

CITY OF WINNIPEG

NEWPCC BOILER REPLACEMENT 2025- 2026 - COMMISSIONING PLAN

Revision:

Rev 0

KGS Group Project:

23-0107-010

Client Project:

S-1284

Date:

April 2, 2025

Prepared by:



Andrew Fustey, P.Eng.
Mechanical Engineer

Reviewed by:



Jason Smith, P. Eng.
Senior Mechanical Engineer

Approved by:



Prasan Silva, P. Eng.
Senior Mechanical Engineer

TABLE OF CONTENTS

1.0 INTRODUCTION 1

2.0 COMMISSIONING TEAM 2

2.1 Participants 2

2.2 Roles and Responsibilities..... 2

3.0 SCHEDULE..... 5

4.0 COMMISSIONING REQUIREMENTS 6

4.1 General..... 6

4.2 Specifications 6

4.3 Mechanical Commissioning Works 9

4.3.1 Pre-COMMISSIONING 9

4.3.2 COMMISSIONING Tasks – BLR-B0005, BLR-B0006, BLR-B0007 10

4.3.3 COMMISSIONING Tasks – P-B0110, P-0120, P-B0130, P-B0140, P-B0150 10

4.3.4 Performance Verification 10

4.4 Electrical Commissioning Works 11

4.4.1 Pre-COMMISSIONING 11

4.4.2 Commissioning Tasks – MCC-B7001, MCC-B7002 11

4.4.3 COMMISSIONING Tasks 11

4.4.4 Performance Verification 11

4.5 City of Winnipeg Forms 100 to 104 Intent..... 12

5.0 TRAINING 14

5.1 Training Session Objectives..... 14

6.0 O&M MANUAL 16

List of Tables

Table 1: Roles and Responsibilities

Table 2: Mechanical Equipment to be Commissioned

Table 3: Electrical Equipment and Systems to be Commissioned

List of Appendices

Appendix A: Commissioning Schedule

Appendix B: Pre-Commissioning and Commissioning Forms

Appendix C: Commissioning Deficiency Log

STATEMENT OF LIMITATIONS AND CONDITIONS

Limitations

This report has been prepared for The City of Winnipeg (“The City”) in accordance with the agreement between KGS Group and The City (the “Agreement”). This report represents KGS Group’s professional judgment and exercising due care consistent with the preparation of similar reports. The information, data, recommendations and conclusions in this report are subject to the constraints and limitations in the Agreement and the qualifications in this report. This report must be read as a whole, and sections or parts should not be read out of context.

This report is based on information made available to KGS Group by The City. Unless stated otherwise, KGS Group has not verified the accuracy, completeness or validity of such information, makes no representation regarding its accuracy and hereby disclaims any liability in connection therewith. KGS Group shall not be responsible for conditions/issues it was not authorized or able to investigate or which were beyond the scope of its work. The information and conclusions provided in this report apply only as they existed at the time of KGS Group’s work.

Third Party Use of Report

Any use a third party makes of this report or any reliance on or decisions made based on it, are the responsibility of such third parties. KGS Group accepts no responsibility for damages, if any, suffered by any third party as a result of decisions made or actions undertaken based on this report.

1.0 INTRODUCTION

Boiler 5 was installed in 1999 to serve as a backup boiler to the four existing hot water boilers in the main boiler room at the North End Sewage Treatment Plant (NEWPCC). The boiler is a hot water heating type boiler with original design maximum rated output of 3433 kW. Boiler 5 was taken out of service in April 2022 due to boiler mechanical failure. An interim backup boiler system was installed in 2024 for redundant emergency capacity to replace boiler 5, while a permanent boiler system was designed.

A new permanent boiler system will be installed to replace the existing Boiler 5 and interim backup system. The permanent boiler system will consist of two new 1962 kW boilers, three new circulation pumps, flowmeters and a new flash steam separator tank. The boiler control system will include controls by the boiler vendor, which will be integrated into the City Process Control System (PCS) system. The PCS system will have new HMI screens dedicated to boilers 5 and 6, which interface with the boiler vendor controls.

The following document provides a plan for the start-up, testing, operation and acceptance criteria for the commissioning of the new equipment and systems installed for the project. It details the commissioning processes, roles and responsibilities, commissioning specifications and objectives, procedures, verification requirements, and documentation for the Project.

2.0 COMMISSIONING TEAM

2.1 Participants

Commissioning will require the participation of the following organizations to verify the performance of the equipment and systems:

- General Contractor, and Subcontractors.
- Original Equipment Manufacturer (OEM).
- Contract Administrator – KGS Group.
- Owner/Client – City of Winnipeg (The City).

2.2 Roles and Responsibilities

The Contract Administrator is to provide comprehensive planning and leadership for the commissioning of the works. In cooperation with the Contractor and Owner, the Contract Administrator will be responsible for ensuring that all commissioning activities are carried out to allow for the delivery of a fully operational facility that is compliant and complete. The Contract Administrator will provide sufficient personnel to develop, manage and implement the commissioning works as illustrated by Table 1 below.

The Contractor shall be responsible for the commissioning work under the direction of the Contract Administrator. The Contractor shall be capable of carrying out the commissioning duties outlined below or employ a commissioning agent subcontractor to assist with the duties. The Contractor will be responsible for carrying out testing on-site and demonstrating that the system adheres to project specifications and operates satisfactorily. The Contract Administrator will witness and monitor the commissioning activities, and upon satisfactory completion of the commissioning, will review the documentation provided by the Contractor for acceptance. A Commissioning handover package will be compiled and provided to the City by the Contract Administrator, which includes all commissioning documentation, including:

- Commissioning Completion Report
- Project commissioning plans and procedures
- Evidence of commissioning verification
- Deficiency reports and corrective action taken
- Training material and records
- Other commissioning documents

TABLE 1
ROLES AND RESPONSIBILITIES

Item	Task Description	Organization	Responsibility	
			Department (If Applicable)	Individual (If Applicable)
1	Safely perform all pre-commissioning, commissioning and performance verification activities.	Contractor		
2	Obtain all required approvals from Authority Having Jurisdiction (Inspection and Technical Services Manitoba, Manitoba Hydro Winnipeg Area) for the installed boilers, piping, and new MCCs.	Contractor		
3	Safely operate the equipment as required to perform commissioning activities	Contractor		
4	Document equipment and control system settings.	Contractor		
5	Provide operations and maintenance manuals.	Contractor		
6	Provide as-built drawings.	Contractor		
7	Provide training to maintenance staff and operators in accordance with City standards.	Contractor		
8	Schedule and coordinate commissioning works with respect to the construction schedule.	Contract Administrator & Contractor		
9	Prepare agenda and record minutes of commissioning meetings.	Contract Administrator		
10	Verify and document the performance of all assets impacted by the construction works, prior to starting construction.	The City		
11	Attend and witness pre-commissioning, commissioning and performance verification activities	Contract Administrator & The City		
12	Track deficiencies, record corrective measures	Contract Administrator		
13	Supply commissioning record sheets, test forms, and other documentation.	Contract Administrator		

Item	Task Description	Organization	Responsibility	
			Department (If Applicable)	Individual (If Applicable)
14	Review and approve commissioning handover package.	Contract Administrator		
15	Start-up and shut down of existing systems required for the commissioning work.	The City		
16	Monitor alarms during performance verification.	Contract Administrator and The City		
17	Apply and remove safety lockouts as required.	The City		
18	Carry out process testing during Performance Verification.	Contractor		
19	Perform all required Plant PCS and HMI programming and network integration for control of new equipment.	City		
20	Commissioning Completion Report in accordance with RFP 325-2023 - D12.7	Contract Administrator		

3.0 SCHEDULE

A preliminary construction schedule that includes a high-level commissioning section is provided in Appendix A. The schedule identifies the general timeline for key items such as anticipated pre-commissioning activities (including vendor start-up of equipment), commissioning of boilers, pumps and other associated mechanical and electrical equipment, and performance verification of the overall system.

A detailed commissioning schedule to be prepared by the Contractor in consultation with the Contract Administrator during construction. The detailed commissioning schedule shall be submitted for review and approval of the Contract Administrator minimum of 4 weeks prior to the start of the commissioning activities.

4.0 COMMISSIONING REQUIREMENTS

4.1 General

Commissioning of the boilers and associated systems will follow the requirements of the technical specifications listed in the reference section and make use of the commissioning forms and procedures described therein and equipment vendor recommended start-up or commissioning documents. In addition to these documents, the Contractor is responsible for reviewing the full scope of drawings and specifications and meeting all of the commissioning requirements listed therein.

The following is a general list of the systems to be commissioned. Each system named below includes all electrical and mechanical components that operate together to achieve the desired purpose.

- Hydronic Systems
- Remote Monitoring/Control
- Natural and Digester Gas System
- Nitrogen Systems
- Power Distribution
- PCS Automation Systems

Detailed commissioning requirements for each mechanical and electrical system and device are provided in Sections 4.3 and 4.4.

Appendix B has been provided with pre-commissioning and commissioning documentation to be completed by the Contractor. Documentation will be updated as the control narrative continues to be developed, should any updates be necessary. The Contractor shall be responsible for carrying out the pre-commissioning tests, commissioning tests, and performance verification described therein.

4.2 Specifications

The general commissioning specifications, in addition to technical specification Section 01 91 13, applicable to the work are as follows:

1. The Contractor shall submit completed testing and field commissioning record sheets on which the results of the various checks and tests shall be recorded, dated, and approved by the OEM and/or installation Subcontractor and the Contract Administrator. Pre-commissioning and commissioning record sheets are contained in Appendix B. Contractor and OEM shall provide evidence of Factory Acceptance Tests for boilers, pumps and other major equipment, prior to beginning on-site commissioning.
2. The scope of equipment to be tested is shown in Table 2 and 3. Additional associated components and systems may also require commissioning.
3. The Contractor shall advise the Contract Administrator and the City in writing when the work may be inspected before proceeding with the next commissioning task. The equipment and systems shall not be started before the approval of the Contract Administrator has been obtained.

4. The Contractor is responsible for providing the necessary tools, materials, and equipment for conducting the required tests.
5. The Contractor shall notify the Contract Administrator, in writing, at least two weeks prior to the date which commissioning activities will commence.
6. Any defects which become evident during commissioning shall be immediately corrected at the Contractor's expense and the test repeated until the work is proven satisfactory by the Contract Administrator.
7. Testing, at a minimum, shall prove the following:
 - a. All mechanical and electrical equipment affected by the work operate correctly and satisfactorily.
 - b. Control devices operate correctly and satisfactorily.
 - c. All circuits, controls and interlock sequences of operation are correct.
 - d. All protective and indicating devices operate satisfactorily.
 - e. Motor running currents under no load (decoupled motor) and full load are within acceptable ranges.
8. The Contractor is responsible for submitting the Operation and Maintenance (O&M) Manuals in accordance with the technical specifications.
9. The Contractor shall coordinate commissioning of the new equipment and systems with the OEM in the factory and on-site start-up.
10. Upon total completion of the commissioning the final hand-over package shall be submitted by the Contractor to the Contract Administrator. It shall include all as-built drawings, factory acceptance tests (in-factory and on-site), Testing and Balancing (TAB) reports, equipment settings, lubricant schedules, installation records, warranty information, preventative maintenance schedule for equipment and components, pre-commissioning and commissioning records, and performance verification records.
11. Upon completion of Performance Verification, the Contractor shall submit:
 - i. Completed form CD-PM-TO-16 Certificate of Equipment Satisfactory Performance Form 103 (see Appendix B).
 - ii. Complete form CD-PM-TO-17 Certificate of Satisfactory Process Performance Form 104 (see Appendix B).

The detailed commissioning tasks are outlined below. For each of the tasks, detailed procedure and record sheets will be provided or developed to document the commissioning of the mechanical and electrical equipment. The Contract Administrator will monitor the commissioning activities as specified in Section 2.0; and upon satisfactory completion of the commissioning, will review the documentation provided by the Contractor. The Contractor shall be responsible for performing all commissioning and performance verification tests, under the direction of the Contract Administrator.

TABLE 2
MECHANICAL EQUIPMENT AND SYSTEMS TO BE COMMISSIONED

Item	Equipment Type	Tag	Applicable Commissioning Documents
1	Boilers	BLR-B0005, BLR-B0006, BLR-B0007	System Verification Forms (Appendix B) City of Winnipeg Forms Equipment Vendor Forms
2	Circulation Pumps	P-B0110, P-B0120, P-B0130, P-B0140	System Verification Forms (Appendix B) City of Winnipeg Forms Equipment Vendor Forms
3	Low Flow Circulation Pump	P-B0150	System Verification Forms (Appendix B) City of Winnipeg Forms Equipment Vendor Forms
4	Digester and Natural Gas Safety Shutoff Valves (Boilers 1 and 2)	N/A	System Verification Forms (Appendix B) City of Winnipeg Forms Equipment Vendor Forms
5	Nitrogen Gas System	N/A	City of Winnipeg Forms

TABLE 3
ELECTRICAL EQUIPMENT AND SYSTEMS TO BE COMMISSIONED

Item	Equipment Type	Tag	Applicable Commissioning Documents
1	Circulation Pump VFDs	VFD-B0110, VFD-B0120, VFD-B1030	System Verification Forms (Appendix B) City of Winnipeg Forms Equipment Vendor Forms
2	Motor E-Stop Switch	HSS-B01100, HSS-B01200, HSS-B10300	System Verification Forms (Appendix B) City of Winnipeg Forms Equipment Vendor Forms
3	Boiler E-Stop Switch	HSS-B00515, HSS-B00516	System Verification Forms (Appendix B) City of Winnipeg Forms
4	Flowmeters	FE-B00050, FE-B00051, FE-B00052, FE-B00060, FE-B00061, FE-B00062	System Verification Forms (Appendix B) City of Winnipeg Forms
5	Boiler 5 Circuit Breaker	CB-B0005	System Verification Forms (Appendix B) City of Winnipeg Forms
6	Boiler 6 Circuit Breaker	CB-B0006	System Verification Forms (Appendix B) City of Winnipeg Forms

Item	Equipment Type	Tag	Applicable Commissioning Documents
7	Circulation Pump Circuit Breaker	CB-B0110, CB-B0120, CB-B0130, CB-B0140	System Verification Forms (Appendix B) City of Winnipeg Forms
8	Flow Switches	FS-B00519, FS-B00619	System Verification Forms (Appendix B) City of Winnipeg Forms
9	MCC	MCC-B7001 and MCC-B7002	System Verification Forms (Appendix B) City of Winnipeg Forms Equipment Vendor Forms

4.3 Mechanical Commissioning Works

The Contractor shall perform the following pre-commissioning, commissioning and performance verification activities. This list is not exhaustive, and the Contractor may be required to perform additional tasks, other than what is described below to ensure the new boilers and associated systems operate satisfactorily.

4.3.1 PRE-COMMISSIONING

1. Provide on-site boiler start-up and commissioning by boiler manufacturer (or authorized agent). Manufacturers shall commission the integral boiler controls and safety systems, including systems for the natural gas and digester gas trains.
2. Perform all required factory and pre-startup testing according to manufacturer's instructions. Submit Factory Acceptance Testing to Contract Administrator, prior to boiler on-site commissioning.
3. Obtain all necessary approvals from Authority Having Jurisdiction (Inspection and Technical Services Manitoba) for installed boilers and piping.
4. Ensure all associated piping systems are installed and tested as per the specifications. Including hydrostatic pressure testing for new hydronic, nitrogen, natural gas, and digester gas piping systems in accordance with technical specification Section 23 21 13.02.
5. Ensure all equipment to be pre-commissioned is installed.
6. Verify all equipment installed is accessible for maintenance, clean, safe and free of defects.
7. Ensure all associated piping supports are installed, and penetrations are sealed.
8. Ensure all equipment is properly lubricated and have associated safety guards in place.
9. Manually test all valves to ensure for proper range in operation and isolation of service.
10. Ensure all power and control wiring to equipment, instrumentation and other devices affected by the MCC replacement and boiler installation are complete.
11. Ensure all instrumentation (ie: temperature transmitters, flow switches, etc.) are calibrated at the device and scaled appropriately within the plant control system.

4.3.2 COMMISSIONING TASKS – BLR-B0005, BLR-B0006, BLR-B0007

1. Perform boiler heating loop temperature control testing in accordance with system verification commissioning forms (see Appendix B).
2. Perform boiler loss of power testing in accordance with system verification commissioning forms (see Appendix B).
3. Perform boiler low water testing in accordance with system verification commissioning forms (see Appendix B).
4. Perform boiler high limit testing in accordance with system verification commissioning forms (see Appendix B).
5. Perform boiler E-stop testing in accordance with system verification commissioning forms (see Appendix B).
6. Perform boiler control system testing in accordance with system verification commissioning forms (see Appendix B).
7. Perform all other testing and inspection requirements in accordance with technical specification section 23 52 00 – Heating Boilers.

4.3.3 COMMISSIONING TASKS – P-B0110, P-0120, P-B0130, P-B0140, P-B0150

1. Perform pump functional testing in accordance with system verification commissioning forms (see Appendix B).
2. Perform pump control system testing in accordance with system verification commissioning forms (see Appendix B).
3. Test circulation pump (P-B0110, P-B0120, P-B0130) low flow and high flow rate functionality with the PCS (see Appendix B).

4.3.4 PERFORMANCE VERIFICATION

1. Perform Testing Adjusting and Balancing (TAB) in accordance with technical specification section 23 05 93.
2. Verify the boilers, pump and associated equipment are functioning as intended during normal plant operations for a minimum of 3 days.
 - a. Complete form CD-PM-TO-16 Certificate of Equipment Satisfactory Performance Form 103 see Appendix B).
 - b. Complete form CD-PM-TO-17 Certificate of Satisfactory Process Performance Form 104 (see Appendix B).

Refer to Appendix B for relevant commissioning forms to be employed during commissioning. Any forms not provided that are necessary to show completion of the tasks described shall be developed by the Contractor in an organized fashion, in a computer-generated format.

4.4 Electrical Commissioning Works

The Contractor shall perform the following pre-commissioning, commissioning and performance verification activities. This list is not exhaustive, and the Contractor may be required to perform additional tasks, other than what is described below to ensure the new boilers and associated systems operate satisfactorily.

4.4.1 PRE-COMMISSIONING

1. Perform loop wiring checks for each instrument or device as outlined in Appendix B.
2. Perform loop wiring checks for each existing instrument or device connected to MCC-B7001 and MCC-B7002 as outlined in Appendix B.
3. Record as-built wiring information in the I/O List and Cable List included in Appendix E.
4. Perform instrument calibration for each instrument as outlined in Appendix B.
5. Establish and verify network communications for all new networked devices including but not limited to: the new network switch, MCC power meters, VFDs, and boiler control panel.
6. Verify that all motors supplied by MCC-B7001 and MCC-B7002 rotate in the correct direction and operate in both automatic and manual modes as required.
7. Verify that all non-motor loads supplied by MCC-B7001 and MCC-B7002 are energized and drawing similar current when previously connected to MCC-1B and MCC-2B.

4.4.2 COMMISSIONING TASKS – MCC-B7001, MCC-B7002

1. Perform MCC functional testing in accordance with system verification commissioning forms (see Appendix B).
2. Perform motor functional testing for all motors (existing and new) powered by the MCCs in accordance with system verification commissioning forms (see Appendix B).

4.4.3 COMMISSIONING TASKS

1. Verify that range specified in plant PCS matches range of the instrument for each instrument as outlined in Appendix B. Coordinate with the City.
2. Verification of read-out on plant PCS for 0%, 50%, and 100% signals for each instrument as outlined in Appendix B. Coordinate with the City.
3. Verify operation of all hand switches.
4. Verify correct operation of all pump and boiler interlocks.

4.4.4 PERFORMANCE VERIFICATION

1. Verify the boiler control system is functioning as intended during normal plant operations.
 - a. Complete form CD-PM-TO-16 Certificate of Equipment Satisfactory Performance Form 103 (see Appendix B).
 - b. Complete form CD-PM-TO-17 Certificate of Satisfactory Process Performance Form 104 (see Appendix B).

Refer to Appendix B for relevant City of Winnipeg Electrical Checklists to be employed during commissioning. Any forms not provided that are necessary to show completion of the tasks described shall be developed by the Contractor in an organized fashion, in a computer-generated format.

4.5 City of Winnipeg Forms 100 to 104 Intent

As part of the pre-commissioning and commissioning phases for this project, the City of Winnipeg Forms 100 to 104 shall be filled out in addition to the documentation provided by the Contract Administrator. Contractor and equipment vendors. These forms are included within Appendix B for reference and are listed below with a brief description.

- Form 100 – Certificate of Equipment Delivery
 - Intended to document when all major equipment has been received onsite. The list of major equipment shall include all associated equipment tags throughout the Contract Documents.
 - This list shall be finalized between the Contract Administrator, City of Winnipeg and Contractor during the construction period.
- Form 101 – Certificate of Readiness to Install
 - Intended to document that the installing Contractor is familiar with the associated equipment/system to be installed.
 - This certificate shall confirm the installing Contractor is fully aware of the scope outlined in the Contract Documents and any specific equipment/system vendor installation requirements.
- Form 102 – Certificate of Satisfactory Installation
 - Intended to document that the equipment/system was installed to the satisfaction of the equipment/system vendor/supplier and the Contract Administrator after a detailed inspection has taken place.
 - The Contractor shall coordinate with Contract Administrator to schedule these inspection dates during the Construction.
 - The Contractor shall also arrange and document any specified tests to demonstrate the equipment/system was installed satisfactory.
- Form 103 – Certificate of Equipment Satisfactory Performance
 - Intended to document that the equipment/system has performed for a minimum 3 days continuously with no issues utilizing the specified test fluid/material.
 - The Contractor shall coordinate with Contract Administrator to schedule these inspection dates during the Construction.
 - The Contractor shall arrange, and document specified testing and measurement of the equipment/system performance to demonstrate that the design criteria were met.
- Form 104 – Certificate of Satisfactory Process Performance
 - Intended to document that the equipment/system has performed satisfactorily for a continuous period with the specified process fluid/material. This period shall be established by the Contract Administrator during construction.
 - The Contractor shall coordinate with Contract Administrator and City of Winnipeg to schedule these inspection/witness dates during the Construction.

- The Contractor shall arrange, and document specified testing and measurement of the equipment/system performance to demonstrate that the design criteria were met.
- The Contractor shall complete commissioning documentation to record equipment/system operating parameters that demonstrate satisfactory performance. Any deficiencies and corrective actions shall be documented through the Commissioning Log in Appendix C and issued to the Contract Administrator.
- The City of Winnipeg shall provide any existing system monitoring and data points for coordination with the Contract Administrator and Contractor to allow for confirmation of satisfactory process performance.

5.0 TRAINING

Training classes will be presented by the Contract Administrator and the Contractor at the NEWPCC boardroom for City personnel. The Contract Administrator is responsible for the coordination, quality assurance, overall packaging, and presentation of the training sessions. Training sessions shall be provided in accordance with Section **01 79 00 – Demonstration and Training** and **Appendix V – Training Requirements**. (Where discrepancies exist between the Commissioning Plan, Section 01 79 00, and Appendix V, most stringent requirements shall be provided.)

The Contract Administrator will provide a general description of the new systems, including the design philosophy, criteria, and intent. The Contractor will instruct City personnel how to operate the new equipment and control systems safely, and reliably. The Contractor will also instruct equipment maintenance requirements along with diagnosis and trouble-shooting information.

The Contract Administrator and Contractor (in coordination with associated subtrades and vendors) will provide training material in advance of training sessions for review and approval by the City. Final review and approval of all training manuals and materials is required by the City of Winnipeg prior to the training sessions. It is assumed that feedback will be provided in a timely manner and that scheduling of the training sessions in conjunction with commissioning work will not be delayed.

Technical memoranda prepared by the Contractor will be provided following the commissioning/training workshops. The City will be responsible for providing appropriate personnel to participate in the training for the operation and maintenance of the facility.

The Contract Administrator will provide a general overview of the systems only. The Contractor's individual equipment instructors will be responsible for the content and quality of their respective sections. The Contractor and any required certified factory-trained manufacturers' personnel will provide specific instruction on the start-up, operation and shut-down of their equipment with emphasis on the components, control features, servicing and maintenance. Specifically, training for the operation and maintenance of the Automation System including the HMI is required. It is expected that the Contractor will provide instruction on the operation of the HMI system.

5.1 Training Session Objectives

The objectives of the training will be to provide City personnel with the following information:

- A description of the function and design of the boiler system.
- An overview of the function requirements of the system.
- A detailed description of the extent of all structural, electrical, and mechanical work performed.
- A review of the system layout, the equipment, controls and emergency shut off.
- Equipment and system start-up, operation, monitoring, servicing (including trouble-shooting diagnosis), maintenance and shut-down procedures.

- System operating sequences, including step-by-step directions for starting, operating and shutting down applicable switches and control settings.
- Recommended preventative maintenance practices along with diagnosis and trouble-shooting information.
- A review of O&M Manual documentation

Additionally, commissioning workshops will be held to train plant staff on the operation and maintenance of the new upgraded facilities and equipment. Training sessions/workshops are to be video recorded by the Contractor and submitted to the Contract Administrator for review. The Contract Administrator will provide the video records to the City to serve as documented record. (Refer to Appendix V for additional information.)

6.0 O&M MANUAL

Upon completion of the project, the Contractor shall provide a complete set of information (the “Operation and Maintenance Information” or “O&M Information”) to furnish City staff with all the information required to operate and maintain the Project. O&M Manual shall comply with the requirements of *Appendix P – Operations Manual Specification* and *Appendix Q – Operations and Maintenance Information*.

A draft of the O&M manual will be provided to the City prior to commissioning. Final review and approval of all operation and maintenance (O&M) manuals and materials will be required by the City prior to the training sessions. Recommended Preventative Maintenance procedures will be provided by the OEM and Contractor in document format prior to Substantial Completion.

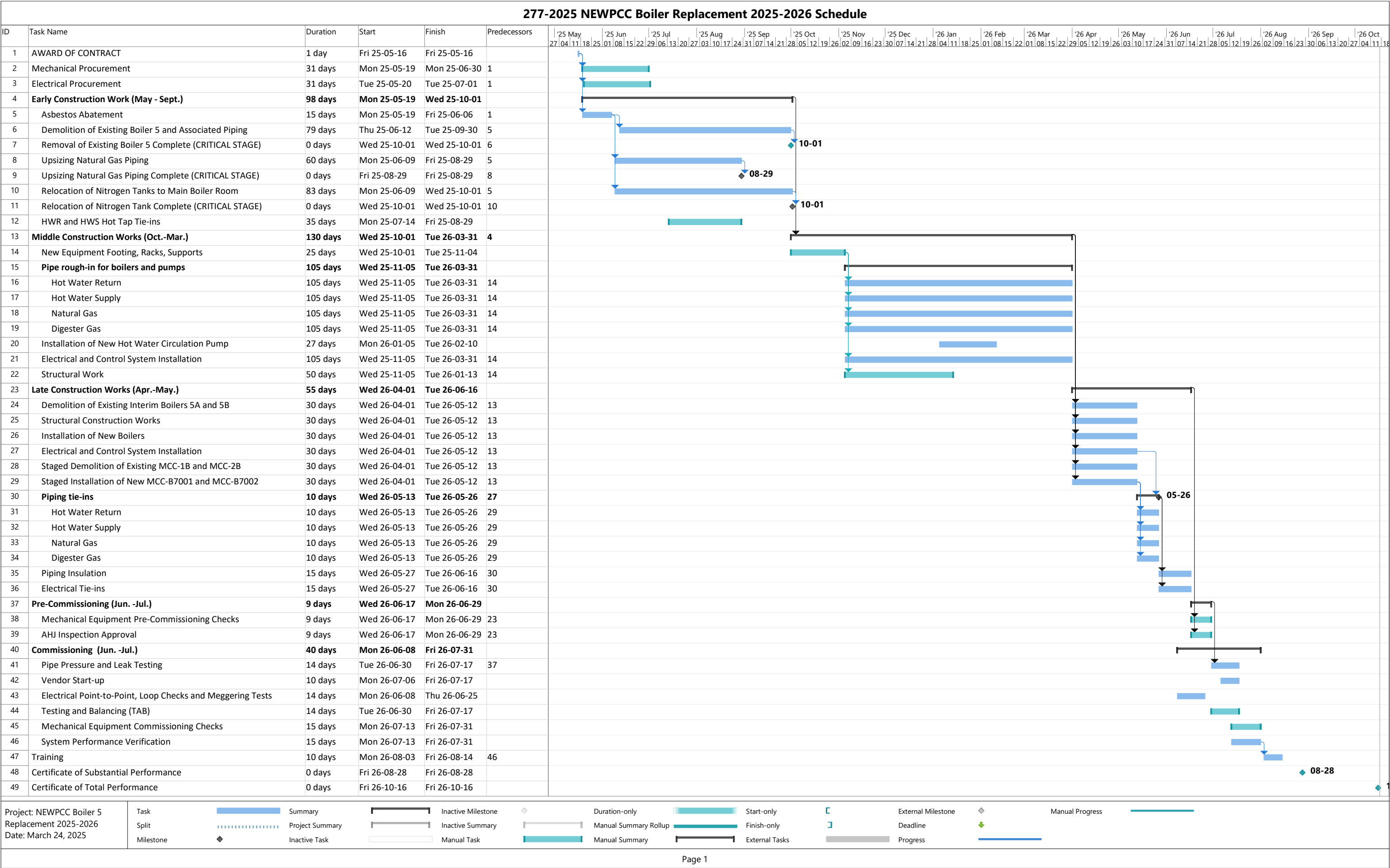
The O&M documentation will be provided in two sections, one containing information furnished by the Contract Administrator, and one containing information provided by the Contractor and will include the following:

- Consultant:
 - As-built drawings
 - Final Asset Registry
 - Final Construction Report; and
 - Commissioning Records
 - Safe Work Procedures (SWP)
 - Standard Operating Procedures (SOP)
 - Lock Out – Tag Out Procedures (LOTO)
- Contractor:
 - “As-Built” contract documents
 - Operating Manuals
 - Maintenance Manuals
 - Shop Drawings
 - Product Information (PI) sheets
 - Supplemental training materials like presentations, training videos and/or equipment models
 - Video recordings of all training sessions
 - Lubricants Schedule
 - Equipment Maintenance Schedule
 - Set Points for All Assets
 - Spare Parts List for All Assets
 - Equipment Warranty Information
 - Supplier Contact Information

The O&M document package will be provided in electronic and hard copy format.

APPENDIX A

Commissioning Schedule (Preliminary)



APPENDIX B

Pre-Commissioning and Commissioning Forms

1_Pre-Commissioning Forms



Form 100
CERTIFICATE OF EQUIPMENT DELIVERY

We certify that the equipment listed below has been delivered into the care and custody of the Installation Contractor. The equipment has been found to be in satisfactory condition. There is no visible evidence of exterior damage or defects.

Project:

Equipment Description:

Equipment Supply Bid Opp. No.:

Equipment Install Bid Opp. No.:

Equipment Tag No.:

Specification Reference:

(Authorized Representative of Supply Contractor)

Date

(Authorized Representative of Install Contractor)

Date

(Authorized Representative of Contract Administrator)

Date



Water and Waste Department • Service des eaux et des déchets

Form 101
CERTIFICATE OF READINESS TO INSTALL

We have familiarized the installing contractor of the specific requirements related to the equipment listed below and am satisfied that the installing contractor understands the required installation procedures.

Project:

Equipment Description:

Equipment Supply Bid Opp. No.:

Equipment Install Bid Opp. No.:

Equipment Tag No.:

Specification Reference:

(Authorized Representative of Supply Contractor)

Date

We certify that we have received satisfactory installation instructions from the equipment manufacturer/vendor.

(Authorized Representative of Install Contractor)

Date



Water and Waste Department • Service des eaux et des déchets

Form 102
CERTIFICATE OF SATISFACTORY INSTALLATION

We have completed our checks and inspection of the installation of our equipment as listed below and confirm that it is satisfactory and that any defects have been remedied except any as noted below.

Project:

Equipment Description:

Equipment Supply Bid Opp. No.:

Equipment Install Bid Opp. No.:

Equipment Tag No.:

Specification Reference:

Outstanding Defects:

(Authorized Representative of Supply Contractor)

Date

(Authorized Representative of Install Contractor)

Date

(Authorized Representative of Contractor Administrator)

Date



Water and Waste Department • Service des eaux et des déchets

Form 103

CERTIFICATE OF EQUIPMENT SATISFACTORY PERFORMANCE

We certify that the equipment listed below has been continuously operated for a minimum of three (3) consecutive days and that the equipment operates satisfactorily and meets it's specified operating criteria. No defects in the equipment were found and as such are classified as "conforming".

Project:

Equipment Description:

Equipment Supply Bid Opp. No.:

Equipment Install Bid Opp. No.:

Equipment Tag No.:

Specification Reference:

(Authorized representative of Supply Contractor)

Date

(Authorized representative of Install Contractor)

Date

(Authorized representative of Contract Administrator)

Date



Form 104

CERTIFICATE OF SATISFACTORY PROCESS PERFORMANCE

We certify that the process system listed below has been continuously operated and tested as per the Specifications using process fluid and that the equipment meets its Performance Testing and Operating Criteria. No defects in the process system were found and as such are classified as "conforming".

Project:

Equipment Description:

Equipment Supply Bid Opp. No.:

Equipment Install Bid Opp. No.:

Equipment Tag No.:

Specification Reference:

(Authorized Representative of Supply Contractor)

Date

(Authorized Representative of Install Contractor)

Date

(Authorized Representative of Contract Administrator
i.e. Commissioning Lead or Design Discipline Lead)

Date

(Authorized Representative of City)

Date



ELECTRICAL PRE-COMMISSIONING CHECKLIST



PROJECT	
Facility: NEWPCC	Project Name: NEWPCC Boiler Replacement 2025
Area: B	Bid Opportunity:277-2025

Instrument/Device Loop Verification Checks						
Device Tag	Control Panel Tag	Pass/Fail [P/F]	Tested By		Signature	Date (YYYY-MM-DD)
			Company	Name		
FIT-B00050	CP-B8001					
FIT-B00051	CP-B8001					
FIT-B00052	CP-B8001					
FIT-B00060	CP-B8001					
FIT-B00061	CP-B8001					
FIT-B00062	CP-B8001					
HSS-B000515	BLR-B0005 CONTROL PANEL					
PIT-B000516	BLR-B0005 CONTROL PANEL					
PIT-B000517	BLR-B0005 CONTROL PANEL					
AE-B000518	BLR-B0005 CONTROL PANEL					
FS-B000519	BLR-B0005 CONTROL PANEL					
HSS-B000615	BLR-B0006 CONTROL PANEL					
PIT-B000616	BLR-B0006 CONTROL PANEL					
PIT-B000617	BLR-B0006 CONTROL PANEL					
AE-B000618	BLR-B0006 CONTROL PANEL					
FS-B000619	BLR-B0006 CONTROL PANEL					
HSS-B000615	BLR-B0006 CONTROL PANEL					
HSS-B01100	VFD-B0110					
HSS-B01200	VFD- B0120					

HSS-B01300	VFD- B0130					
HV-B110A	BOILER 1 CONTROL PANEL					
HV-B110B	BOILER 1 CONTROL PANEL					
HV-B111A	BOILER 1 CONTROL PANEL					
HV-B111B	BOILER 1 CONTROL PANEL					
HV-B210A	BOILER 2 CONTROL PANEL					
HV-B210B	BOILER 2 CONTROL PANEL					
HV-B211A	BOILER 2 CONTROL PANEL					
HV-B211B	BOILER 2 CONTROL PANEL					
ESL-B70012	CP-B8001					
ESL-B70022	CP-B8001					
XS-B70011	CP-B8001					
XS-B70021	CP-B8001					

[illegible]

[illegible]

	PRE-COMMISSIONING FORM EQUIPMENT INSPECTION – Boiler		Page 1 of 2
			System Title:
Project	Facility: NEWPCC	Project Name: NEWPCC Boiler Replacement 2025-2026	
	Area: B	Bid Opportunity: 277-2025	

Testing:	Nameplate Information					
	Equipment Tag: BLR-B0005	PID: 23-0107-010_PB_M6-07	Location: Boiler 5 Room			
	Equipment Type: Boiler					
	Specifications:	Specified Product	Shop Drawings	Installed		
	Manufacturer					
	Model					
	Serial No.					
	Heating Capacity (BTUH):					
	Inlet Supply Pressure (psig)					
	Boiler Capacity Output (BHP)					
	Electrical (V/Ph/Hz):					
	Checklist				Complete	N/A
	No Physical Damage				☐	☐
	Equipment vendor pre-commissioning is completed. (Including boiler efficiency test)				☐	☐
	Electrical power and control wiring installed and tested.				☐	☐
	Control loop test for equipment control points and alarms.				☐	☐
	Bump test performed to confirm blower motor rotation is correct.				☐	☐
	TAB completed and submitted.				☐	☐
	Associated piping systems are installed, tested and leak checked.				☐	☐
	Natural gas piping installed and tested.				☐	☐
Digester gas piping installed and tested.				☐	☐	
Correct direction of flow.				☐	☐	
Boiler has adequate service space to maintain minimum clearances.				☐	☐	
Correct identification tag.				☐	☐	
Proper support/mounting.				☐	☐	
Flexible connections installed.				☐	☐	
Drain piping installed				☐	☐	
Chimney installed.				☐	☐	

		PRE-COMMISSIONING FORM EQUIPMENT INSPECTION – Boiler		Page 2 of 2
				System Title:
Project	Facility:	NEWPCC	Project Name:	NEWPCC Boiler Replacement 2025-2026
	Area:	B	Bid Opportunity:	277-2025

	Roof penetration sealed.		☐	☐
	Insulation installed.		☐	☐
	Other:		☐	☐
	Comments:			

	Company	Name	Signature	Date (yyyy/mm/dd)
Performed By				
Checked By				

	PRE-COMMISSIONING FORM EQUIPMENT INSPECTION – Boiler		Page 1 of 2
			System Title:
Project	Facility: NEWPCC	Project Name: NEWPCC Boiler Replacement 2025-2026	
	Area: B	Bid Opportunity: 277-2025	

Testing:	Nameplate Information					
	Equipment Tag: BLR-B0006	PID: 23-0107-010_PB_M6-08	Location: Boiler 5 Room			
	Equipment Type: Boiler					
	Specifications:	Specified Product	Shop Drawings	Installed		
	Manufacturer					
	Model					
	Serial No.					
	Heating Capacity (BTUH):					
	Inlet Supply Pressure (psig)					
	Boiler Capacity Output (BHP)					
	Electrical (V/Ph/Hz):					
	Checklist				Complete	N/A
	No Physical Damage				☐	☐
	Equipment vendor pre-commissioning is completed. (Including boiler efficiency test)				☐	☐
	Electrical power and control wiring installed and tested.				☐	☐
	Control loop test for equipment control points and alarms.				☐	☐
	Bump test performed to confirm Motor rotation is correct.				☐	☐
	TAB completed and submitted				☐	☐
	Associated piping systems are installed, tested and leak checked.				☐	☐
	Natural gas piping installed and tested.				☐	☐
Digester gas piping installed and tested.				☐	☐	
Correct direction of flow.				☐	☐	
Boiler has adequate service space to maintain minimum clearances.				☐	☐	
Correct identification tag.				☐	☐	
Proper support/mounting.				☐	☐	
Flexible connections installed.				☐	☐	
Drain piping installed				☐	☐	
Chimney installed.				☐	☐	

		PRE-COMMISSIONING FORM EQUIPMENT INSPECTION – Boiler		Page 2 of 2
				System Title:
Project	Facility:	NEWPCC	Project Name:	NEWPCC Boiler Replacement 2025-2026
	Area:	B	Bid Opportunity:	277-2025

	Roof penetration sealed.		☐	☐
	Insulation installed.		☐	☐
	Other:		☐	☐
	Comments:			

	Company	Name	Signature	Date (yyyy/mm/dd)
Performed By				
Checked By				

	PRE-COMMISSIONING FORM MOTOR CONTROL CENTRE		Page 1 of 2
			ID:
Project	Facility: NEWPCC	Project Name: NEWPCC Boiler Replacement 2025-2026	
	Area : B	Bid Opportunity: 277-2025	

MCC Data	MCC Equipment No.: MCC-		Location: Boiler Room		No. of Sections:
	Manufacturer:		Model:	Serial No:	
	Rated Voltage: V	Vertical Bus: A	Horizontal Bus: A	Withstand kAIC	
	☐ Copper Bus	☐ 3 Wire	☐ Bottom Entry ☐ Top Entry	Service Entrance Rated: ☐ Yes ☐ No	
	☐ Aluminum Bus	☐ 4 Wire	Control Voltage:	Neutral Bus ☐ Yes ☐ No	
	☐ Main Breaker Frame: A Trip: A	Settings: L: _____ I: _____ S: _____ G: _____	Trip Plug: ☐ LI ☐ LSI ☐ LSIG	Manufacturer: Model:	
	☐ Main Lugs	☐ Main Fuse Trip: A			
	☐ Alternative Circuit Feed Frame: A Trip: A	Settings: L: _____ I: _____ S: _____ G: _____	Trip Plug: ☐ LI ☐ LSI ☐ LSIG	Manufacturer: Model:	

Visual Inspection / Cleaning	Identification Tag Installed: ☐ Yes ☐ No		Visual Signs of Overheating: ☐ Yes ☐ No	
	Visual signs of Moisture: ☐ Yes ☐ No		Visual Signs of Corona: ☐ Yes ☐ No	
	Exercise local hand switches: ☐ Yes ☐ No		Cables Supported Appropriately: ☐ Yes ☐ No	
	Power Cables Labeled at Both Ends: ☐ Yes ☐ No		Control Cables Labeled at Both Ends: ☐ Yes ☐ No	
	All Pilot Device Lamacoids Installed ☐ Yes ☐ No		All Bucket Lamacoids Installed ☐ Yes ☐ No	
	Power Cable Connections: ☐ Good ☐ Acceptable ☐ Poor		Control Cable Connections: ☐ Good ☐ Acceptable ☐ Poor	
	All instruments work: ☐ Good ☐ Acceptable ☐ Poor		Ground Connection: ☐ Good ☐ Acceptable ☐ Poor	
	Door fasteners: ☐ Good ☐ Acceptable ☐ Poor		Elec/Mech Interlocks: ☐ Good ☐ Acceptable ☐ Poor	
	All doors closed securely: ☐ Good ☐ Acceptable ☐ Poor		Required clearances met: ☐ Good ☐ Acceptable ☐ Poor	
	Cleanliness (As Found): ☐ Good ☐ Acceptable ☐ Poor		Vents/Filter Conditions: ☐ Good ☐ Acceptable ☐ Poor	
	Enclosure secured to floor/wall as per manufacturer instructions: ☐ Yes ☐ No		Enclosure free of scratches/dents: ☐ Good ☐ Acceptable ☐ Poor	
	Horizontal busbar torqued: ☐ Yes ☐ No		Touchup paint applied to scratches/chips ☐ Yes ☐ No	
	Vertical busbar torqued: ☐ Yes ☐ No		Overload settings agree with load FLA ☐ Yes ☐ No	
	Set screws torqued: ☐ Yes ☐ No		Overcurrent settings match final arc flash study and drawings ☐ Yes ☐ No	
	Splice bars torqued: ☐ N/A ☐ Yes ☐ No		Exercise all circuit breakers, disconnects and operating mechanisms: ☐ Yes ☐ No	
	Adjust and test ground fault device ☐ N/A ☐ Yes ☐ No		Exercise all electrically operated circuit breakers, disconnects and operating mechanisms: ☐ N/A ☐ Yes ☐ No	

	PRE-COMMISSIONING FORM MOTOR CONTROL CENTRE	Page 2 of 2
		ID:

	Comments	
--	----------	--

Insulation Resistance Test	Test Preparation: Source: ☐ Disconnected ☐ Connected with Source Isolated Cable Destination/Load: ☐ Disconnected ☐ Connected with Source Isolated		<i>Note: Approval of City's Representative is required, prior to leaving cables connected during the test.</i>		
	Equipment Temperature:	°C	Temperature Correction Factor to 20°C:		
	Test	Voltage	Insulation Resistance (MΩ)		Ground all phases not under test. Refer to manufacturer instructions for additional MCC devices to be disconnected prior to using megohmmeter.
			Phase A	Phase B	
	MCC Vertical Bus Phase to Ground				Test Summary ☐ Test Passed ☐ Test Inconclusive Further Investigation Required. ☐ Test Failed
	MCC Vertical Bus Phase to Phase				
	MCC Horizontal Bus Phase to Ground				
	MCC Horizontal Bus Phase to Phase				
Comments:					

Final Analysis	Returned to Service: ☐ Yes ☐ No	Comments:
	Monitoring / Inspection Required: ☐ Yes ☐ No	
	Repair / Replacement Required: ☐ Yes ☐ No	

	Company	Name	Signature	Date (yyyy/mm/dd)
Performed By				
Checked By				

Note: The person performing the check is responsible for ensuring that the data is transcribed from the handwritten form correctly, and that the analysis results are correct.

		PRE-COMMISSIONING FORM MOTOR STARTER, VFD, BASIC		Page 1 of 1
				ID:
Project	Facility:	NEWPCC	Project Name:	NEWPCC Boiler Replacement 2025-2026
	Area:	B	Bid Opportunity:	277-2025

Starter Data	Load: P-		Starter Location: Main Boiler Room		Cell #:
	Manufacturer:		Type: VFD	Size: 15HP	Rated Voltage: 600 V
	MAC Address: (Network Drives Only)				
	Circuit Protection:	☐ Disconnect	Disc. Size: A		
		☐ Fused Disc.	Fuse Size: A		
		☐ Breaker	Fuse Type:		
	Overload Protection:	☐ MCP	Breaker/MCP Rating: A	Inst. Setting: A	Manufacturer:
☐ Thermal		Class:	☐ 10 ☐ 20 ☐ 30 ☐ Unknown	Setting / Rating: A	Model:
					☐ Electronic
				Model:	

Visual Inspection / Cleaning	Starter Identification Tag Installed: ☐ Yes ☐ No		Visual Signs of Overheating: ☐ Yes ☐ No	
	Cleanliness (As Found): ☐ Good ☐ Acceptable ☐ Poor		Electro/Mechanical Interlock: ☐ Good ☐ Acceptable ☐ Poor	
	Connections ☐ Good ☐ Acceptable ☐ Poor		Communication Cable: ☐ Good ☐ Acceptable ☐ Poor	
	Ground Connection: ☐ Good ☐ Acceptable ☐ Poor		Door Mechanical: ☐ Good ☐ Acceptable ☐ Poor	
	Cables Routed Appropriately: ☐ Yes ☐ No		Indicating Lights: ☐ Good ☐ Acceptable ☐ Poor	
	Line Filtering: ☐ Yes ☐ No		H-O-A Switch Condition: ☐ Good ☐ Acceptable ☐ Poor	
	Load Filtering: ☐ Yes ☐ No		Emergency Stop Button Condition: ☐ Good ☐ Acceptable ☐ Poor	
	Control Wiring Connected and Properly Separated from Power Wiring: ☐ Yes ☐ No		Speed Potentiometer Condition: ☐ Good ☐ Acceptable ☐ Poor	
	Exercise Circuit Breaker/MCP/Disconnect: ☐ Yes		Unit Cleaned: ☐ Yes	
	Comments:			

	Company	Name	Signature	Date (yyyy/mm/dd)
Performed By				
Checked By				

Note: The person performing the check is responsible for ensuring that the data is transcribed from the handwritten form correctly, and that the analysis results are correct.

		PRE-COMMISSIONING FORM MOTOR STARTER, FVNR, BASIC		Page 1 of 1
				ID:
Project	Facility:	NEWPCC	Project Name:	NEWPCC Boiler Replacement 2025-2026
	Area:	B	Bid Opportunity:	277-2025

Starter Data	Load:		Starter Location:		Cell #:	
	Manufacturer:		Type:	Size:	Rated Voltage: V	
	MAC Address: (Network Drives Only)					
	Circuit Protection:	☐ Disconnect	Disc. Size: A			
		☐ Fused Disc.	Fuse Size: A			
		☐ Breaker	Fuse Type:			
	Overload Protection:	☐ MCP	Breaker/MCP Rating: A	Inst. Setting: A	Manufacturer:	
☐ Thermal		Class:	Setting / Rating: A	Model:		
				Manufacturer:		
☐ Electronic	☐ 10 ☐ 20 ☐ 30 ☐ Unknown		Model:			

Visual Inspection / Cleaning	Starter Identification Tag Installed: ☐ Yes ☐ No		Visual Signs of Overheating: ☐ Yes ☐ No	
	Cleanliness (As Found): ☐ Good ☐ Acceptable ☐ Poor		Electro/Mechanical Interlock: ☐ Good ☐ Acceptable ☐ Poor	
	Connections ☐ Good ☐ Acceptable ☐ Poor		Contactor Condition: ☐ Good ☐ Acceptable ☐ Poor	
	Ground Connection: ☐ Good ☐ Acceptable ☐ Poor		Overload Condition: ☐ Good ☐ Acceptable ☐ Poor	
	Cables Routed Appropriately: ☐ Yes ☐ No		Door Mechanical ☐ Good ☐ Acceptable ☐ Poor	
	Exercise Circuit Breaker/MCP/Disconnect ☐ Yes		Unit Cleaned: ☐ Yes	
	Comments:			

	Company	Name	Signature	Date (yyyy/mm/dd)
Performed By				
Checked By				

Note: The person performing the check is responsible for ensuring that the data is transcribed from the handwritten form correctly, and that the analysis results are correct.

	PRE-COMMISSIONING POINT TO POINT CHECKS AUTOMATION CONTROL CABLES		Page 1 of 1
			ID:
Project	Facility: NEWPCC	Project Name: NEWPCC Boiler Replacement 2025-2026	
	Area: B	Bid Opportunity: 277-2025	

Cable/Conduit Data	Source:		Dest.:	
	Installation: ☐ Cable ☐ Cable Tray ☐ Strapped ☐ Direct Buried ☐ Conduit ☐ EMT ☐ Rigid Steel ☐ Alum. ☐ PVC ☐ Other:			
	No. of Pairs:	Size: AWG	Type:	Rated Voltage: V

Visual Inspection	Cable Identification Tag Installed: ☐ Yes ☐ No ☐ N/A		Enclosure Entry Acceptable: ☐ Yes ☐ No
	Wire tags installed: ☐ Yes ☐ No		Conduit / Cable Supported Appropriately: ☐ Yes ☐ No
	Comments:		

Continuity Point to Point Check	Pair	ID/Device	Cond. 1 to Cond. 2 Continuity Check (Pass/Fail)	Pair	ID/Device	Cond. 1 to Cond. 2 Continuity Check (Pass/Fail)
	1			13		
	2			14		
	3			15		
	4			16		
	5			17		
	6			18		
	7			19		
	8			20		
	9			21		
	10			22		
	11			23		
	12			24		
	Comments:					
	Test Summary: ☐ Test Passed ☐ Test Failed					

	Company	Name	Signature	Date (yyyy/mm/dd)
Performed By				
Checked By				

	PRE-COMMISSIONING FORM EQUIPMENT INSPECTION – Pump		Page 1 of 2
			System Title:
Project	Facility: NEWPCC	Project Name: NEWPCC Boiler Replacement 2025-2026	
	Area: B	Bid Opportunity: 277-2025	

Testing:	Nameplate Information				
	Equipment Tag:	PID:	Location:		
	Equipment Type:				
	Service (Domestic Water or Hydronic): Domestic Water				
	Specifications:	Specified Product	Shop Drawings	Installed	
	Manufacturer				
	Model				
	Serial No.				
	Motor HP:				
	Electrical (V/Ph/Hz):				
	Checklist			Complete	N/A
	No Physical Damage			☐	☐
	Equipment vendor pre-commissioning is completed.			☐	☐
	Electrical power and control wiring installed and tested.			☐	☐
	Associated piping connections are completed.			☐	☐
	Correct direction of flow.			☐	☐
	Pump is in acceptable orientation.			☐	☐
	Motor & pump aligned.			☐	☐
	Pump has adequate service space.			☐	☐
	Temperature and pressure gauges installed.			☐	☐
	Valves & Strainers installed.			☐	☐
	Bearings lubricated.			☐	☐
	Correct identification tag.			☐	☐
	Proper support/mounting.			☐	☐
	Bump test performed to confirm Impeller & Motor rotation is correct.			☐	☐
Other:			☐	☐	

		PRE-COMMISSIONING FORM EQUIPMENT INSPECTION – Pump		Page 2 of 2
				System Title:
Project	Facility:	NEWPCC	Project Name:	NEWPCC Boiler Replacement 2025-2026
	Area:	B	Bid Opportunity:	277-2025

	Comments:	
--	-----------	--

	Company	Name	Signature	Date (yyyy/mm/dd)
Performed By				
Checked By				

2_Commissioning Forms

	COMMISSIONING FORM MOTOR CONTROL CENTRE		Page 1 of 5
			ID:
Project	Facility: NEWPCC	Project Name: NEWPCC Boiler Replacement 2025-2026	
	Area : B	Bid Opportunity: 277-2025	

Project Contact	General Contractor:	Project Manager:
	Consultant:	Contract Administrator:
	City of Winnipeg:	Consulting Project Manager:

Panelboard Data	MCC Equipment No.:		Location:		No. of Sections:
	Manufacturer:		Model:	Serial No:	
	Rated Voltage: V	Vertical Bus: A	Horizontal Bus: A	Withstand kAIC	
	☐ Copper Bus	☐ 3 Wire	☐ Bottom Entry ☐ Top Entry	Service Entrance Rated: ☐ Yes ☐ No	
	☐ Aluminum Bus	☐ 4 Wire	Control Voltage:	Neutral Bus ☐ Yes ☐ No	
	☐ Main Breaker Frame: A Trip: A	Settings: L: _____ I: _____ S: _____ G: _____	Trip Plug: ☐ LI ☐ LSI ☐ LSIG	Manufacturer: Model:	
	☐ Main Lugs	☐ Main Fuse Trip: A			
	☐ Alternative Circuit Feed Frame: A Trip: A	Settings: L: _____ I: _____ S: _____ G: _____	Trip Plug: ☐ LI ☐ LSI ☐ LSIG	Manufacturer: Model:	
	Refer to following sections for main breaker if >= 250A, or has long, short, or ground fault settings.				

Accessories	Power Meter Installed: ☐ Yes ☐ No		Manufacturer: Model:	
	Phases: ☐ 1ph ☐ 3ph	CT Ratio:	Metering Voltage	Power Supply Voltage
	Transient Voltage Suppressor Installed: ☐ Yes ☐ No		Manufacturer: Model: Instrument No.:	
	Phases: ☐ 1ph ☐ 3ph	Rating: kA	MCOV:	
	Power Failure Relay Installed: ☐ Yes ☐ No		Manufacturer: Model: Instrument No.:	
	Phases: ☐ 1ph ☐ 3ph		Volts:	
	Comments:			

	COMMISSIONING FORM MOTOR CONTROL CENTRE	Page 2 of 5
		ID:

Visual Inspection / Cleaning	Identification Tag Installed: ☐ Yes ☐ No	Visual Signs of Overheating: ☐ Yes ☐ No
	Visual signs of Moisture: ☐ Yes ☐ No	Visual Signs of Corona: ☐ Yes ☐ No
	Fuse/Breaker Sizes Match Drawings: ☐ Yes ☐ No	Cables Supported Appropriately: ☐ Yes ☐ No
	Power Cables Labeled at Both Ends: ☐ Yes ☐ No	Control Cables Labeled at Both Ends: ☐ Yes ☐ No
	All Pilot Device Lamacoids Installed ☐ Yes ☐ No	All Bucket Lamacoids Installed ☐ Yes ☐ No
	Power Cable Connections: ☐ Good ☐ Acceptable ☐ Poor	Control Cable Connections: ☐ Good ☐ Acceptable ☐ Poor
	All instruments work: ☐ Good ☐ Acceptable ☐ Poor	Ground Connection: ☐ Good ☐ Acceptable ☐ Poor
	Door Mechanical: ☐ Good ☐ Acceptable ☐ Poor	Elec/Mech Interlocks: ☐ Good ☐ Acceptable ☐ Poor
	All buckets close securely: ☐ Good ☐ Acceptable ☐ Poor	Required clearances met: ☐ Good ☐ Acceptable ☐ Poor
	Cleanliness (As Found): ☐ Good ☐ Acceptable ☐ Poor	Vents/Filter Conditions: ☐ Good ☐ Acceptable ☐ Poor
	Exercise All Circuit Breakers and Disconnects: ☐ Yes ☐ No	Comments:

Contact / Pole Measurements	Test Preparation:	Source: ☐ Disconnected ☐ Connected with Source Isolated	Note: Approval of City's Representative is required, prior to leaving cables connected during the test.			Equipment Temperature: °C
						Temperature Correction Factor to 20°C:
	Test		Resistance Line to Load (uΩ)			Test Summary ☐ Test Passed ☐ Test Inconclusive Further Investigation Required. ☐ Test Failed
			Phase A	Phase B	Phase C	
	Main Breaker	☐ N/A				
	Alternate Source Breaker	☐ N/A				
	Downstream MCC Feeder Breaker	☐ N/A				
	Breaker	☐ N/A				
Breaker	☐ N/A					
Comments:						

Insulation Resistance Test	Test Preparation:	Source: ☐ Disconnected ☐ Connected with Source Isolated	Cable Destination/Load: ☐ Disconnected ☐ Connected with Source Isolated			Note: Approval of City's Representative is required, prior to leaving cables connected during the test.	
	Equipment Temperature:	°C		Temperature Correction Factor to 20°C:			
	Test		Voltage	Insulation Resistance (MΩ)			Ground all phases not under test
				Phase A	Phase B	Phase C	Test Summary ☐ Test Passed ☐ Test Inconclusive
	MCC Vertical Bus Phase to Ground						
MCC Vertical Bus Phase to Phase							

	COMMISSIONING FORM MOTOR CONTROL CENTRE					Page 3 of 5
						ID: _____

	MCC Horizontal Bus Phase to Ground					Further Investigation Required. ☐ Test Failed
	MCC Horizontal Bus Phase to Phase					
	Comments:					

Load/Feeder Breakers	Breakers Without Inst. Setting							
	<i>List by model of breaker. Multiple breakers of varying ampacity may be listed per line.</i>							
	Load Tag	Cell Location	Frame Size (A)	Trip Size (A)	Manufacturer	Model Series	Visual Inspection	Comments
Visual Inspection: G=Good, A=Acceptable, P=Poor. Provide comments for breakers listed as poor. 1. Record all feeder bucket fuses and circuit breakers tying into MCC bus. 2. Confirm lamacoid is installed. 3. Look for visual indications of overheating 4. Inspect and torque connections. 5. Confirm disconnect operation and exercise operation including with circuit breaker. 6. Confirm cables are routed and supported appropriately.								

Incoming Breakers	Breakers Without Inst. Setting							
	<i>List by model of breaker. Multiple breakers of varying ampacity may be listed per line.</i>							
	Main Breaker	Long Time Settings	Short Time Settings	Inst. Time Settings	Ground Settings			
	☐ N/A	Pickup: Delay:	Pickup: Delay:	Pickup: Delay:	Pickup: Delay:			
	Alt. Source Breaker	Long Time Settings	Short Time Settings	Inst. Time Settings	Ground Settings			
☐ N/A	Pickup: Delay:	Pickup: Delay:	Pickup: Delay:	Pickup: Delay:				

Load/Feeder Breakers	Breakers Without Inst. Setting							
	<i>List by model of breaker. Multiple breakers of varying ampacity may be listed per line.</i>							
	Feeder	Long Time Settings	Short Time Settings	Inst. Time Settings				
		Pickup: Delay:	Pickup: Delay:	Pickup: Delay:				
	Feeder	Long Time Settings	Short Time Settings	Inst. Time Settings				
	Pickup: Delay:	Pickup: Delay:	Pickup: Delay:					
Feeder	Long Time Settings	Short Time Settings	Inst. Time Settings					
	Pickup: Delay:	Pickup: Delay:	Pickup: Delay:					
Feeder	Long Time Settings	Short Time Settings	Inst. Time Settings					
	Pickup: Delay:	Pickup: Delay:	Pickup: Delay:					

		COMMISSIONING FORM MOTOR CONTROL CENTRE						Page 4 of 5	
								ID:	

	Feeder	Long Time Settings ☐ N/A		Short Time Settings ☐ N/A		Inst. Time Settings ☐ N/A	
		Pickup:	Delay:	Pickup:	Delay:	Pickup:	Delay:
	Relay	Power Failure ☐ N/A	Percent Unbalance: ☐ N/A %		Delay Time Setting ☐ N/A Restart: s Trip: s		Line Voltage Setting Volts: VAC

MCC Instrumentation Testing			TVSS			Power Failure		
	Display Light Illuminates		TVSS Status				Power Failure Status	☐ Yes ☐ No ☐ N/A
	Signal Receive at PLC Card		☐ N/A	☐ Yes	☐ No	☐ N/A	☐ N/A	☐ Yes ☐ No ☐ N/A
	Signal Appears on HMI			☐ Yes	☐ No	☐ N/A		☐ Yes ☐ No ☐ N/A
	SCADA Can See Signal			☐ Yes	☐ No	☐ N/A		☐ Yes ☐ No ☐ N/A
	Relay Fully Functional			☐ Yes	☐ No	☐ N/A		☐ Yes ☐ No ☐ N/A
	Fail-Safe Monitoring			☐ Yes	☐ No	☐ N/A		☐ Yes ☐ No ☐ N/A
	Resets Automatically			☐ Yes	☐ No	☐ N/A		☐ Yes ☐ No ☐ N/A
	Test Meter:	Manufacturer:		Model:		Calibration Date:		
	Comments							
	Power Meter Fully Functional		☐ Yes	☐ No	☐ N/A			
		Phase	Desired Value (V)	Displayed Value (V)	Measured Value (V)	Difference (V)	Acceptable?	
	Power Meter Voltage Line to Ground	A					☐ Yes	☐ No
		B					☐ Yes	☐ No
		C					☐ Yes	☐ No
	Power Meter Current Line to Ground	A					☐ Yes	☐ No
		B					☐ Yes	☐ No
		C					☐ Yes	☐ No
	Desired TVSS Relay Line Voltage			Test Meter Measured Phase Line Voltage			State	State Description
	A-B	B-C	C-A	A-B (V)	B-C (V)	C-A (V)	(0 or 1)	(Normal or Alarm)
600V	600V	600V						
Test Surge	600V	600V						
600V	Test Surge	600V						
600V	600V	Test Surge						
Desired Power Fail Relay Line Voltage			Test Meter Measured Phase Line Voltage			State	State Description	
A-B	B-C	C-A	A-B (V)	B-C (V)	C-A (V)	(0 or 1)	(Normal or Alarm)	
600V	600V	600V						

	COMMISSIONING FORM MOTOR CONTROL CENTRE	Page 5 of 5
		ID:

	0V	600V	600V					
	600V	0V	600V					
	600V	600V	0V					

Final Analysis	Returned to Service: ☐ Yes ☐ No	Comments:
	Monitoring / Inspection Required: ☐ Yes ☐ No	
	Repair / Replacement Required: ☐ Yes ☐ No	

	Company	Name	Signature	Date (yyyy/mm/dd)
Performed By				
Checked By				

Note: The person performing the check is responsible for ensuring that the data is transcribed from the handwritten form correctly, and that the analysis results are correct.

	COMMISSIONING FORM VARIABLE FREQUENCY DRIVE		Page 1 of 4
			ID:
Project	Facility: NEWPPC	Project Name: NEWPCC Boiler Replacement 2025-2026	
	Area : B	Bid Opportunity: 277-2025	

Project Contact	General Contractor:	Project Manager:
	Consultant:	Contract Administrator:
	City of Winnipeg:	Consulting Project Manager:

Contact/Pole Measurements	Test		Resistance (uΩ)			Test Summary ☐ Test Passed ☐ Test Inconclusive Further Investigation Required. ☐ Test Failed
			Phase A	Phase B	Phase C	
	Harmonic Filter Contact	☐ N/A				
	Bypass Contactor Contact	☐ N/A				
	Breaker/Disconnect	☐ N/A				
Comments:						

Insulation Resistance Test	Test Preparation: Setup: ☐ Source isolated ☐ Contactor open		Cable Destination/Load: ☐ Disconnected ☐ Connected with Load Isolated		<i>Note: Approval of City's Representative is required, prior to leaving cables connected during the test.</i>	
	WARNING: DISCONNECT ALL POWER CABLES FROM VFD MODULE AND CAPACITORS. DISCONNECT ALL CONTROL POWER FUSES PRIOR TO TEST.					
	Test	Voltage	Insulation Resistance (MΩ)			Ground all phases not under test Test Summary ☐ Test Passed ☐ Test Inconclusive Further Investigation Required. ☐ Test Failed
			Phase A	Phase B	Phase C	
	VFD Line to Ground	1000 VDC				
	VFD Load to Ground	1000 VDC				
	VFD Line to Load	1000 VDC				
	Harmonic Filter Contactor Line to Ground	1000 VDC				
	Harmonic Filter Contactor Load to Ground	1000 VDC				
	Harmonic Filter Line to Ground	1000 VDC				
Bypass Contactor Line to Ground	1000 VDC					
Bypass Contactor Load to Ground	1000 VDC					
Bypass Contactor Line to Load	1000 VDC					
Comments:						

	COMMISSIONING FORM VARIABLE FREQUENCY DRIVE	Page 2 of 3
		ID:

Full Load Operational Testing	Ramp	Specified	Actual	Current	Specified	Actual		
	Ramp Up Time:		Ramp Down Time:					
	Motor Measured Current Phase A:		Phase B:		Phase C:			
	VFD Displayed Current Phase A:		Phase B:		Phase C:			
	Ammeter Current in Bypass Mode ☐ N/A ☐ Yes ☐ No			PLC HMI Displayed Motor Current:				
	Potentiometer Adjust Speed in Manual Mode ☐ Yes ☐ No			Potentiometer Adjust Speed in Local Auto Mode ☐ Yes ☐ No				
	Description		Forward Run, Start, Stop		Reverse Run, Start, Stop			
	VFD Manual Mode		☐ N/A	☐ Yes	☐ No	☐ N/A	☐ Yes	☐ No
	VFD Automatic Mode – PLC Control							
	VFD Automatic Mode – Local Control							
	Bypass Manual Mode							
	Bypass Automatic Mode – Local Control							
	Comments							

VFD Settings	Program VFD Settings to Match Setting Letter		VFD Setting Letter File Name:
	Settings Applied to VFD ☐ Yes ☐ No		
	Comments		

	COMMISSIONING FORM VARIABLE FREQUENCY DRIVE	Page 3 of 3
		ID:

VFD Settings	Verify Control Signals Between VFD and PLC			Comments:	
	Test Preparation: Test physical signals. Jumpers for signals not permitted.				
	Field wiring labelled at both ends? ☐ Yes ☐ No				
	Settings Applied to VFD ☐ Yes ☐ No				
	Discrete Signals	Pilot Light Illuminated	Signal Received at PLC Card	Signal Appears on HMI	SCADA Can See Signal
	Ready	☐ N/A ☐ Yes ☐ No	☐ N/A ☐ Yes ☐ No	☐ N/A ☐ Yes ☐ No	☐ N/A ☐ Yes ☐ No
	VFD Mode	☐ N/A ☐ Yes ☐ No	☐ N/A ☐ Yes ☐ No	☐ N/A ☐ Yes ☐ No	☐ N/A ☐ Yes ☐ No
	Bypass Mode	☐ N/A ☐ Yes ☐ No	☐ N/A ☐ Yes ☐ No	☐ N/A ☐ Yes ☐ No	☐ N/A ☐ Yes ☐ No
	Manual Mode	☐ N/A ☐ Yes ☐ No	☐ N/A ☐ Yes ☐ No	☐ N/A ☐ Yes ☐ No	☐ N/A ☐ Yes ☐ No
	Auto Mode	☐ N/A ☐ Yes ☐ No	☐ N/A ☐ Yes ☐ No	☐ N/A ☐ Yes ☐ No	☐ N/A ☐ Yes ☐ No
	Forward Run	☐ N/A ☐ Yes ☐ No	☐ N/A ☐ Yes ☐ No	☐ N/A ☐ Yes ☐ No	☐ N/A ☐ Yes ☐ No
	Reverse Run	☐ N/A ☐ Yes ☐ No	☐ N/A ☐ Yes ☐ No	☐ N/A ☐ Yes ☐ No	☐ N/A ☐ Yes ☐ No
	VFD Fault	☐ N/A ☐ Yes ☐ No	☐ N/A ☐ Yes ☐ No	☐ N/A ☐ Yes ☐ No	☐ N/A ☐ Yes ☐ No
	Bypass Fault	☐ N/A ☐ Yes ☐ No	☐ N/A ☐ Yes ☐ No	☐ N/A ☐ Yes ☐ No	☐ N/A ☐ Yes ☐ No
	Vibration Lockout	☐ N/A ☐ Yes ☐ No	☐ N/A ☐ Yes ☐ No	☐ N/A ☐ Yes ☐ No	☐ N/A ☐ Yes ☐ No
	Analog Signals	Measured Signal	Signal Received at VFD/PLC Card	Signal Appears on HMI	SCADA Can See Signal
	Speed Input	mA	☐ N/A ☐ Yes ☐ No	☐ N/A ☐ Yes ☐ No	☐ N/A ☐ Yes ☐ No
	Speed Reference	mA	☐ N/A ☐ Yes ☐ No	☐ N/A ☐ Yes ☐ No	☐ N/A ☐ Yes ☐ No
Motor Current	mA	☐ N/A ☐ Yes ☐ No	☐ N/A ☐ Yes ☐ No	☐ N/A ☐ Yes ☐ No	

Final Analysis	Returned to Service: ☐ Yes ☐ No	Comments:
	Monitoring / Inspection Required: ☐ Yes ☐ No	
	Repair / Replacement Required: ☐ Yes ☐ No	

	Company	Name	Signature	Date (yyyy/mm/dd)
Performed By				
Checked By				

Note: The person performing the check is responsible for ensuring that the data is transcribed from the handwritten form correctly, and that the analysis results are correct.

		COMMISSIONING FORM SYSTEM FUNCTIONAL TEST		Page 2 of 2
				System Title:
Project	Facility: NEWPCC	Project Name: NEWPCC Boiler Replacement 2025-2026		
	Area: B	Bid Opportunity: 277-2025		

		- Boiler shutdown on low flow switch activation - Boiler shutdown on low water cutoff switch - PCS receives and HMI displays a general fault alarm when the boiler encounters a fault. When the fault is fixed, an operator is able to acknowledge the alarm on the HMI and clear the fault. - A low flow alarm is generated on the HMI if the boiler's dedicated flowmeter detects low flow. - If the flow switch on the outlet of the boiler detects low flow, the boiler initiates shutdown and is disabled. An alarm is generated on the HMI. - Boiler fuel change over from natural gas to digester gas. - Boiler fuel change over from digester gas to natural gas.	☐ Yes ☐ Yes ☐ Yes	☐ No ☐ No ☐ No
	Comments:			

	Company	Name	Signature	Date (yyyy/mm/dd)
Performed By				
Checked By				

		COMMISSIONING FORM SYSTEM FUNCTIONAL TEST		Page 2 of 2
				System Title:
Project	Facility: NEWPCC	Project Name: NEWPCC Boiler Replacement 2025-2026		
	Area: B	Bid Opportunity: 277-2025		

		- Boiler shutdown on low water cutoff switch - PCS receives and HMI displays a general fault alarm when the boiler encounters a fault. When the fault is fixed, an operator is able to acknowledge the alarm on the HMI and clear the fault. - A low flow alarm is generated on the HMI if the boiler's dedicated flowmeter detects low flow. - If the flow switch on the outlet of the boiler detects low flow, the boiler initiates shutdown and is disabled. An alarm is generated on the HMI - Boiler fuel change over from natural gas to digester gas. - Boiler fuel change over from digester gas to natural gas.	☐ Yes ☐ Yes	☐ No ☐ No
	Comments:			

	Company	Name	Signature	Date (yyyy/mm/dd)
Performed By				
Checked By				

		COMMISSIONING FORM SYSTEM FUNCTIONAL TEST		Page 1 of 2
				System Title:
Project	Facility:	NEWPCC	Project Name:	NEWPCC Boiler Replacement 2025-2026
	Area:	B	Bid Opportunity:	277-2025

Functional Testing	System Title:			
	Commissioning Process Overview	1. This functional test will verify the circulation pump with domestic water transferred from the hot water mixing tank to boiler BLR-B0005.		

Functional Testing	Functional Testing – Boiler – Normal Operation						
	Equipment Tag(s): Pump: P-B0110						
	Action	- Operate and ensure the manual valve is in the “Open” position to allow domestic water flow from the hot water mixing tank to the pump. - Enable boiler circulation pump on HMI and manually to start. - Adjust flow rate through HMI for a minimum 6 points for a minimum duration of 5 minutes each. - Flow rate to be at 0%, 20%, 40%, 60%, 80% and 100% the maximum recommended flow rate as directed by the Contract Administration. - Record associated flow rate set point, pump speeds, measured flow rate through flow meters, pressure gauge readings and pump motor amperage.					
	Expected Result	- Pressure gauge on pump discharge measures discharge pressure. - Associated circulation pump flow meter register flow rate.					
	Field Checks	- Verify no leaks in piping system. - Record associated flow rate set point, pump speeds, measured flow rate through flow meters and pressure gauges. - Record set points for high speed flow rate and low speed flow rate.					
	Actual Result	- Piping leaks observed. - Pump starts via local hand switch. - Pump starts when called for by PCS. - Pump flow received by PCS and displayed on HMI. - Pump ramps down to low flow rate when its dedicated boiler is disabled. - Pump ramps up to high flow rate when its dedicated boiler is enabled. - If a pump is off and its dedicated boiler is enabled, the pump shall ramp to the high flow rate. - Pump is turned off via HMI. - Pump is turned off via local control panel. - Pump run status displayed on HMI. - High flow rate set point: _____ - Low flow rate set point: _____ - Pressure gauge, flow meter and pump motor amperage reading for each scenario.				☐ Yes	☐ No
						☐ Yes	☐ No
						☐ Yes	☐ No
						☐ Yes	☐ No
						☐ Yes	☐ No
☐ Yes						☐ No	
☐ Yes						☐ No	
☐ Yes						☐ No	
	%	Speed (rpm)	Pressure (kPa)	Flow Rate (L/sec)	Pump Motor (A)		
	0						
	20						
	40						
	60						
	80						
	100						

		COMMISSIONING FORM SYSTEM FUNCTIONAL TEST		Page 2 of 2
				System Title:
Project	Facility:	NEWPCC	Project Name:	NEWPCC Boiler Replacement 2025-2026
	Area:	B	Bid Opportunity:	277-2025

	Comments:	
--	------------------	--

	Company	Name	Signature	Date (yyyy/mm/dd)
Performed By				
Checked By				

		COMMISSIONING FORM SYSTEM FUNCTIONAL TEST		Page 1 of 2
				System Title:
Project	Facility: NEWPCC	Project Name: NEWPCC Boiler Replacement 2025-2026		
	Area: B	Bid Opportunity: 277-2025		

Functional Testing	System Title:			
	Commissioning Process Overview	1. This functional test will verify the circulation pump with domestic water transferred from the hot water mixing tank to boiler BLR-B0006.		

Functional Testing	Functional Testing – Boiler – Normal Operation																																								
	Equipment Tag (s): Pump: P-B0120																																								
	Action	- Operate and ensure the manual valve is in the “Open” position to allow domestic water flow from the hot water mixing tank to the pump. - Enable boiler circulation pump on HMI and manually to start. - Adjust flow rate through HMI for a minimum 6 points for a minimum duration of 5 minutes each. - Flow rate to be at 0%, 20%, 40%, 60%, 80% and 100% the maximum recommended flow rate as directed by the Contract Administration. - Record associated flow rate set point, pump speeds, measured flow rate through flow meters, pressure gauges and pump motor amperage readings.																																							
	Expected Result	- Pressure gauge on pump discharge measures discharge pressure. - Associated circulation pump flow meter register flow rate.																																							
	Field Checks	- Verify no leaks in piping system. - Record associated flow rate set point, pump speeds, measured flow rate through flow meters and pressure gauges. - Record set points for high speed flow rate and low speed flow rate.																																							
	Actual Result	- Piping leaks observed. - Pump starts via local hand switch. - Pump starts when called for by PCS. - Pump flow received by PCS and displayed on HMI. - Pump ramps down to low flow rate when its dedicated boiler is disabled. - Pump ramps up to high flow rate when its dedicated boiler is enabled. - If a pump is off and its dedicated boiler is enabled, the pump shall ramp to the high flow rate. - Pump is turned off via HMI. - Pump is turned off via local control panel. - Pump run status displayed on HMI. - High flow rate set point: _____ - Low flow rate set point: _____ - Pressure gauge, flow meter and pump motor amperage reading for each scenario.				☐ Yes	☐ No																																		
						☐ Yes	☐ No																																		
						☐ Yes	☐ No																																		
						☐ Yes	☐ No																																		
						☐ Yes	☐ No																																		
☐ Yes						☐ No																																			
☐ Yes						☐ No																																			
<table border="1"> <thead> <tr> <th>%</th> <th>Speed (rpm)</th> <th>Pressure (kPa)</th> <th>Flow Rate (L/sec)</th> <th>Pump Motor (A)</th> </tr> </thead> <tbody> <tr><td>0</td><td></td><td></td><td></td><td></td></tr> <tr><td>20</td><td></td><td></td><td></td><td></td></tr> <tr><td>40</td><td></td><td></td><td></td><td></td></tr> <tr><td>60</td><td></td><td></td><td></td><td></td></tr> <tr><td>80</td><td></td><td></td><td></td><td></td></tr> <tr><td>100</td><td></td><td></td><td></td><td></td></tr> </tbody> </table>					%	Speed (rpm)	Pressure (kPa)	Flow Rate (L/sec)	Pump Motor (A)	0					20					40					60					80					100						
%	Speed (rpm)	Pressure (kPa)	Flow Rate (L/sec)	Pump Motor (A)																																					
0																																									
20																																									
40																																									
60																																									
80																																									
100																																									

		COMMISSIONING FORM SYSTEM FUNCTIONAL TEST		Page 2 of 2
				System Title:
Project	Facility:	NEWPCC	Project Name: NEWPCC Boiler Replacement 2025-2026	
	Area:	B	Bid Opportunity: 277-2025	

	Comments:	
--	------------------	--

	Company	Name	Signature	Date (yyyy/mm/dd)
Performed By				
Checked By				

		COMMISSIONING FORM SYSTEM FUNCTIONAL TEST		Page 2 of 2
				System Title:
Project	Facility:	NEWPCC	Project Name: NEWPCC Boiler Replacement 2025-2026	
	Area:	B	Bid Opportunity: 277-2025	

	Comments:	
--	------------------	--

	Company	Name	Signature	Date (yyyy/mm/dd)
Performed By				
Checked By				

		COMMISSIONING FORM SYSTEM FUNCTIONAL TEST		Page 1 of 1
				System Title:
Project	Facility:	NEWPCC	Project Name:	NEWPCC Boiler Replacement 2025-2026
	Area:	B	Bid Opportunity:	277-2025

Functional Testing	System Title:			
	Commissioning Process Overview	1. This functional test will verify the circulation pump with domestic water transferred from the hot water mixing tank to boiler BLR-B0007.		

Functional Testing	Functional Testing – Boiler – Normal Operation			
	Equipment Tag (s): Pump: P-B0140			
	Action	- Operate and ensure the manual valve is in the "Open" position to allow domestic water flow from the hot water mixing tank to the pump. - Enable boiler circulation pump on HMI to start. - Record associated flow rate set point, pump speeds, measured flow rate through flow meters, pressure gauge and pump motor amperage readings.		
	Expected Result	Pressure gauge on pump discharge measures discharge pressure.		
	Field Checks	- Verify no leaks in piping system - Record associated flow rate set point, pump speed, measured flow rate through flow meters and pressure gauges.		
	Actual Result	- Piping leaks observed. - Flow rate reading: - Pump speed reading: - Pressure gauge reading on pump discharge: - Pump motor amperage reading:	☐ Yes	☐ No
	Comments:			

	Company	Name	Signature	Date (yyyy/mm/dd)
Performed By				
Checked By				

		COMMISSIONING FORM SYSTEM FUNCTIONAL TEST		Page 1 of 1
				System Title:
Project	Facility:	NEWPCC	Project Name:	NEWPCC Boiler Replacement 2025-2026
	Area:	B	Bid Opportunity:	277-2025

Functional Testing	System Title:		
	Commissioning Process Overview	1. This functional test will verify the recirculation pump with domestic water transferred from the hot water mixing tank to boiler BLR-B0007.	

Functional Testing	Functional Testing – Boiler – Normal Operation			
	Equipment Tag (s): Pump: P-B0150			
	Action	- Operate and ensure the manual valve is in the "Open" position to allow domestic water flow from the hot water mixing tank to the pump skid. - Enable boiler circulation pump on HMI to start. - Adjust flow rate to 2 L/s through HMI for a minimum duration of 5 minutes. - Record associated flow rate set point, pump speeds, measured flow rate through flow meters, pressure gauge and pump motor amperage readings.		
	Expected Result	- Pressure gauge on pump discharge measures discharge pressure. - Associated circulation pump flow meter register flow rate.		
	Field Checks	- Verify no leaks in piping system - Record associated flow rate set point, pump speeds, measured flow rate through flow meters and pressure gauges.		
	Actual Result	- Piping leaks observed. - Flow rate reading: - Pump speed reading: - Pressure gauge reading on pump discharge: - Pump motor amperage reading:	☐ Yes	☐ No
	Comments:			

	Company	Name	Signature	Date (yyyy/mm/dd)
Performed By				
Checked By				

	COMMISSIONING FORM LOCAL CONTROL PANELS FUNCTIONAL TEST		Page 1 of 1
			ID:
Project	Facility: NEWPCC	Project Name: NEWPCC Boiler Replacement 2025-2026	
	Area: B	Bid Opportunity: 277-2025	

Local Control Panel Commissioning Checklist	Equipment Tag:	Diagram/Drawing:		Location:
	Equipment Type: Local Control Panels			
	Checklist:	☐ Panel tag/lamacoid present ☐ CSA label is present ☐ All terminal blocks labelled. ☐ All wire labels are present. ☐ Point to point check complete. ☐ Loop checks complete.	☐ Fuses installed and properly sized as per drawings/Field Instructions/RFIs. ☐ Panel door emergency stops tested (if applicable). ☐ Panel door selector switches operational (if applicable). ☐ VFD speed potentiometer operational (if applicable).	☐ Panel door pilot lights operational (if applicable). ☐ Panel mounted local displays operational (if applicable). ☐ System functional test forms complete.
	Comments:			

Final Analysis	Returned to Service: ☐ Yes ☐ No ☐ N/A	Comments:
	Monitoring / Inspection Required: ☐ Yes ☐ No	
	Repair / Replacement Required: ☐ Yes ☐ No	

	Company	Name	Signature	Date (yyyy/mm/dd)
Performed By				
Checked By				

Note: The person performing the check is responsible for ensuring that the data is transcribed from the handwritten form correctly, and that the analysis results are correct.

		COMMISSIONING FORM NETWORK COMMUNICATIONS FUNCTIONAL TEST		Page 1 of 1
				System Title: NETWORKING
Project	Facility: NEWPCC	Project Name: NEWPCC Boiler Replacement 2025-2026		
	Area: B	Bid Opportunity: 277-2025		

Network Inspection and Checklist	Drawings:		Location:	
	Equipment Type: Networking			
	Checklist:	☐ Network cables installed, tested, and terminated. ☐ Network cables copper and fiber test results recorded. ☐ Networking equipment powered and operational. ☐ Networking equipment is properly tagged.	☐ Patch cables installed. ☐ Networking equipment and cables installed as per drawings/RFIs/Field Instructions ☐ Device network devices communicating. ☐ Control network devices communicating.	☐ Fire alarm system communicating. ☐ Card access system communicating. ☐ CCTV system communicating.
		Comments:		

Final Analysis	Returned to Service: ☐ Yes ☐ No ☐ N/A	Comments:
	Monitoring / Inspection Required: ☐ Yes ☐ No	
	Repair / Replacement Required: ☐ Yes ☐ No	

	Company	Name	Signature	Date (yyyy/mm/dd)
Performed By				
Checked By				

Note: The person performing the check is responsible for ensuring that the data is transcribed from the handwritten form correctly, and that the analysis results are correct.

APPENDIX C

Commissioning Deficiency Log

[illegible]



Experience in Action