
| 3 | n/a | Room Data -24 | Canning Lab | 342 | n/a | n/a | n/a | n/a | n/a | Y | Y | Y | n/a | n/a |
| 3 | n/a | Room Data -25 | Quiet Room | 336 | n/a | n/a | n/a | n/a | n/a | Y | Y | Y | n/a | n/a |
| 3 | n/a | Room Data -26 | Open Workstations | 329 | n/a | n/a | n/a | n/a | n/a | Y | Y | Y | n/a | n/a |

CFIA Laboratory Renovation Commissioning Matrix

| Phase | MMS # | Tag # | Description | Room # | Shop Dwg | Draft PI ² | PI ² | Draft ICL | ICL | TAB | Draft PV | PV FPT | O&M | Trg |
|-------|-------|-------|-------------|--------|-------------|--------------------------|-----------------|--------------|-----|-----|-------------|-----------|-----|-----|
|-------|-------|-------|-------------|--------|-------------|--------------------------|-----------------|--------------|-----|-----|-------------|-----------|-----|-----|

Notes

Y = required commissioning deliverable

n/a = no activity associated with this asset

tbd = to be determined during construction phase

C = activity and deliverable complete

1 = testing by others

2 = required for new equipment only

Activities and all requirements will be finalized following issue of IFC CD

- Indicates no activity required



Appendix "D" Commissioning PI Forms

Complete PI Forms will be provided after the issue of IFC contract documents

CFIA GTA Lab Renovation Elect Product Information (PI) Forms

CFIA GTA Lab Renovation Project Electrical PI Forms

PI Forms will be updated based on IFC CDs and issued at the Commissioning Kick Off Meeting

Forms can be copied if additional PI Forms are required

This commissioning package only contains PI Forms for new supplied equipment

PI Forms are not provided for existing or re-located equipment as it is including in existing databases and CMM Systems

| | | | |
|-------------------|-------|------------------|-------|
| Cx Manager | _____ | PWSCC Cx Manager | _____ |
| Design Consultant | _____ | Project Manager | _____ |

PI Forms will be finalized with IFC CDs Prepared by VSC Group Inc.

CFIA GTA Lab Renovation Elect Product Information (PI) Forms

| | | | |
|-----------------|---------------------------|---------------------|-----|
| MMS No: | | Equipment Name/Tag: | ATS |
| Equipment Type: | Automatic Transfer Switch | | |
| Location: | Level: | Room No: | |
| Room Name: | | | |
| Systems Served: | | | |

| | | | |
|--|--------|------|--------|
| Manufacturer: | | | |
| Model: | | | |
| Serial No: | | | |
| | Design | Shop | Actual |
| Voltage (V): | | | |
| No. Phases: | | | |
| No. Wires: | | | |
| Switch Rating (A): | | | |
| Short Circuit Rating (kA): | | | |
| Arc Flash Hazard (cal/cm ²): | | | |
| Start-Up Time Delay (sec): | | | |
| Cool Down Time Delay (minutes): | | | |
| Mounting Type: | | | |
| Enclosure Type: | | | |
| Enclosure Colour: | | | |
| Neutral Transfer (Y/N): | | | |
| Fire Alarm System Connection Provided (Y/N): | | | |
| BAS Connection Provided (Y/N): | | | |

Notes;

Cx Manager _____ PWSCC Cx Manager _____
 Design Consultant _____ Project Manager _____

CFIA GTA Lab Renovation Elect Product Information (PI) Forms

| | | | |
|---------|--|---------------------|--------|
| MMS No: | | Equipment Name/Tag: | SP-3AA |
|---------|--|---------------------|--------|

| | | | |
|-----------------|----------|-----|----------|
| Equipment Type: | Splitter | | |
| Location: | Level: | 3rd | Room No: |
| Fed From: | | | |
| System Served: | | | |

| | | | |
|--|---------|------|--------|
| Manufacturer: | | | |
| Model: | | | |
| Serial No: | | | |
| | Design | Shop | Actual |
| Voltage (V): | 600 vac | | |
| No. Phases: | 3 | | |
| No. Wires: | | | |
| Mains (A): | 200 A | | |
| Short Circuit Rating (kA): | | | |
| Arc Flash Hazard (cal/cm ²): | | | |
| Mounting Type: | | | |
| Enclosure Type: | | | |
| Enclosure Colour: | | | |
| Main Breaker Provided (Y/N): | | | |
| Isolated Ground Bus Provided (Y/N): | | | |
| Surge Protection Device Provided (Y/N): | | | |

Notes;

Cx Manager _____ PWSCC Cx Manager _____
 Design Consultant _____ Project Manager _____

CFIA GTA Lab Renovation Elect Product Information (PI) Forms

| | | | |
|-----------------|------------------------------|---------------------|--------|
| MMS No: | | Equipment Name/Tag: | TX-3AA |
| Equipment Type: | Transformer | | |
| Location: | Level: 3 rd Floor | Room No: | |
| Fed From | SP-3AA c/w disconnect switch | | |
| System Served: | EP-3EEA | | |

| | | | |
|--|---------|------|--------|
| Manufacturer: | | | |
| Model: | | | |
| Serial No: | | | |
| | Design | Shop | Actual |
| Primary Voltage (V): | 600 Vac | | |
| Primary Delta/Wye: | Delta | | |
| Primary No. Phases: | 3 | | |
| Primary No. Wires: | 4 | | |
| Secondary Voltage (V): | 208 Vac | | |
| Secondary Delta/Wye: | Wye | | |
| Secondary No. Phases: | 3 | | |
| Secondary No. Wires: | 4 | | |
| Impedance (%): | | | |
| K-Rating: | | | |
| Insulation Class (°C): | | | |
| Temperature Rise (°C): | | | |
| Taps: | | | |
| Harmonic Mitigating: | | | |
| Arc Flash Hazard (cal/cm ²): | | | |
| Mounting Type: | | | |
| Enclosure Type: | | | |
| Enclosure Colour: | | | |

| |
|--------|
| Notes; |
|--------|

Cx Manager _____ PWSCC Cx Manager _____
 Design Consultant _____ Project Manager _____

CFIA GTA Lab Renovation Elect Product Information (PI) Forms

| | | | |
|---------|--|---------------------|---------|
| MMS No: | | Equipment Name/Tag: | EP-3EEA |
|---------|--|---------------------|---------|

| | | | |
|-----------------|-----------------------------|-----|----------|
| Equipment Type: | Panel Board Emergency Panel | | |
| Location: | Level: | 3rd | Room No: |
| Room Name: | | | |
| System Served: | | | |

| | | | |
|--|-------------|------|--------|
| Manufacturer: | | | |
| Model: | | | |
| Serial No: | | | |
| | Design | Shop | Actual |
| Voltage (V): | 120/208 Vac | | |
| No. Phases: | 3 | | |
| No. Wires: | 4 | | |
| Mains (A): | 225 A | | |
| Short Circuit Rating (kA): | | | |
| Arc Flash Hazard (cal/cm ²): | | | |
| Tub Size: | | | |
| Capacity (No. Circuits): | 60 | | |
| Mounting Type: | Surface | | |
| Enclosure Type: | | | |
| Enclosure Colour: | | | |
| Main Breaker Provided (Y/N): | | | |
| Isolated Ground Bus Provided (Y/N): | | | |
| Surge Protection Device Provided (Y/N): | | | |
| Digital Metering Provided (Y/N): | | | |

Notes;

Cx Manager _____ PWSCC Cx Manager _____
 Design Consultant _____ Project Manager _____

CFIA GTA Lab Renovation Elect Product Information (PI) Forms

| | | | |
|---------|--|---------------------|--------|
| MMS No: | | Equipment Name/Tag: | DP-UPS |
|---------|--|---------------------|--------|

| | | | |
|-----------------|--------------------------------------|-----|----------|
| Equipment Type: | Panel Board Distribution Panel | | |
| Location: | Level: | 3rd | Room No: |
| Room Name: | | | |
| System Served: | Various autoclaves and lab equipment | | |

| | | | |
|--|---------|------|--------|
| Manufacturer: | | | |
| Model: | | | |
| Serial No: | | | |
| | Design | Shop | Actual |
| Voltage (V): | 208 Vac | | |
| No. Phases: | 3 | | |
| No. Wires: | 4 | | |
| Mains (A): | 600 A | | |
| Short Circuit Rating (kA): | | | |
| Arc Flash Hazard (cal/cm ²): | | | |
| Tub Size: | | | |
| Capacity (No. Circuits): | 60 | | |
| Mounting Type: | | | |
| Enclosure Type: | | | |
| Enclosure Colour: | | | |
| Main Breaker Provided (Y/N): | | | |
| Isolated Ground Bus Provided (Y/N): | | | |
| Surge Protection Device Provided (Y/N): | | | |
| Digital Metering Provided (Y/N): | | | |

Notes;

Cx Manager _____ PWSCC Cx Manager _____
 Design Consultant _____ Project Manager _____

CFIA GTA Lab Renovation Elect Product Information (PI) Forms

| | | | |
|-----------------|---|---------------------|-----------|
| MMS No: | | Equipment Name/Tag: | UPS-01 |
| Equipment Type: | Uninterruptable Power Supply C/w Maintenance Bypass | | |
| Location: | Level: 3rd | Room No: | «Room_No» |
| Room Name: | | | |
| System Served: | DP-UPS | | |

| | |
|---------------|--|
| Manufacturer: | |
| Model: | |
| Serial No: | |

Asset Capacities / Characteristics / Performance:

| | Design | Shop | Actual |
|-------------------------------------|------------------------|------|--------|
| kVA Rating: | 160 kVA | | |
| AC Input Voltage (V): | | | |
| AC Input Delta/Wye: | | | |
| AC Input No. Phases: | | | |
| AC Input No. Wires: | | | |
| AC Input Nominal Input Current (%): | | | |
| AC Input Full Load PF: | | | |
| AC Input Full Load THD (%): | | | |
| AC Output Voltage (V): | 208 Vac | | |
| AC Output Delta/Wye: | | | |
| AC Output No. Phases: | 3 | | |
| AC Output No. Wires: | S | | |
| AC Output Full Load PF: | 0.9 | | |
| AC Output Full Load THD (%): | < 2% @ 100%linear load | | |
| Batteries Voltage (VDC): | | | |
| Batteries Quantity: | | | |
| Batteries Maximum DC Current (A): | | | |
| Full Load Operating Time: | | | |

Cx Manager _____ PWSCC Cx Manager _____
 Design Consultant _____ Project Manager _____

CFIA GTA Lab Renovation Elect Product Information (PI) Forms

| | | | |
|---|--|--|--|
| | | | |
| Full Load Charging Time: | | | |
| Short Circuit Rating (kA): | | | |
| Arc Flash Hazard (cal/cm ²): | | | |
| Mounting Type: | | | |
| Enclosure Type: | | | |
| Enclosure Colour: | | | |
| BAS Connection Provided (Y/N): | | | |
| Remote Alarm Status Panel Provided (Y/N): | | | |

| |
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| |

Cx Agent _____ PWSCC Cx Manager _____
 Departmental Representative _____ Project Manager _____

Cx Manager _____ PWSCC Cx Manager _____
 Design Consultant _____ Project Manager _____

CFIA GTA Lab Renovation Elect Product Information (PI) Forms

| | | | |
|---------|--|---------------------|----|
| MMS No: | | Equipment Name/Tag: | F1 |
|---------|--|---------------------|----|

| | | | |
|-----------------|---------------------------------------|-----|----------|
| Equipment Type: | Lighting Fixture Recessed Fluorescent | | |
| Location: | Level: | 3rd | Room No: |
| Room Name: | | | |
| System Served: | | | |

| | | | |
|-----------------|--------------------------|------|--------|
| Manufacturer: | | | |
| Model: | | | |
| Serial No: | | | |
| | Design | Shop | Actual |
| Base OEM | CFI | | |
| Model # | GA-14-2-F28-G-3-AP3-120V | | |
| Voltage (Vac) | 120 Vac | | |
| Wattage | 28W T8 | | |
| Ballast Voltage | 347 Vac | | |
| # of lamps | 2 | | |
| Ceiling Type | Recessed | | |
| Wall Type | n/a | | |
| | | | |
| | | | |
| | | | |
| | | | |
| | | | |
| | | | |

Notes: 1' X 4' Recessed Fluorescent Fixture
 c/w).125" Thick lens sealed and gasketed suitable for clean room applications

Cx Manager _____ PWSCC Cx Manager _____
 Design Consultant _____ Project Manager _____

CFIA GTA Lab Renovation Elect Product Information (PI) Forms

| | | | |
|---------|--|---------------------|----|
| MMS No: | | Equipment Name/Tag: | F1 |
|---------|--|---------------------|----|

| | | | |
|-----------------|------------------|-----|----------|
| Equipment Type: | Lighting Fixture | | |
| Location: | Level: | 3rd | Room No: |
| Room Name: | | | |
| System Served: | | | |

| | | | |
|-----------------|--------|------|--------|
| Manufacturer: | | | |
| Model: | | | |
| Serial No: | | | |
| | Design | Shop | Actual |
| Base OEM | | | |
| Model # | | | |
| Voltage (Vac) | | | |
| Wattage | | | |
| Ballast Voltage | | | |
| # of lamps | | | |
| Ceiling Type | | | |
| Wall Type | | | |
| | | | |
| | | | |
| | | | |
| | | | |
| | | | |

Notes; 1' X 4' Recessed Fluorescent Fixture
 c/w).125" Thick lens sealed and gasketed suitable for clean room applications

Cx Manager _____ PWSCC Cx Manager _____
 Design Consultant _____ Project Manager _____

CFIA GTA Lab Renovation Elect Product Information (PI) Forms

| | | | |
|---------|--|---------------------|----|
| MMS No: | | Equipment Name/Tag: | F2 |
|---------|--|---------------------|----|

| | | | |
|-----------------|---------------------------------------|-----|----------|
| Equipment Type: | Lighting Fixture Recessed Fluorescent | | |
| Location: | Level: | 3rd | Room No: |
| Room Name: | | | |
| System Served: | | | |

| | | | |
|-----------------|--------------------------|------|--------|
| Manufacturer: | | | |
| Model: | | | |
| Serial No: | | | |
| | Design | Shop | Actual |
| Base OEM | CFI | | |
| Model # | GA-14-2-F28-G-3-AP3-120V | | |
| Voltage (Vac) | 120 Vac | | |
| Wattage | 28W T8 | | |
| Ballast Voltage | 347 Vac | | |
| # of lamps | 2 | | |
| Ceiling Type | Recessed | | |
| Wall Type | n/a | | |
| | | | |
| | | | |
| | | | |
| | | | |
| | | | |
| | | | |

Notes: 1' X 4' Recessed Fluorescent Fixture
c/w).125" Thick lens drywall mounted

Cx Manager _____ PWSCC Cx Manager _____
 Design Consultant _____ Project Manager _____

CFIA GTA Lab Renovation Elect Product Information (PI) Forms

| | | | |
|---------|--|---------------------|----|
| MMS No: | | Equipment Name/Tag: | F2 |
|---------|--|---------------------|----|

| | | | |
|-----------------|---------------------------------------|-----|----------|
| Equipment Type: | Lighting Fixture Recessed Fluorescent | | |
| Location: | Level: | 3rd | Room No: |
| Room Name: | | | |
| System Served: | | | |

| | | | |
|-----------------|--------------------------|------|--------|
| Manufacturer: | | | |
| Model: | | | |
| Serial No: | | | |
| | Design | Shop | Actual |
| Base OEM | CFI | | |
| Model # | GA-14-2-F28-G-3-AP3-120V | | |
| Voltage (Vac) | 120 Vac | | |
| Wattage | 28W T8 | | |
| Ballast Voltage | 347 Vac | | |
| # of lamps | 2 | | |
| Ceiling Type | Recessed | | |
| Wall Type | n/a | | |
| | | | |
| | | | |
| | | | |
| | | | |
| | | | |
| | | | |

Notes: 1' X 4' Recessed Fluorescent Fixture
c/w).125" Thick lens drywall mounted

Cx Manager _____ PWSCC Cx Manager _____
 Design Consultant _____ Project Manager _____

CFIA GTA Lab Renovation Elect Product Information (PI) Forms

| | | | |
|---------|--|---------------------|---|
| MMS No: | | Equipment Name/Tag: | F |
|---------|--|---------------------|---|

| | | | |
|-----------------|------------------|-----|----------|
| Equipment Type: | Lighting Fixture | | |
| Location: | Level: | 3rd | Room No: |
| Room Name: | | | |
| System Served: | | | |

| | | | |
|-----------------|--------|------|--------|
| Manufacturer: | | | |
| Model: | | | |
| Serial No: | | | |
| | Design | Shop | Actual |
| Base OEM | | | |
| Model # | | | |
| Voltage (Vac) | | | |
| Wattage | | | |
| Ballast Voltage | | | |
| # of lamps | | | |
| Ceiling Type | | | |
| Wall Type | | | |
| | | | |
| | | | |
| | | | |
| | | | |
| | | | |

| |
|--------|
| Notes; |
|--------|

Cx Manager _____ PWSCC Cx Manager _____
 Design Consultant _____ Project Manager _____

CFIA GTA Lab Renovation Elect Product Information (PI) Forms

| | | | |
|---------|--|---------------------|----|
| MMS No: | | Equipment Name/Tag: | FR |
|---------|--|---------------------|----|

| | | | |
|-----------------|--------|-----|----------|
| Equipment Type: | | | |
| Location: | Level: | 3rd | Room No: |
| Room Name: | | | |
| System Served: | | | |

| | | | |
|-----------------|--------|------|--------|
| Manufacturer: | | | |
| Model: | | | |
| Serial No: | | | |
| | Design | Shop | Actual |
| Base OEM | | | |
| Model # | | | |
| Voltage (Vac) | | | |
| Wattage | | | |
| Ballast Voltage | | | |
| # of lamps | | | |
| Ceiling Type | | | |
| Wall Type | | | |
| | | | |
| | | | |
| | | | |
| | | | |
| | | | |

Notes;

Cx Manager _____ PWSCC Cx Manager _____
 Design Consultant _____ Project Manager _____

CFIA GTA Lab Renovation Elect Product Information (PI) Forms

| | | | |
|---------|--|---------------------|----|
| MMS No: | | Equipment Name/Tag: | E! |
|---------|--|---------------------|----|

| | | | |
|-----------------|---------------------|-----|----------|
| Equipment Type: | Pictogram Exit Sign | | |
| Location: | Level: | 3rd | Room No: |
| Room Name: | | | |
| System Served: | | | |

| | | | |
|-----------------|--------|------|--------|
| Manufacturer: | | | |
| Model: | | | |
| Serial No: | | | |
| | Design | Shop | Actual |
| Base OEM | | | |
| Model # | | | |
| Voltage (Vac) | | | |
| Wattage | | | |
| Ballast Voltage | | | |
| # of lamps | | | |
| Ceiling Type | | | |
| Wall Type | | | |
| | | | |
| | | | |
| | | | |
| | | | |

Notes;

Cx Manager _____ PWSCC Cx Manager _____
 Design Consultant _____ Project Manager _____

CFIA GTA Lab Renovation PI Forms

CFIA GTA Lab Renovation Project Mechanical PI Forms

PI Forms will be updated based on IFC CDs and issued at the Commissioning Kick Off Meeting

Forms can be copied if additional PI Forms are required

This commissioning package only contains PI Forms for new supplied equipment

PI Forms are not provided for existing or re-located equipment as it is including in existing databases and CMM Systems

CFIA GTA Lab Renovation PI Forms

| | | | |
|--------------|-------------|------|--------|
| MMS #: | | Tag: | RHC-01 |
| Description: | Reheat Coil | | |
| Location: | Floor: | 3rd | Room: |

| | | | |
|-------|-----------|----------|--|
| Power | Emergency | Fed From | |
|-------|-----------|----------|--|

| | | | |
|--|--------|------|--------|
| | Actual | | |
| Manufacturer Name: | | | |
| Model #: | | | |
| Serial # / Part #: | | | |
| | Design | Shop | Actual |
| Type / Size | | | |
| Htg Rating (BTUH) | | | |
| Water Flow (l/s) | | | |
| Water DP | | | |
| Water T _{in} / T _{out} (C) | / | / | / |
| Pipe Size | | | |
| # Rows | | | |
| Material | | | |

| | |
|--------|--|
| Notes: | |
|--------|--|

| | | | |
|-----------------------|--|------------------|--|
| Mechanical Contractor | | PWSGC Cx Manager | |
| Design Consultant | | Cx Manager | |

CFIA GTA Lab Renovation PI Forms

| | | | |
|--------------|----------------------|------|--------|
| MMS #: | | Tag: | FHC-01 |
| Description: | Fume Hood Controller | | |
| FH Tag# | | | |
| Location: | Floor: | 3rd | Room: |

| | | | |
|-------|-----------|----------|--|
| Power | Emergency | Fed From | |
|-------|-----------|----------|--|

| | | | |
|---------------------|--------|------|--------|
| | Actual | | |
| Manufacturer Name: | | | |
| Model #: | | | |
| Serial # / Part #: | | | |
| | Design | Shop | Actual |
| Type / Size | | | |
| FH Face velocity | | | |
| Min Air Flow (l/s) | | | |
| Voltage (V) | | | |
| Phase | | | |
| Inlet / Outlet Size | / | / | / |
| Outlet Size | | | |
| Control Interface | | | |

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| Notes: |
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CFIA GTA Lab Renovation PI Forms

| | | | |
|--------------|-------------|------|-------|
| MMS #: | | Tag: | FD-XX |
| Description: | Fire Damper | | |
| Location: | Floor: | 3rd | Room: |

| | | | |
|-------|-----------|----------|--|
| Power | Emergency | Fed From | |
|-------|-----------|----------|--|

| | | | |
|--------------------|--------|------|--------|
| | Actual | | |
| Manufacturer Name: | | | |
| Model #: | | | |
| Serial # / Part #: | | | |
| | Design | Shop | Actual |
| Type / Size | | | |
| Link Temp Rating | | | |
| | | | |
| Inlet Size | | | |
| Outlet Size | | | |
| Access Doors | | | |

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| Notes: |
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| | | | |
|-----------------------|--|------------------|--|
| Mechanical Contractor | | PWSGC Cx Manager | |
| Design Consultant | | Cx Manager | |

CFIA GTA Lab Renovation PI Forms

| | | | |
|--------------|-----------------------------------|------|--------|
| MMS #: | | Tag: | DPM-01 |
| Description: | Lab Differential Pressure Monitor | | |
| Location: | Floor: | 3rd | Room: |

| | | | |
|-------|-----------|----------|--|
| Power | Emergency | Fed From | |
|-------|-----------|----------|--|

| | | | |
|---------------------|--------|------|--------|
| | Actual | | |
| Manufacturer Name: | | | |
| Model #: | | | |
| Serial # / Part #: | | | |
| | Design | Shop | Actual |
| Pressure Range (Pa) | | | |
| Supply voltage | | | |
| Low level alarm | | | |
| High level alarm | | | |
| Control Interface | | | |
| Filtration Req'ts | | | |
| | | | |

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| Notes: |
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| Mechanical Contractor | | PWSGC Cx Manager | |
| Design Consultant | | Cx Manager | |

CFIA GTA Lab Renovation PI Forms

| | | | |
|--------------|---------|------|-------|
| MMS #: | | Tag: | AC-01 |
| Description: | AC Unit | | |
| Location: | Floor: | 3rd | Room: |

| | | | |
|-------|-----------|----------|--|
| Power | Emergency | Fed From | |
|-------|-----------|----------|--|

| | | | |
|--------------------|--------|------|--------|
| | Actual | | |
| Manufacturer Name: | | | |
| Model #: | | | |
| Serial # / Part #: | | | |
| | Design | Shop | Actual |
| Cooling Medium | | | |
| Air Flow (l/s) | | | |
| Tons / BTU | | | |
| Voltage (V) | | | |
| Phase | | | |
| BMS interface | | | |
| | | | |
| | | | |
| Control Interface | | | |

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| Notes: |
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| Mechanical Contractor | | PWSGC Cx Manager | |
| Design Consultant | | Cx Manager | |

CFIA GTA Lab Renovation PI Forms

| | | | |
|--------------|-----------------|------|-------|
| MMS #: | | Tag: | CU-01 |
| Description: | Condensing Unit | | |
| Location: | Floor: | 3rd | Room: |

| | | | |
|-------|-----------|----------|--|
| Power | Emergency | Fed From | |
|-------|-----------|----------|--|

| | | | |
|--------------------|--------|------|--------|
| | Actual | | |
| Manufacturer Name: | | | |
| Model #: | | | |
| Serial # / Part #: | | | |
| | Design | Shop | Actual |
| Cooling Medium | R-410a | | |
| Air Flow (l/s) | | | |
| Tons / BTU | | | |
| Voltage (V) | | | |
| Phase | | | |
| | | | |
| | | | |
| Control Interface | | | |

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| Notes: |
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| | | | |
|-----------------------|--|------------------|--|
| Mechanical Contractor | | PWSGC Cx Manager | |
| Design Consultant | | Cx Manager | |

CFIA GTA Lab Renovation PI Forms

| | | | |
|--------------|---------------|------|-------|
| MMS #: | | Tag: | S-01 |
| Description: | Sink & Faucet | | |
| Location: | Floor: | 3rd | Room: |

| | | | |
|-------|-----------|----------|--|
| Power | Emergency | Fed From | |
|-------|-----------|----------|--|

| | | | |
|-----------------------------|--------|------|--------|
| | Actual | | |
| Manufacturer Name: | | | |
| Model #: | | | |
| Serial # / Part #: | | | |
| | Design | Shop | Actual |
| Flow Rate | | | |
| Hot / Cold H ₂ O | | | |
| Tempered H ₂ O | | | |
| Voltage (V) | | | |
| Inlet pipe size | | | |
| Control | | | |
| | | | |
| | | | |

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| Notes: |
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|-----------------------|--|------------------|--|
| Mechanical Contractor | | PWSGC Cx Manager | |
| Design Consultant | | Cx Manager | |

CFIA GTA Lab Renovation PI Forms

| | | | |
|--------------|-----------------------------------|------|-------|
| MMS #: | | Tag: | Ew-02 |
| Description: | Emergency Eyewash & Drench Shower | | |
| Location: | Floor: | 3rd | Room: |

| | | | |
|-------|-----------|----------|--|
| Power | Emergency | Fed From | |
|-------|-----------|----------|--|

| | | | |
|-----------------------------|--------|------|--------|
| | Actual | | |
| Manufacturer Name: | | | |
| Model #: | | | |
| Serial # / Part #: | | | |
| | Design | Shop | Actual |
| Flow Rate | | | |
| Hot / Cold H ₂ O | | | |
| Tempered H ₂ O | | | |
| Voltage (V) | | | |
| Inlet pipe size | | | |
| Control | | | |
| | | | |
| | | | |

| | |
|--------|--|
| Notes: | |
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|-----------------------|--|------------------|--|
| Mechanical Contractor | | PWSGC Cx Manager | |
| Design Consultant | | Cx Manager | |

CFIA GTA Lab Renovation PI Forms

| | | | |
|--------------|-----------------|------|-------|
| MMS #: | | Tag: | DF-01 |
| Description: | Fountain Cooler | | |
| Location: | Floor: | 3rd | Room: |

| | | | |
|-------|-----------|----------|--|
| Power | Emergency | Fed From | |
|-------|-----------|----------|--|

| | | | |
|-----------------------------|--------|------|--------|
| | Actual | | |
| Manufacturer Name: | | | |
| Model #: | | | |
| Serial # / Part #: | | | |
| | Design | Shop | Actual |
| Flow Rate | | | |
| Hot / Cold H ₂ O | | | |
| Tempered H ₂ O | | | |
| Voltage (V) | | | |
| GFI included | | | |
| Inlet pipe size | | | |
| Control | | | |
| | | | |

| | |
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| Notes: | |
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|-----------------------|--|------------------|--|
| Mechanical Contractor | | PWSGC Cx Manager | |
| Design Consultant | | Cx Manager | |

CFIA GTA Lab Renovation PI Forms

| | | | |
|--------------|---|------|-------|
| MMS #: | | Tag: | |
| Description: | Supply / Exhaust Lab Air Terminal Unit / Controller | | |
| Location: | Floor: | 3rd | Room: |

| | | | |
|-------|-----------|----------|--|
| Power | Emergency | Fed From | |
|-------|-----------|----------|--|

| | | | |
|--------------------|--------|------|--------|
| | Actual | | |
| Manufacturer Name: | | | |
| Model #: | | | |
| Serial # / Part #: | | | |
| | Design | Shop | Actual |
| Type / Size | | | |
| Max Air Flow (l/s) | | | |
| Min Air Flow (l/s) | | | |
| Voltage (V) | | | |
| Phase | | | |
| Reheat Coil | | | |
| Inlet Size | | | |
| Outlet Size | | | |
| Control Interface | | | |

| |
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| Notes: |
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| | | | |
|-----------------------|--|------------------|--|
| Mechanical Contractor | | PWSGC Cx Manager | |
| Design Consultant | | Cx Manager | |

CFIA GTA Lab Renovation PI Forms

| | | | |
|--------------|---------------------|------|-------|
| MMS #: | | Tag: | A |
| Description: | Supply Air Diffuser | | |
| Location: | Floor: | 3rd | Room: |

| | | | |
|-------|-----------|----------|--|
| Power | Emergency | Fed From | |
|-------|-----------|----------|--|

| | | | |
|--------------------|--------------------------|------|--------|
| | Actual | | |
| Manufacturer Name: | | | |
| Model #: | | | |
| Serial # / Part #: | | | |
| | Design | Shop | Actual |
| Model | 600X600 SCD 31 3C B12 | | |
| Type | Squarer cone diffuser | | |
| OEM | eh price | | |
| Colour | | | |
| | | | |
| | | | |

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| Notes: |
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| | | | |
|-----------------------|--|------------------|--|
| Mechanical Contractor | | PWSGC Cx Manager | |
| Design Consultant | | Cx Manager | |

CFIA GTA Lab Renovation PI Forms

| | | | |
|--------------|--------------------|------|-------|
| MMS #: | | Tag: | B |
| Description: | Exhaust Air Grille | | |
| Location: | Floor: | 3rd | Room: |

| | | | |
|-------|-----------|----------|--|
| Power | Emergency | Fed From | |
|-------|-----------|----------|--|

| | | | |
|--------------------|----------------------------|------|--------|
| | Actual | | |
| Manufacturer Name: | | | |
| Model #: | | | |
| Serial # / Part #: | | | |
| | Design | Shop | Actual |
| Model | - / 5300 / F / L / A / B12 | | |
| Square | Louvered face diffuser | | |
| OEM | eh price | | |
| Colour | | | |
| | | | |
| | | | |

| |
|--------|
| Notes: |
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| | | | |
|-----------------------|--|------------------|--|
| Mechanical Contractor | | PWSGC Cx Manager | |
| Design Consultant | | Cx Manager | |



Appendix "E" Commissioning PV Forms

Complete PV Forms will be provided after the issue of IFC contract documents

**CFIA GTA Lab 2301 Midland Ave.
Differential Pressure Monitor Testing
Functional Performance Test Plan**

| Tag # | Description / Room Location of DP Station | Design DP |
|---|--|------------------------|
| A Room # | B Room # | DP Rm B vs Rm A |
| TAB Instrument Model #, Serial #, Cal Date | | |

Each Differential Pressure Monitoring Station is tagged on BMS Drawing.
Each DP station monitors a DP between two (2) adjacent spaces
Room #s and design DP are to be noted and system tested against this criteria
Support systems are required to fully execute functional performance testing

The FPT plans have been fully executed by the appropriate parties.

Signature: _____

Title: General Contractor Representative

Signature: _____

Title: Mechanical Contractor

Signature: _____

Title: Controls Contractor

Signature: _____

Title: TAB Contractor

Signature: _____

Title: Mechanical Designer

Signature: _____

Title: Commissioning Manager

DP Operational Testing includes review of actual versus design operation.

DP stations are sampled under normal operating conditions.

Detailed test procedures is laid out to be executed by Construction / Commissioning Team as required or deemed necessary.

CFIA GTA Lab 2301 Midland Ave. Differential Pressure Monitor Testing Functional Performance Test Plan

Alarms

Objective: Verify equipment soft alarms are operating as intended and specified.

Instructions: Follow the instructions below in sequential order and fill in appropriate values (input/output values) if information is requested.

Acceptance: All alarms operate as per design.

| System Testing Procedure | Complete <input checked="" type="checkbox"/> | Comments |
|--|---|----------|
| Wiring diagrams showing safeties, interlocks & starter interconnections provided and reviewed. | <input type="checkbox"/> | |

| Local / Remote Soft Alarms (notification only) Testing Procedure | Complete <input checked="" type="checkbox"/> | Comments |
|--|---|-------------------------------|
| Simulate Pressure Differential Alarm condition and verify the following: | <input type="checkbox"/> | Record time delays |
| - Verify alarm is generated locally (visual & audible) | <input type="checkbox"/> | |
| - Verify alarm is generated at the BAS. | <input type="checkbox"/> | |
| Simulate Door Alarm condition and verify the following: | <input type="checkbox"/> | Record time delays |
| - Verify alarm is generated locally (visual & audible) | <input type="checkbox"/> | |
| - Verify alarm is generated at the BAS. | <input type="checkbox"/> | |
| Return all parameters back to normal / automatic operation. | <input type="checkbox"/> | |

Barrier Differential Pressure Monitoring

Objective: Verify the design conditions are met.

Instructions: Follow the instructions below in sequential order and fill in appropriate values (input/output values) if information is requested.

Acceptance: Requires correction and retest of all deficiencies as defined in the comments section.

| Barrier Differential Pressure & Differential Pressure Monitoring | Complete <input checked="" type="checkbox"/> | Comments |
|---|---|----------|
| Normal operating condition: | | |
| - Verify that all Fume Hood Sashes are in closed position. | <input type="checkbox"/> | |
| - Verify that Pressure Differential across the barrier is as per design. | <input type="checkbox"/> | |

CFIA GTA Lab 2301 Midland Ave. Differential Pressure Monitor Testing Functional Performance Test Plan

| Barrier Differential Pressure & Differential Pressure Monitoring | Complete <input checked="" type="checkbox"/> | Comments |
|--|---|----------|
| Record design Pressure Differential across the barrier: _____ " wc / _____ kPa | <input type="checkbox"/> | |
| Record actual Pressure Differential across the barrier: _____ " wc / _____ kPa | <input type="checkbox"/> | |
| Open Fume Hood Sash to its 50% open position and verify that Pressure differential across the barrier remains unchanged. | <input type="checkbox"/> | |
| Record design Pressure Differential across the barrier: _____ " wc | <input type="checkbox"/> | |
| Record actual Pressure Differential across the barrier: _____ " wc | <input type="checkbox"/> | |
| Open Fume Hood Sash to its 100% open position and verify that Pressure differential across the barrier remains unchanged. | <input type="checkbox"/> | |
| Record design Pressure Differential across the barrier: _____ " wc | <input type="checkbox"/> | |
| Record actual Pressure Differential across the barrier: _____ " wc | <input type="checkbox"/> | |
| Close all Fume Hood Sashes | <input type="checkbox"/> | |
| Record DP in Unoccupied Mode _____ " wc / _____ kPa | <input type="checkbox"/> | |
| Return all parameters back to normal / automatic operation. | <input type="checkbox"/> | |

| Test Results Summary | Yes | No | n/a |
|---|--------------------------|--------------------------|--------------------------|
| Differential Pressure Monitor operates as designed. | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| Actual Differential Pressure as per design. | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| Remedial Work Required. | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |

BAS Graphics & Trends

Objective: Verify building automation graphics and trends are installed and operate according to the specification.

Instructions: Follow the instructions below in sequential order and fill in appropriate values (input/output values) and other details if information is requested.

Acceptance: Requires correction and retest of all deficiencies as defined in the comments section.

| <i>BAS System Trends (set up, data collection, presentation, archiving data, and printing). Trends to be 7 calendar days</i> | Complete <input checked="" type="checkbox"/> | Comments |
|--|---|----------|
| System trends completed by BMS Contractor. | <input type="checkbox"/> | |

CFIA GTA Lab 2301 Midland Ave. Differential Pressure Monitor Testing Functional Performance Test Plan

| <i>BAS System Trends (set up, data collection, presentation, archiving data, and printing). Trends to be 7 calendar days</i> | Complete <input checked="" type="checkbox"/> | Comments |
|---|--|-----------------|
| Trend data printout attached. | <input type="checkbox"/> | |

| <i>BAS System Graphics and Display of Parameters / Status</i> | Complete <input checked="" type="checkbox"/> | Comments |
|---|--|-----------------|
| Differential Pressure System graphics complete. | <input type="checkbox"/> | |
| Graphics accurately represent installed system. | <input type="checkbox"/> | |
| Verify Differential Pressure Monitoring System Graphics is as per design. | <input type="checkbox"/> | |
| Verify attached Graphics Check Sheet is completed. | <input type="checkbox"/> | |

BMS Trending Check Sheet

Ensure trend logs are properly set up with measuring intervals (XX mins), trend durations and storage (7 days), and proper data archiving

| | | | |
|--------------------------|-----------------------|--------------------------|----------|
| <input type="checkbox"/> | Differential Pressure | <input type="checkbox"/> | DP Alarm |
| <input type="checkbox"/> | | <input type="checkbox"/> | |
| <input type="checkbox"/> | | <input type="checkbox"/> | |
| <input type="checkbox"/> | | <input type="checkbox"/> | |

Comments:

CFIA GTA Lab 2310 Midland Ave.

Lab FPT Process

This document describes the Functional Performance Test Plan process
The process is to be executed for each controlled lab area / space
The results are recorded on a separate FPT Result document
All elements to be verified, including air flow control, temperature alarms, infiltration, graphics.
All design data based on design engineer data / information

Record all the required info including design criteria and location
Review and ensure the lab air flow criteria are correct and meet the design criteria

Ensure the lab and adjacent spaces are in "Occupied" mode and stable

Note the current lab conditions both temperature and air flow
Note any discrepancies compared to the design criteria

Change room / space operating parameters to ensure all the operations maintain the design hierarchy and room / space conditions.

The process cannot measure Air Changes per Hour only exhaust and supply air volumes

Adjust temperature set points to bring on heating and record the results
Once it is determined all heating stages operate while maintain the design pressure criteria and results are recorded proceed to setting space / area for full cooling.
Record all the test results
Compare test results against the design criteria and determine if space / area passes or fails this program
Record any commissioning issues

Return space / area to the design set point and automatic control

Record the automatic set points along with test date and time along with the names of test witnesses

Comments:

**CFIA GTA Lab 2301 Midland Ave., Toronto
Generic Lab / Room (w/ fume hood / snorkels) Testing
Functional Performance Test Plan**

| | | |
|-------------|----------------------------------|--|
| Lab Room #: | Room Name: | |
| Floor: 3rd | BMS dwgs: | |
| | Mech Dwg M 5.01 Rev XX dated XXX | |

Date Executed: _____

This is a standard functional performance test plan which is used for all lab spaces. As all the lab spaces have various combinations of devices and equipment each space will be tested individually operating all the devices.

The test plan process and recorded results are structured and designed to be repeatable at a later date to prove performance and test result verification.

Operational concept is as follows;

- lab spaces are designed with a infiltration air flow
- the infiltration air flow is variable based on differential pressure monitoring
- the fume hood and other exhaust volumes will be made up by adjustments to exhaust air flows rest by diff pressure
- supply / exhaust air variable air flow devices
- heating controls are independent of air flow
- cooling request may adjust total air flows, while maintaining supply / exhaust air / diff pressure relationships
- labs will be tested to current engineer design conditions

Lab operations will be tested for all lab areas / rooms / space
Unoccupied operations will be sampled for key areas

The FPT plans have been fully executed by the appropriate parties.

Signature: _____

Title: Owner Representative

Signature: _____

Title: General Contractor Representative

Signature: _____

Title: Mechanical Contractor

Signature: _____

Title: Controls Contractor

Signature: _____

Title: TAB Contractor

Signature: _____

Title: Mechanical Designer

Signature: _____

Title: Commissioning Manager

**CFIA GTA Lab 2301 Midland Ave., Toronto
Generic Lab / Room (w/ fume hood / snorkels) Testing
Functional Performance Test Plan**

| Power Off / Fail Safe Operations / Positions | Complete <input checked="" type="checkbox"/> | Comments |
|---|--|-----------------|
| Lab systems are designed to fail safe and protect the associated environment. The fail safe configuration is designed by the engineer of record. The fail safe configuration and set up will be sampled under separate cover, and not included in this FPT Plan. | | |
| BAS Soft Alarm (notification only) Testing Procedure | Complete <input checked="" type="checkbox"/> | Comments |
| Ensure Infiltration Rate Alarm parameters are programmed in the BAS. | <input type="checkbox"/> | |
| <p><i>If infiltration rate equals to or more than 94 l/s (200 CFM) alarm at +/- 47 l/s (100 CFM) with 30 second delay. If the infiltration rate is less than 94 l/s (199 CFM) alarm at +/- 24 l/s (50 CFM) with 30 second delay.</i></p> <p style="text-align: center;"><i>This pass / fail criteria to be provide by the Engineer of Record</i></p> | | |
| Design Infiltration Rate _____ Actual Infiltration Rate _____ | <input type="checkbox"/> | |
| | <input type="checkbox"/> | |
| High Infiltration Rate alarm set point _____ Adjust High Infiltration Rate alarm set point to _____ Verify that an alarm is generated at the BAS. | <input type="checkbox"/> | |
| Low Infiltration Rate alarm set point _____ Adjust Low Infiltration Rate alarm set point to _____ Verify that an alarm is generated at the BAS. | <input type="checkbox"/> | |
| Lab alarming will be defined with IFC documentation | <input type="checkbox"/> | |
| Simulate Room Temperature Alarm condition and verify that an alarm is generated at the BAS. | <input type="checkbox"/> | |
| High space temperature alarm set point _____ Adjust high temperature alarm set point to _____ Verify that an alarm is generated at the BAS. | <input type="checkbox"/> | |

**CFIA GTA Lab 2301 Midland Ave., Toronto
Generic Lab / Room (w/ fume hood / snorkels) Testing
Functional Performance Test Plan**

| | | |
|--|--|-----------------|
| BAS Soft Alarm (notification only) Testing Procedure | Complete <input checked="" type="checkbox"/> | Comments |
|--|--|-----------------|

| | | |
|--|--------------------------|--|
| Low space temperature alarm set point _____ | <input type="checkbox"/> | |
| Adjust low temperature alarm set point to _____ Verify that an alarm is generated at the BAS. | <input type="checkbox"/> | |
| Return all parameters back to normal. | <input type="checkbox"/> | |

| Test Results Summary | Yes | No | n/a |
|---|--------------------------|--------------------------|--------------------------|
| Alarms tested operate as intended | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| Alarms tested annunciate and notify as required | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| Remedial Work Required | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |

3. Air Flow / Heating / Cooling Testing Room #: _____

Objective: Verify the equipment responds to various inputs conditions and maintains the desired air flow / temperature as designed.

Instructions: Follow the instructions below in sequential order and fill in appropriate values (input/output values) if information is requested.

Acceptance: Requires correction and retest of all deficiencies as defined in the comments section.

Caution: *Only qualified personnel familiar with the operation of the equipment and its associated systems and components should adjust, operate and test the equipment. Failure to observe proper safety precautions could result in damage to equipment and/or severe bodily injury.*

Lab / Space Air Flow Conditions (record data from Siemens shop drawing documentation)

Conversion Factors: cfm x 0.471947 = l/s l/s x 2.118882 = cfm

*May not be shown in BMS shop drawings

Space for calculations:

(InfA)= EA₁+EA₂+EA_N- SA₁-SA₂-SA_N

Calculated Infiltration: _____ (based on design drawings)

**CFIA GTA Lab 2301 Midland Ave., Toronto
Generic Lab / Room (w/ fume hood / snorkels) Testing
Functional Performance Test Plan**

| Air Flow Control | Complete <input checked="" type="checkbox"/> | Comments |
|---|--|-----------------|
| Ensure all support systems and lab devices are operational. | <input type="checkbox"/> | |
| Design Infiltration amount is: _____ CFM / lps | <input type="checkbox"/> | |
| Review lab room # assignments correlate to all supplied construction documents (specs, drawings, BAS shop drawings). | <input type="checkbox"/> | |
| Review cooling and heating testing, as these sequences and routines may be executed during air control testing. | <input type="checkbox"/> | |
| Review space for any additional air / ventilation related ducts, grills and vents. Ensure, actual performance of this exhaust / supply is provided, and matches the design. | <input type="checkbox"/> | |
| Set all lab devices to minimum air flow (hoods closed / snorkels turned down) | <input type="checkbox"/> | |
| <p>Word of caution: keep track of signs (+ve / -ve). Generally all labs are balanced. $\sum_{air} + 0 = +(\text{Infiltration Air}) + \text{Supply Air}_N - \text{Exhaust Air}_N$ $0 = (\text{InfA}) + \text{SA}_1 + \text{SA}_2 + \text{SA}_N - \text{EA}_1 - \text{EA}_2 - \text{EA}_N$ Assume Supply Air is positive to space, Exhaust Air is negative to space (includes all non-lab ventilation seen above).</p> <p>(InfA) = EA₁ + EA₂ + EA_N - SA₁ - SA₂ - SA_N</p> <p>Total all exhaust air subtract all supply air = infiltration. Corridors, air locks and other specialty areas may differ. All air flows are as per design documentation. All variations will be noted and resolution will be documented.</p> | | |
| Record all device specific exhaust air volume control positions. Fume Hood sashes at _____ % Snorkel rheostat at _____ % Misc exhaust devices to _____ % | <input type="checkbox"/> | |
| Verify infiltration air flow rate is always constant. | <input type="checkbox"/> | |
| Record actual infiltration air flow rate: _____ CFM / lps | <input type="checkbox"/> | |
| | <input type="checkbox"/> | |
| Air Change Control testing | <input type="checkbox"/> | |
| Determine hierarchy with respect to all controls | <input type="checkbox"/> | |

**CFIA GTA Lab 2301 Midland Ave., Toronto
Generic Lab / Room (w/ fume hood / snorkels) Testing
Functional Performance Test Plan**

| Air Flow Control | Complete <input checked="" type="checkbox"/> | Comments |
|--|--|-----------------|
| Verify air change controls operates as per design | <input type="checkbox"/> | |
| Design air changes / hour ; _____ | <input type="checkbox"/> | |
| Determine and show all calculations | <input type="checkbox"/> | |
| Vary space parameters to ensure ACH operates as design | <input type="checkbox"/> | |
| Actual air changes / hour ; _____ | <input type="checkbox"/> | |
| Verify operation meets design conditions. | <input type="checkbox"/> | |
| | <input type="checkbox"/> | |

| 50% Air Flow | Complete <input checked="" type="checkbox"/> | Comments |
|---|--|-----------------|
| Adjust all devices to 50% flow Fume Hood sashes at 50% Snorkel rheostat at 50% Misc exhaust devices to 50% | <input type="checkbox"/> | |
| Record any device specific exhaust air volume control positions. | <input type="checkbox"/> | |
| Record actual infiltration air flow rate: _____ CFM / lps | <input type="checkbox"/> | |
| Record actual differential pressure: _____ / _____ " wc / kPa | <input type="checkbox"/> | |
| | <input type="checkbox"/> | |
| | <input type="checkbox"/> | |
| | <input type="checkbox"/> | |

| Heating Control | Complete <input checked="" type="checkbox"/> | Comments |
|---|--|-----------------|
| Adjust space temperature set point to _____ to create a call for heating. | <input type="checkbox"/> | |

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Generic Lab / Room (w/ fume hood / snorkels) Testing
Functional Performance Test Plan

| Heating Control | Complete <input checked="" type="checkbox"/> | Comments |
|---|--|-----------------|
| Record expected supply air response: <input type="checkbox"/> Supply air goes to minimum flow <input type="checkbox"/> Supply air remains constant <input type="checkbox"/> Other: _____ | | |
| Verify supply air responds accordingly as per above selected option. | <input type="checkbox"/> | |
| Verify minimum supply air flow. | <input type="checkbox"/> | |
| Verify the reheat valve opens and discharge air temperature increases. | <input type="checkbox"/> | |
| Verify air infiltration and SA / EA air flow relationships are maintained during call for heating. | <input type="checkbox"/> | |
| Reset & record space set point to design : _____ C | <input type="checkbox"/> | |
| Verify and record actual infiltration air flow rate: _____ CFM / lps | <input type="checkbox"/> | |
| Record actual differential pressure: _____ / _____ " wc / kPa | <input type="checkbox"/> | |
| Verify heating set point meets design criteria. | <input type="checkbox"/> | |

| Cooling Control | Complete <input checked="" type="checkbox"/> | Comments |
|---|--|-----------------|
| Adjust space temperature set point to _____ to create a call for cooling. | <input type="checkbox"/> | |
| Record expected supply air response: <input type="checkbox"/> Supply air volume increases accordingly <input type="checkbox"/> Supply air remains constant <input type="checkbox"/> Other: _____ | | |
| Verify supply air responds accordingly as per above selected option. | <input type="checkbox"/> | |
| Verify the reheat valve closes and discharge air temperature decreases. | <input type="checkbox"/> | |
| Verify air infiltration and SA / EA air flow relationships are maintained during call for cooling. | <input type="checkbox"/> | |
| Reset & record space set point to design : _____ C | <input type="checkbox"/> | |
| Verify and record actual infiltration air flow rate: _____ CFM / lps | <input type="checkbox"/> | |
| Record actual differential pressure: _____ / _____ " wc / kPa | <input type="checkbox"/> | |
| Verify cooling set point meets design criteria. | <input type="checkbox"/> | |
| Return all parameters back to normal | <input type="checkbox"/> | |

**CFIA GTA Lab 2301 Midland Ave., Toronto
Generic Lab / Room (w/ fume hood / snorkels) Testing
Functional Performance Test Plan**

| Maximum Air Flow | Complete <input checked="" type="checkbox"/> | Comments |
|--|---|----------|
| Adjust all devices to Maximum air flow Fume Hood sashes at 100% Snorkel rheostat at 100% Misc exhaust devices to 100% | <input type="checkbox"/> | |
| Record any device specific exhaust air volume control positions. | <input type="checkbox"/> | |
| Verify infiltration air flow rate is always constant. | <input type="checkbox"/> | |
| Verify and record actual infiltration air flow rate: _____ CFM / lps | <input type="checkbox"/> | |
| Record actual differential pressure: _____ / _____ " wc / kPa | <input type="checkbox"/> | |
| Verify operation meets design conditions. | <input type="checkbox"/> | |
| Return all parameters back to normal. | <input type="checkbox"/> | |
| | | |

BMS Graphics Check Sheet

| | | | |
|--------------------------|------------------------------------|--------------------------|-----------------------------|
| <input type="checkbox"/> | Exhaust Air 1 Flow (CFM) | <input type="checkbox"/> | Supply Air 1 Flow (CFM) |
| <input type="checkbox"/> | Exhaust Air 2 Flow (CFM) | <input type="checkbox"/> | Supply Air 2 Flow (CFM) |
| <input type="checkbox"/> | Lab Room Temperature | <input type="checkbox"/> | Σ Air Infiltration Flow CFM |
| <input type="checkbox"/> | Device 1 Air Flow Rate | <input type="checkbox"/> | Device 2 Air Flow Rate |
| <input type="checkbox"/> | Device 3 Air Flow Rate | <input type="checkbox"/> | Device 4 Air Flow Rate |
| <input type="checkbox"/> | Device 5 Air Flow Rate | <input type="checkbox"/> | Device 6 Air Flow Rate |
| <input type="checkbox"/> | Fixed Air / Ventilation Air Flow | <input type="checkbox"/> | Space Temperature Set point |
| <input type="checkbox"/> | Design Infiltration rate set point | <input type="checkbox"/> | Actual infiltration rate |
| <input type="checkbox"/> | Total Supply Air | <input type="checkbox"/> | Total Exhaust Air |
| | | | |

BMS Trending to be provided separately by BMS Contractor

**CFIA GTA Lab 2301 Midland Ave., Toronto
Generic Lab / Room (w/ fume hood / snorkels) Testing
Functional Performance Test Plan**

Service / Utility Connection to the Fume Hood Verification Table

| Service / Utility connection provided | Fume Hood Tag: _____ | Fume Hood Tag: _____ | Comments |
|---------------------------------------|-------------------------|-------------------------|----------|
|---------------------------------------|-------------------------|-------------------------|----------|

| | | | |
|----------------------------|--------------------------|--------------------------|--|
| Non-potable cold water | <input type="checkbox"/> | <input type="checkbox"/> | |
| Non-potable tempered water | <input type="checkbox"/> | <input type="checkbox"/> | |
| Non-potable hot water | <input type="checkbox"/> | <input type="checkbox"/> | |
| RO / DI water | <input type="checkbox"/> | <input type="checkbox"/> | |
| Compressed air | <input type="checkbox"/> | <input type="checkbox"/> | |
| Vacuum | <input type="checkbox"/> | <input type="checkbox"/> | |
| Nitrogen | <input type="checkbox"/> | <input type="checkbox"/> | |
| Helium | <input type="checkbox"/> | <input type="checkbox"/> | |
| | <input type="checkbox"/> | <input type="checkbox"/> | |

Note: It is beyond the scope of this test matrix to verify the quality of the gas / utility being provided. This test section indicates verification of utility operation at the fume hood only. Service / utility connections are being tested as a courtesy to the construction process. Testing indicates, a service / utility is connected and energized. The actual service / utility quality is not being tested or verified.

- Indicates, a service / utility appears connected.
- Indicates, a service / utility is not required.
- Indicates, a service / utility is not operational at the time of the test.

Comments:

CFIA GTA Lab 2310 Midland Ave. Lab Room / Space (no equipment) Test Plan

Notes: Testing to be performed as per Lab FPT Process.
All elements to be verified, including air flow control, temperature alarms, infiltration, graphics.
All design data based on design engineer data / information

Room #: _____ BMS Dwg #: _____
Design Infiltration (l/s): _____ (CFM): _____

Conversion Factors: CFM x 0.471947 = l/s l/s x 2.118882 = CFM

| Exhaust Air _Σ (l/s) | Supply Air _Σ (l/s) | Actual Infiltration (l/s) | % Infiltration Difference $\frac{Actual-Design}{Design} \times 100\%$ (calculate as required) |
|-----------------------------------|----------------------------------|------------------------------|---|
| | | | |
| | | | |
| | | | |
| | | | |

Cooling / Heating Set point : _____ Actual Space Temperature : _____ C / F

Temperature Alarms (low / high) : _____ C / F / _____ C / F

| Test Results Summary | Yes | No | n/a |
|----------------------------------|--------------------------|--------------------------|--------------------------|
| Cooling as per design | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| Heating as per design | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| Lab / Room / Space as per design | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |

Room / Lab space operates to meet the design criteria

Comments:

Tested by: _____ Test Date: _____

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| | |
|--------------------------------|------------|
| Lab Room / Space PV Data Sheet | Room # 3XX |
| Room name: | Floor: 3rd |
| Project Phase: | |

Applies to renovated lab rooms and space only as per mechanical & electrical drawings
 Applies to spaces with services, corridors and common spaces may not be tested
 Spaces which have not been renovated are not in contract

Mech dwg: _____ Rev: _____ Dated: _____
 Elect dwg: _____ Rev: _____ Dated: _____

All utilities and service will be verified for proper installation and operation

Receptacles;

Correct power source, grounding, GFI operation, voltage drop

Lighting

Proper control incl. emergency lighting

Utilities verify availability

Sinks and faucets verify operation

Eye washes and showers verify correct operation

Record observation in comments section

All parties to sign off once all testing is complete and issues are resolved

| Description of Service or Utility | # of items | Comments |
|-----------------------------------|------------|----------|
|-----------------------------------|------------|----------|

| | | |
|-----------------------------------|--|--|
| Normal Power Receptacle(s) | | |
| | | |
| Normal Power GFI Receptacle(s) | | |
| | | |
| Emergency Power Receptacle(s) | | |
| | | |
| Emergency Power GFI Receptacle(s) | | |
| | | |
| UPS Power | | |
| | | |

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| Description of Service or Utility | # of items | Comments |
|-----------------------------------|------------|----------|
|-----------------------------------|------------|----------|

| | | |
|-----------------------------|--|---|
| Lighting Control | | Single Switch 3 Way Switching 4 Way Switching |
| Emergency Lighting | | |
| Natural Gas Service | | |
| Vacuum Service | | |
| RO H ₂ O Service | | |
| DCW | | |
| Test for water hammer | | as per 22 11 16 3.8.7 |
| DHW | | |
| Test for water hammer | | as per 22 11 16 3.8.7 |
| Heating H ₂ O | | |
| Relocated sink & faucet | | |
| New sink & faucet | | |
| Emergency Eye Wash Station | | |
| Emergency Shower | | |
| | | |

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| Item | Description | Gen Cont | Cx Mgr | Comments: |
|------|--------------------------------|----------|--------|-----------|
| 1 | Electrical labelling complete: | | | |
| 2 | Mechanical labelling complete: | | | |
| | | | | |

| |
|------------------|
| Remarks/Comments |
|------------------|

| Acknowledged | Date |
|------------------------|------|
| General Contractor: | |
| Commissioning Manager: | |
| Owner Representative: | |



Appendix "F" Commissioning Milestones

CFIA Lab Renovation
Mech Elect Commissioning Milestones

| Item # | Spec Sect ⁷ | Ph ^{4,5} | Commissioning Milestone | Date ^{2,3} | Duration ⁶ (hrs / days) | Prerequisite | Deliverable |
|--------|------------------------|-------------------|---|---------------------|---------------------------------------|----------------|----------------------------------|
| 1 | 01 91 13 1.6.13 | 1 | Attend Kick of Mtg | tbd | 1/2 day | | Mtg Min |
| 2 | 01 91 13 1.6.13 | 1 | Attend Monthly Commissioning Meeting 01 | tbd | 1 hour | | Mtg Min |
| 3 | 01 91 13 1.6.13 | 1 | Attend Monthly Commissioning Meeting 02 | tbd | 1 hour | | Mtg Min |
| 4 | 01 91 13 1.6.13 | 1 | Attend Monthly Commissioning Meeting 03 | tbd | 1 hour | | Mtg Min |
| 5 | 01 91 13 1.6.13 | 1 | Attend Monthly Commissioning Meeting 04 | tbd | 1 hour | | Mtg Min |
| 6 | 01 91 13 1.6.13 | 1 | Attend Monthly Commissioning Meeting 05 | tbd | 1 hour | | Mtg Min |
| 7 | 01 91 13 1.6.13 | 2 | Attend Monthly Commissioning Meeting 06 | tbd | 1 hour | | Mtg Min |
| 8 | 01 91 13 1.6.13 | 2 | Attend Monthly Commissioning Meeting 07 | tbd | 1 hour | | Mtg Min |
| 9 | 01 91 13 1.6.13 | 2 | Attend Monthly Commissioning Meeting 08 | tbd | 1 hour | | Mtg Min |
| 10 | 01 91 13 1.6.13 | 2 | Attend Monthly Commissioning Meeting 09 | tbd | 1 hour | | Mtg Min |
| 11 | 01 91 13 1.6.13 | 3 | Attend Monthly Commissioning Meeting 10 | tbd | 1 hour | | Mtg Min |
| 12 | | | | | | | |
| 13 | 01 91 13 1.6.1.1 | 1 | Issue Review and Acceptance of Cx and Training Plan | tbd | | | |
| 14 | 01 91 13 1.8.2.1 / 2 | 1 | Submit GCCxC / Cx Documentation | tbd | | | |
| 15 | 01 91 13 1.8.2.3 | 1 | Submit Cx Schedule | tbd | | | |
| 16 | 21 05 01 1.3 | 1 | Issue Mech Shop Drawings | tbd | 1 day | | Shop dwgs meeting specifications |
| 17 | 21 05 01 1.3 | 1 | Issue Elect Shop Drawings | tbd | 1 day | | Shop dwgs meeting specifications |
| 18 | | 1 | Review Mech Shop Drawings | tbd | 10 days | Shop Dwgs | Submittal Review Comments |
| 19 | | 1 | Review Elect Shop Drawings | tbd | 10 days | Shop Dwgs | Submittal Review Comments |
| 20 | 23 05 93 1.2.1 | 1 | Issue TAB personnel | tbd | 1 day | TAB Site Visit | Within 90 days of contract award |
| 21 | 23 05 93 1.6 | 1 | Issue confirmation of TAB compliance | tbd | 1 day | TAB Site Visit | Report |
| 22 | 23 05 93 1.13 | 1 | Issue TAB Plan for Review | tbd | 1 day | TAB Site Visit | TAB Proposed Procedures |
| 23 | 23 05 93 1.14 | 1 | Issue TAB Preliminary TAB Report | tbd | 1 day | | Preliminary TAB Report |
| 24 | 01 91 41 1.2.2 | 1 | Issue Training Plan | tbd | 1 day | GC Revise | Submittal Review Comments |
| 25 | 23 05 93 1.12.3 | 1 | Issue Instrumentation Calibration Certificates | tbd | 1 day | | Cal certificates < 28 days old |
| 26 | | 1 | Issue GC Quality Assurance Program & Processes | tbd | 1 day | | QA Program |
| 27 | 01 91 33 1.5.7 | 1 | Issue Mech Installation Check Lists | tbd | 1 day | | ICLs |
| 28 | 01 91 33 1.5.7 | 1 | Issue Electr Installation Check Lists | tbd | 1 day | | ICLs |
| 29 | 01 79 00 1.3.2 | 1 | Submit Training Plan and Schedule | tbd | 1 day | | Trg Plan and Schedule |
| 30 | 01 91 33 1.2.2 | 1 | Execute Mech PI Foms | tbd | by CT | | |
| 31 | 01 91 33 1.2.2 | 1 | Execute Elect PI Forms | tbd | by CT | | |
| 32 | 01 91 33 1.3.5 | 1 | Issue Mech Installation Check Lists | tbd | 1 day | | Inspection and comments |
| 33 | 01 91 33 1.3.5 | 1 | Issue Electr Installation Check Lists | tbd | 1 day | | Inspection and comments |
| 34 | 23 05 93 1.12 | 1 | Issue TAB Instrument Calibration Documentation | tbd | 1 day | | Instrument Calibration |
| 35 | 21 05 01 1.7.1.1.2 | 1 | Issue TAB Air Results for F-110 | tbd | 1 day | | TAB Report |
| 36 | 23 05 93 1.14 | 1 | Issue TAB Air Results | tbd | 1 day | TAB Report | Submittal Review Comments |
| 37 | 23 05 93 1.14 | 1 | Issue TAB Hydronic Results | tbd | 1 day | TAB Report | Submittal Review Comments |
| 38 | 01 91 33 1.5.9 | 1 | Execute & demonstrate Mech PV Forms | tbd | 3 days | | Completed PV Forms |
| 39 | 01 91 33 1.5.9 | 1 | Execute & demonstrate Elect PV Forms | tbd | 1 day | | Completed PV Forms |
| 40 | 01 91 13 1.3.2.11 | 1 | Execute all CL2 related testing & documentation | tbd | 1 day | | CL2 test results |
| 41 | | 1 | Re-work Mech Cx Issues | tbd | by CT | | Inspection and report |
| 42 | | 1 | Re-work Elect Cx Issues | tbd | by CT | | Inspection and report |
| 43 | 21 05 01 2.4.3 | 1 | Execute Mech Sys Trg & Demo | tbd | 3 days | | Agenda and sign off sheet |
| 44 | 21 05 01 2.4.3 | 1 | Execute Elect Sys Trg & Demo | tbd | 1 day | | Agenda and sign off sheet |
| 45 | 01 91 13 1.4.6 | 1 | Issue Interim Acceptance Certificate | | | | |
| 46 | | | | | | | |

CFIA Lab Renovation
Mech Elect Commissioning Milestones

| Item # | Spec Sect ⁷ | Ph ^{4,5} | Commissioning Milestone | Date ^{2,3} | Duration ⁶ (hrs / days) | Prerequisite | Deliverable |
|--------|------------------------|-------------------|--|---------------------|---------------------------------------|--------------|----------------------------------|
| 47 | | 2 | Start Phase 2 Construction | | | | |
| 48 | | 2 | Execute Mech PI Foms | tbd | by CT | | |
| 49 | | 2 | Execute Elect PI Forms | tbd | by CT | | |
| 50 | | 2 | Issue Mech Installation Check Lists | tbd | 1 day | | Inspection and comments |
| 51 | | 2 | Issue Electr Installation Check Lists | tbd | 1 day | | Inspection and comments |
| 52 | | 2 | Issue TAB Instrument Calibration Documentation | tbd | 1 day | | Instrument Calibration |
| 53 | 21 05 01 1.7.1.5.3 | 2 | Issue TAB Air Results for lab sup & exh air & FH fans | tbd | 1 day | TAB Report | Submittal Review Comments |
| 54 | | 2 | Issue TAB Air Results | tbd | 1 day | TAB Report | Submittal Review Comments |
| 55 | | 2 | Issue TAB Hydronic Results | tbd | 1 day | TAB Report | Submittal Review Comments |
| 56 | | 2 | Execute & demonstrate Mech PV Forms | tbd | 3 days | | Completed PV Forms |
| 57 | | 2 | Execute & demonstrate Elect PV Forms | tbd | 1 day | | Completed PV Forms |
| 58 | | 2 | Execute all CL2 related testing & documentation | tbd | 1 day | | CL 2 test results |
| 59 | | 2 | Re-work Mech Cx Issues | tbd | by CT | | Inspection and report |
| 60 | | 2 | Re-work Elect Cx Issues | tbd | by CT | | Inspection and report |
| 61 | | 2 | Execute Mech Sys Trg & Demo | tbd | 3 days | | Agenda and sign off sheet |
| 62 | | 2 | Execute Elect Sys Trg & Demo | tbd | 1 day | | Agenda and sign off sheet |
| 63 | 01 91 13 1.4.6 | 2 | Issue Interim Acceptance Certificate | | | | |
| 64 | | | | | | | |
| 65 | | 3 | Start Phase 2 Construction | | | | |
| 66 | | 3 | Execute Mech PI Foms | tbd | by CT | | |
| 67 | | 3 | Execute Elect PI Forms | tbd | by CT | | |
| 68 | | 3 | Issue Mech Installation Check Lists | tbd | 1 day | | Inspection and comments |
| 69 | | 3 | Issue Electr Installation Check Lists | tbd | 1 day | | Inspection and comments |
| 70 | | 3 | Issue TAB Instrument Calibration Documentation | tbd | 1 day | | Instrument Calibration |
| 71 | | 3 | Issue TAB Air Results | tbd | 1 day | TAB Report | Submittal Review Comments |
| | | | Issue Final TAB Air Results: | | | | |
| 72 | 12 05 01 1.7.10.11 | 3c | F12/13, F15, F9, F20/21, F110, All lab components Confirm calibration | tbd | 1 day | TAB Report | Submittal Review Comments |
| 73 | | 3 | Issue TAB Hydronic Results | tbd | 1 day | TAB Report | Submittal Review Comments |
| 74 | | 3 | Execute & demonstrate Mech PV Forms | tbd | 3 days | | Completed PV Forms |
| 75 | | 3 | Execute & demonstrate Elect PV Forms | tbd | 1 day | | Completed PV Forms |
| 76 | | 3 | Execute all CL2 related testing & documentation | tbd | 1 day | | CL2 Test results |
| 77 | | 3 | Re-work Mech Cx Issues | tbd | by CT | | Inspection and report |
| 78 | | 3 | Re-work Elect Cx Issues | tbd | by CT | | Inspection and report |
| 79 | | 3 | Execute Mech Sys Trg & Demo | tbd | 3 days | | Agenda and sign off sheet |
| 80 | | 3 | Execute Elect Sys Trg & Demo | tbd | 1 day | | Agenda and sign off sheet |
| 81 | 21 05 01 1.4.5 | 3 | Issue Mech O & M Manual | tbd | 5 days | | Submittal Review Comments |
| 82 | 21 05 01 1.4.5 | 3 | Issue Elect O & M Manual | tbd | 5 days | | Submittal Review Comments |
| 83 | | 3 | Execute Mech Sys Trg & Demo | tbd | 1 day | | Agenda and sign off sheet |
| 84 | | 3 | Execute Elect Sys Trg & Demo | tbd | 1/2 day | | Agenda and sign off sheet |
| 85 | | | | | | | |
| 86 | 01 78 00 1.2.4 | F | Issue final copies of commissioning documentation | tbd | 1 day | | Two (2) weeks prior to Sub Comp. |
| 87 | | F | Issue TAB Instrument Calibration Documentation | tbd | 1 day | | Instrument Calibration |
| 88 | 25 05 01 3.1.4.2.2 | F | Final Calibration of Lab Press / Vol Controls | tbd | | | Results Report |
| 89 | 23 05 93 1.5.3 | F | Final TAB Lab Space DP Operational Review | tbd | 1 day | TAB Report | |
| 90 | | | | | | | |
| 91 | | F | Execute 10 Mth Warranty Review | tbd | 1 day | | Report |

- Notes
- 1 duration provided by CT is Construction Team
 - 2 All dates are provided by General Contractor as Commissioning Milestones
 - 3 General Contractor to include all commissioning milestones in project works schedule
 - 4 Phases include all sub elements
 - 5 F indicate after Phase 3 is complete and signed off
 - 6 Durations are set a one (1) day as they are a single milestone and are submitted / issued on a given scheiduled date
 - 7 Specifications sections may not be repeated for identical milestones for additional phases