CITY OF WINNIPEG

NEWPCC BOILER REPLACEMENT 2025-2026 - CONSTRUCTION PLAN_R1

Revision:

Rev 1

KGS Group Project:

23-0107-010

Client Project:

S-1284

Date:

April 15, 2025

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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.

MCC-1B and MCC-2B are Canadian General Electric MCCs. The original units were installed in 1972 with four sections (three power and one control) each. Additional sections were added in 1985. Modifications to the bucket contents have been ongoing for the life of the MCCs. Eaton has acquired the now-defunct Canadian General Electric brand but no longer manufactures equivalent parts.

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 output boilers, three new circulation pumps, and a new flash steam separator tank. To fit the new boilers in their space, the existing high-pressure and low-pressure nitrogen tanks with their valve trains will need to be relocated to the main boiler room. The existing interim boilers 5a and 5b will also be removed, while interim boiler 5c (new tag: boiler 7) will remain and be tied into the new system. The boiler control system will include controls by the boiler vendor, which will be integrated into the City's process control system (PCS) system.

Two new MCCs (MCC-B7001 and MCC-B7002) will be installed to replace the existing MCC-1B and MCC-2B. MCC-B7001 will replace MCC-1B and MCC-B7002 will replace MCC-2B. In addition to reconnecting to their predecessors' existing loads, the new MCCs will also supply the new loads required by the boiler upgrades and provide spare buckets for future upgrades.

This construction plan provides details of the proposed plan to carry out the above scope and generally describes the work to be done by the General Contractor with steps involved in each task. The plan indicates who the project personnel are and what the communication links between them will be. A project schedule is also presented to illustrate the timeframe to complete the work.

2.0 PROJECT CONTACT PERSONNEL

Communication for the project will be between various City, Contract Administrator, and Contractor personnel. The following plan for lines of communication is to be observed by the Contractor. See key instructions for communication listed below:

The Contractor will direct all enquiries and requests for clarification to the Contract Administrator directly and copy the City Project Manager. The Contract Administrator will review with the City if necessary and advise the Contractor how to proceed.

Contract Administrator:

Prasan Silva, P.Eng.
KGS Group

- Mobile: 204 998 2278
- Email: psilva@kgsgroup.com

City Project Manager:

Arash Kiayee, M.Sc., P. Eng.
City of Winnipeg – Water and Waste Department

- Mobile: 204 918 1391
- Email: AKiayee@winnipeg.ca

A table of contact persons and their information is provided in Appendix A. The Contractor may contact additional project personnel with Contract Administrator approval only. All correspondence between the Contractor and additional project personnel must be copied to the Contract Administrator and City Project Manager.

3.0 PROJECT CONSTRAINTS

A general review of the major constraints of the project is provided below. The Contractor shall review this list and accept the responsibility to mitigate the risks described and the constraints listed below.

3.1 Operating Plant

The boilers at NEWPCC are a critical piece of equipment used for process and space heating at the facility. Due to their critical nature, all existing boilers and associated systems must remain in service during the duration of construction. Therefore, all equipment relocations and piping tie-ins must be planned and performed, while keeping the boiler system in-service without an outage. The Contractor will be responsible for preparing an installation plan for all new tie-ins to the existing system and equipment relocation. Plans must include a step-by-step installation procedure, applicable safety documentation, risk mitigation/contingency plan and a schedule. All plans must be approved by the Contract Administrator prior to performing the work.

3.2 Seasonal Construction

Construction schedule for the project will span from May 2025 through October 2026. Sequencing of construction activities through the seasons will be important for keeping the project on schedule. Piping rough-in, nitrogen tank relocation and new natural gas system tie-in will take place in the summer of 2025 to prepare for the installation of the new boilers. In the following summer of 2026, the interim backup boilers 5a and 5b will be demolished and the two new boilers BLR-B0005 and BLR-B0006 will be installed. MCC-1B and MCC-2B will be demolished and replaced in a staged configuration such that at least one MCC is fully operational at all times. Demolition of the interim system and installation of the new boilers and MCCs must take place during the warm summer months when the plant is expected to have reduced heating requirements, as opposed to the winter months.

The sequence of MCC replacement will depend on which boilers are operating at that time. Contractor shall coordinate closely with the City to determine which MCC is to be replaced first.

3.3 Work Area

Access to the plant by project staff will be limited to the areas necessary for the scope of the installation work. The work area will primarily be in the boiler room, but access may also be required to other areas of the plant for electrical and controls installation.

Access to the site will be from the main entrance to the plant from Main Street. Contractor Parking and laydown area will be to the west of the boiler building. The boiler building can be accessed via the man door on the east side of the building and using the overhead garage door on the west. The overhead door can only be opened from inside the building so access through the east man door is initially required. Contractor laydown area, parking and the active project area are shown on the site map in Appendix B.

Active work areas for other projects and areas of overlap between this project and others are also shown. For the most part, ongoing work in the plant from other projects is not anticipated to interfere with this project. However, the DCS Migration project is expected to be ongoing in the boiler building during the summer months of 2025 to winter months of 2026. During this time, the work area will need to be shared. The Contractor shall coordinate construction works with the DCS Migration project while working in the boiler room. Coordination shall include daily safety toolbox meetings to ensure each Contractor is aware of any risks or safety concerns within the area.

It is expected that the Contractor will keep their active work areas in the boiler building clean and safe. City operations will require frequent access to the boiler building, as the existing boiler system will continue to operate throughout the project.

4.0 CONSTRUCTION SCHEDULE

It is the responsibility of the Contractor to ensure construction progresses in a timely manner to achieve the project schedule. The Contract Administrator and City of Winnipeg will support the Contractor as needed for planning tie-ins, equipment relocation, document reviews and other activities.

The scheduled award for the construction contract is May 2025. A preliminary construction schedule is provided in Appendix C. The Contractor shall be responsible for continually updating the schedule as progress is made with all tasks required to complete the construction works. The Contractor shall make effort to accelerate the The overall scope of work is broken into six main construction phases. Tasks within these phases are further detailed in Section 5 – Construction Sequence.

- Project Start-up: May 2025
- Early Construction Works: May 2025 – September 2025
- Middle Construction Works: October 2025 – March 2026
- Late Construction Works: April 2026 – May 2026
- Commissioning: June 2026 – July 2026
- Project Closeout: August 2026 – October 2026

5.0 CONSTRUCTION SEQUENCE

5.1 Project Start-Up

Prior to, and immediately after, the award of the construction contract, the proponent will be required to submit documentation for review by the Contract Administrator. The submittal review will include:

- Contractor Qualifications
- Procurement Information (vendor data)
- Construction Engineering Documents (fabrication/shop drawings)
- Construction Schedule

Each document will be reviewed and returned to the Contractor, and in some cases further re-submittals will be necessary. Approval of shop drawings, and procurement of long-lead items such as boilers, pumps, VFDs and other electrical and instrumentation equipment should be prioritized to prevent delays. Note that the above list of items shall not be considered a complete list and the Contractor shall be responsible to identify additional long lead items at the start of the project that may impact the overall project schedule and target completion date.

The Contractor will begin mobilizing their staff and equipment to the NEWPCC facility. When ready, the City will grant the Contractor access to the boiler room. However, because the existing boilers will remain in operation throughout the course of construction, the City will require continuous access to the boiler building and control room.

5.2 Early Construction Works (May 2025 – September 2025)

As soon as access to the boiler building is provided, critical path early works such as the items listed below should begin as quickly as possible. For the boilers to be installed, the following activities must be complete.

- Demolition of existing boiler 5 and associated piping
- Relocation of nitrogen tanks to main boiler room
- HWR and HWS hot tap tie-ins
- Demolition of existing boiler 5 blowdown header
- Natural gas system tie-in

Concurrently with the initial site preparatory works, demolition of the existing boiler 5 and associated piping shall commence. The Contractor is responsible for the removal and disposal of the boiler from the site. Additionally, equipment procurement of long lead items must also be initiated as early as possible to avoid delaying future mechanical and electrical installation work.

The existing boiler system must stay in operation throughout the duration of the project. Therefore, hot taps must be performed for the HWR and HWS tie-ins to the existing system. The Contractor will perform NDE at the proposed tie-in locations, prior to installation, to ensure the piping is suitable for hot tapping. NDE results shall be shared with the Contract Administrator for approval, prior to proceeding. NDE shall be performed

early in construction works. The Contractor must submit shop drawings and a hot tapping procedure to the Contract Administrator for review and approval, at least three weeks prior to performing the work.

The existing boiler 5 blowdown header must be demolished up to the header in the main boiler room. The Contractor shall coordinate this work with the Contract Administrator and City, to be completed at a time when no process upset conditions are anticipated. The Contractor must submit a demolition plan, complete with safety documentation, to the Contract Administrator at least three weeks prior to performing the work.

Nitrogen Tank Relocation

Prior to installation of the new boilers, the two nitrogen tanks must be relocated to the main boiler room. ***It is anticipated that the tanks will be taken out via the west overhead door of the boiler room and moved via truck to the east entrance of the boiler room (refer to mechanical drawings for the route.)*** The Contractor shall submit a relocation plan to the Contract Administrator for review and approval, at least three weeks prior to performing the work. The plan must include a step-by-step procedure for performing the work, including safety documentation, contact personnel, risk mitigation strategy and contingency plans. The plan is expected to include the following actions:

1. Piping rough-in for tie-ins to the existing nitrogen system and expansion tank.
2. Installation of new nitrogen tank valve train in main boiler room.
3. Installation of new nitrogen tank housekeeping pads.
4. Relocation and installation of existing high pressure nitrogen tanks into the new system.
5. Tie-in new nitrogen system piping to existing system and transfer service (TP-02 and TP-03)
    - The expansion tank shall be temporarily isolated from the nitrogen system using the existing isolation valve on the top of the tank.
    - The Contractor shall provide provisions to supply nitrogen to the tank, while the expansion tank is isolated from the rest of the system, in case the pressure of the tank begins to decrease. These provisions shall include a supply of make-up nitrogen gas bottles.
    - To minimize the duration of system outage, prior to performing the tie-in, the Contractor shall have new nitrogen piping installed up to the tie-in locations and tie-in spools fabricated for installation.
    - When the tie-in is complete and the expansion tank is brought back online, it is expected the reinstalled high pressure nitrogen tank will temporarily serve as the only nitrogen storage vessel for the new system. The nitrogen supplied to the expansion tank from the high-pressure nitrogen tank will be reduced by the pressure regulator in the new valve train.
6. After the new nitrogen system is online, relocate and tie-in the existing low pressure nitrogen tank into the new system.
7. Demolition of existing remaining nitrogen system piping and equipment.

It is the responsibility of the Contractor to fully detail the relocation procedure and plan using the above steps as a guideline.

Incorporate the following additional requirements relating to the nitrogen tank relocation:

The contractor shall temporarily shore the underside of the walkway/catwalk implementing posts down to the main floor. The shoring system should be such that it provides support for both the walkway/catwalk structural members and the grating. The contractor is to submit walkway/catwalk shoring plan to KGS for review prior to commencing nitrogen tank relocation.

For the nitrogen tank rigging from the walkway/catwalk level down to the main floor, the contractor is to submit a rigging plan to KGS for review. The plan should indicate how the contractor plans to support the rigging system from the building roof structure and specifically indicate which roof beams will be used, type of hoist trolley implemented etc.

The nitrogen tank relocation may necessitate the temporary removal of the walkway/catwalk guardrail. The contractor is to indicate, as part of the shoring and rigging plan, which portions of the guardrail are to be removed. The contractor is to restore the guardrail to its original condition and should therefore also indicate how they plan to do this as part of the shoring and rigging plans. Temporary fall-arrest methods used while the guardrail is removed is the responsibility of the contractor who is to follow Manitoba Workplace Safety and Health regulations/procedures.

Natural Gas System Tie-in

The new 100 mm dia. natural gas header, which will serve boilers 5, 6 and 7, will be tied directly into the 150 mm dia. natural gas main that runs through the boiler room. The natural gas system at the facility will need to be shut down to perform this tie-in. Therefore, this work shall be performed during the summer months when there is less heat demand at the facility.

During the course of construction, the interim backup boilers (boilers 5a, 5b, and 5c) shall remain in service up until they are demolished for installation of the new boilers 5 and 6 in Summer of 2026. Therefore, the new tie-in must be temporarily connected to the existing 80 mm dia. header that serves the three interim backup boilers. A new temporary reducer shall be installed to connect the new 100 mm dia. tie-in to the existing 80 mm dia. header. Only after the interim backup boilers 5a and 5b are demolished, can the new tie-in be disconnected from the existing 80 mm dia. header and the new 100 mm dia. header be installed and connected to the new boilers.

When the natural gas system is temporarily shut down, the existing boilers at the facility will operate using digester gas. The Contractor must provide a shutdown and installation plan to the Contract Administrator for approval, three weeks prior to performing the work.

5.3 Middle Construction Works (October 2025 – March 2026)

Once the early construction works for the project is complete, installation of new systems can begin. These activities include:

- Piping rough-in for boilers and pumps.
  - Including hot water return, hot water supply, natural gas, and digester gas systems.
- Installation of new hot water circulation pumps

- Electrical and control system installation
- Structural Reinforcement of basement

It is expected during the period of middle construction works that the Contractor will prepare and install all mechanical, electrical and control systems as much as possible in anticipation of arrival for long lead time items. Such construction activities to take place during this time include installation of new piping for tie-ins to the new boilers, installation of new hot water circulation pumps and associated piping, and electrical and control wiring installation. At this stage, the DCS Upgrade project is expected to have already installed a control panel for the boiler building with spare space reserved for an additional network switch. This switch will be supplied and installed by the boiler upgrade project. Structural reinforcement of the basement will commence at this time, in preparation for the arrival of new boilers. None of the middle construction work activities shall impact the operation of the existing boilers or associated systems during the winter months. The boilers must remain fully functional and accessible during this time for City operations.

5.4 Late Construction Works (April 2026 – May 2026)

Once delivery of long lead time items have been accepted and installation of ancillary systems is complete, the late construction works may begin. The following activities will take place during the warm spring and summer months:

- Demolition of existing interim boilers 5a and 5b
- Installation of new boilers
- Staged demolition of existing MCC-1B and MCC-2B
- Staged installation of new MCC-B7001 and MCC-B7002
- Electrical and control system installation
- Piping tie-ins
- Structural construction works

Prior to the installation of the two new boilers, existing interim boilers 5a and 5b will need to be removed and turned over to the City. The Contractor will be responsible for moving the interim boilers to a location on the NEWPCC site, as directed by the City. Boiler 5a and 5b piping will be demolished and removed from the space. Once the space is cleared, the two new boilers will be installed with their associated piping tie-ins and electrical and control systems. Automation and control systems will be tied into the City PCS. Structural works such as installation of housekeeping pads and wall/roof penetrations will be performed in parallel with mechanical and electrical construction activities. Full installation of the new boilers and associated mechanical, electrical and structural systems will conclude the late construction works period.

5.5 Commissioning (June 2026 – July 2026)

Once the new boilers and pumps are fully installed with their associated piping and electrical systems, commissioning and performance verification testing will begin. The project Commissioning Plan details the steps for the commissioning process, but below is an overview of the main activities that will be performed (this list is not exhaustive):

- Mechanical equipment pre-commissioning checks
- Mechanical equipment commissioning checks
- Pipe pressure and leak testing
- Vendor start-up
- AHJ inspection approval
- Electrical point-to-point, loop checks and meggering tests
- Testing and Balancing (TAB)
- System performance verification

The Contractor will be responsible for performing commissioning activities for the Contractor Administrator to witness and approve. Refer to the project Commissiong Plan for further detail.

5.6 Project Close-Out (August 2026 – October 2026)

After commissioning and performance verification work has proven the system to be functional, de-mobilization of the temporary construction facilities will proceed. Project Close-out document submittals such as red-line drawings, operation and maintenance documents, etc. will be submitted to the Contract Administrator for review and approval by the Contractor.

Substantial Performance: August 28, 2026

Total Performance: October 16, 2026

6.0 CONCLUSION

This report has presented the details of the construction sequence for the project. Each portion of construction activity has been described with pertinent details highlighted. The scheduling and sequence of work provided are intended to be guidelines for the Work, and the Contractor must undertake each stage/phase in the way deemed to be most efficient for the project. Discrepancies or deviations should be reported to the Contract Administrator as soon as they are noted.

APPENDIX A

Contact Information

Tender No. 277-2025: CONSTRUCTION PLAN - APPENDIX A
CONTACT LIST - (to be updated by Contractor)

Name		Organization	Role	Phone	Email
Contractor:					
		GENERAL CONTRACTOR	Project Manager		
		GENERAL CONTRACTOR	Superintendant		
		GENERAL CONTRACTOR	add others as applicable		
		(add sub-trades)			
KGS Group:					
Prasan	Silva	KGS GROUP	Contract Administrator	204-998-2278	psilva@kgsgroup.com
Jason	Smith	KGS GROUP	Lead Mechanical Engineer	204-223-8904	jsmith@kgsgroup.com
Andrew	Fustey	KGS GROUP	Mechanical Design Engineer	204-296-8900	afustey@kgsgroup.com
Carla	Robinson	KGS GROUP	Lead Electrical Engineer	204-896-1209 ext 895 150	crobinson@kgsgroup.com
Dennis	Guevarra	KGS GROUP	Electrical Design Engineer	431-997-3565	dguevarra@kgsgroup.com
City of Winnipeg:					
Arash	Kiayee	CITY WWSD	City Project Manager	204-918-1391	akiayee@winnipeg.ca

APPENDIX B

Site Map

CONTRACTOR PARKING, SITE ACCESS, AND LAYDOWN AREAS

Duckworth Sheetmetal

Highland Ave

SITE ACCESS ROUTE

Site access route from main street

Winnipeg Water Pollut

CONTRACTOR LAYDOWN AND PARKING AREA

Snow clearing of laydown and parking area as and when required is the responsibility of the Contractor.

PARKING AREA

Parking area for access into east man door.

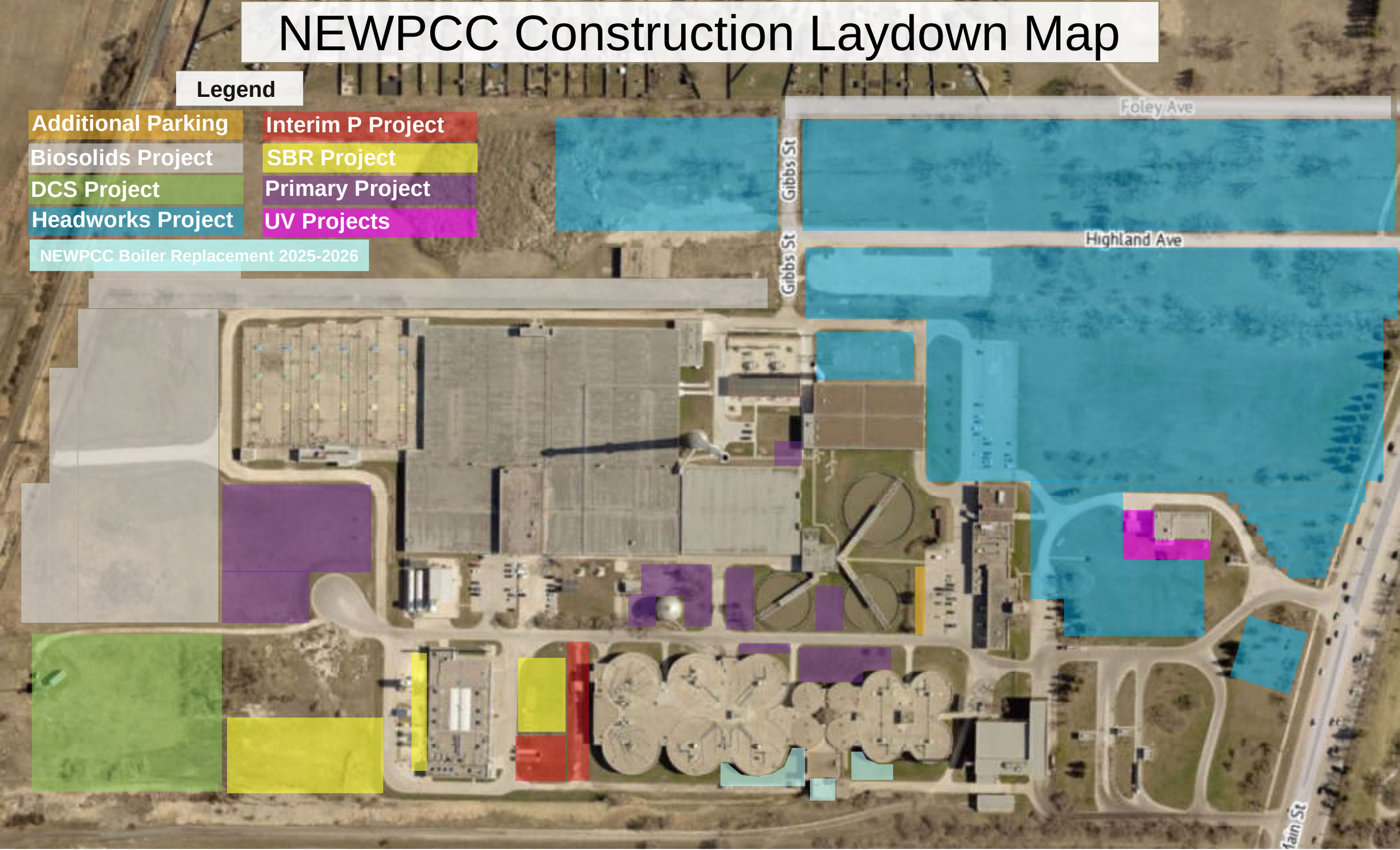
NOTE:

LOCATIONS OF AVAILABLE TEMPORARY POWER CONNECTIONS TO BE COORDINATED WITH CITY OPERATIONS

N

100 m

NEWPCC Construction Laydown Map

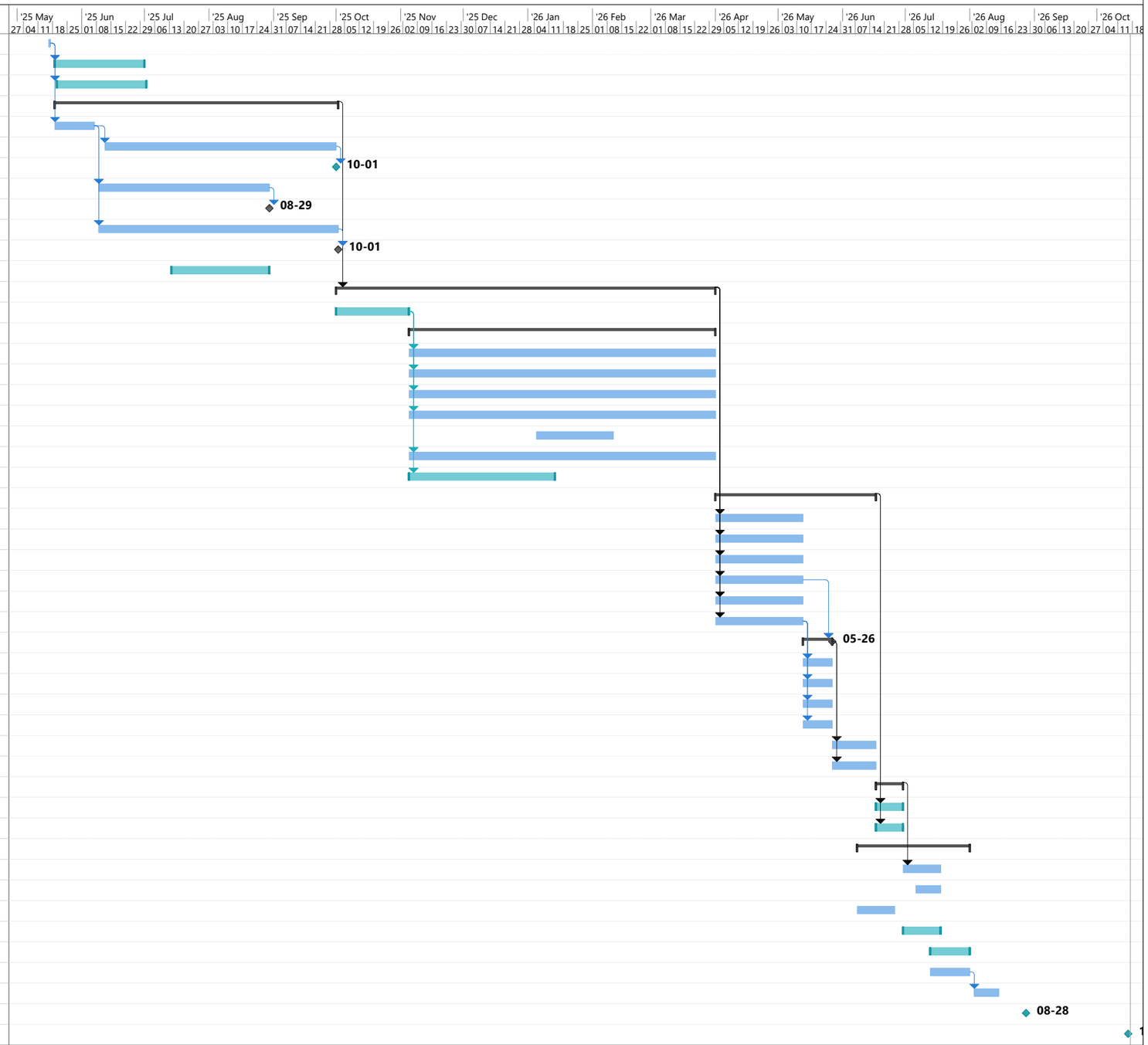


APPENDIX C

Schedule

277-2025 NEWPCC Boiler Replacement 2025-2026 Schedule

ID	Task Name	Duration	Start	Finish	Predecessors
1	AWARD OF CONTRACT	1 day	Fri 25-05-16	Fri 25-05-16	
2	Mechanical Procurement	31 days	Mon 25-05-19	Mon 25-06-30	1
3	Electrical Procurement	31 days	Tue 25-05-20	Tue 25-07-01	1
4	**Early Construction Work (May - Sept.)**	**98 days**	**Mon 25-05-19**	**Wed 25-10-01**	
5	Asbestos Abatement	15 days	Mon 25-05-19	Fri 25-06-06	1
6	Demolition of Existing Boiler 5 and Associated Piping	79 days	Thu 25-06-12	Tue 25-09-30	5
7	Removal of Existing Boiler 5 Complete (CRITICAL STAGE)	0 days	Wed 25-10-01	Wed 25-10-01	6
8	Upsizing Natural Gas Piping	60 days	Mon 25-06-09	Fri 25-08-29	5
9	Upsizing Natural Gas Piping Complete (CRITICAL STAGE)	0 days	Fri 25-08-29	Fri 25-08-29	8
10	Relocation of Nitrogen Tanks to Main Boiler Room	83 days	Mon 25-06-09	Wed 25-10-01	5
11	Relocation of Nitrogen Tank Complete (CRITICAL STAGE)	0 days	Wed 25-10-01	Wed 25-10-01	10
12	HWR and HWS Hot Tap Tie-ins	35 days	Mon 25-07-14	Fri 25-08-29	
13	**Middle Construction Works (Oct.-Mar.)**	**130 days**	**Wed 25-10-01**	**Tue 26-03-31**	**4**
14	New Equipment Footing, Racks, Supports	25 days	Wed 25-10-01	Tue 25-11-04	
15	**Pipe rough-in for boilers and pumps**	**105 days**	**Wed 25-11-05**	**Tue 26-03-31**	
16	Hot Water Return	105 days	Wed 25-11-05	Tue 26-03-31	14
17	Hot Water Supply	105 days	Wed 25-11-05	Tue 26-03-31	14
18	Natural Gas	105 days	Wed 25-11-05	Tue 26-03-31	14
19	Digester Gas	105 days	Wed 25-11-05	Tue 26-03-31	14
20	Installation of New Hot Water Circulation Pump	27 days	Mon 26-01-05	Tue 26-02-10	
21	Electrical and Control System Installation	105 days	Wed 25-11-05	Tue 26-03-31	14
22	Structural Work	50 days	Wed 25-11-05	Tue 26-01-13	14
23	**Late Construction Works (Apr.-May.)**	**55 days**	**Wed 26-04-01**	**Tue 26-06-16**	
24	Demolition of Existing Interim Boilers 5A and 5B	30 days	Wed 26-04-01	Tue 26-05-12	13
25	Structural Construction Works	30 days	Wed 26-04-01	Tue 26-05-12	13
26	Installation of New Boilers	30 days	Wed 26-04-01	Tue 26-05-12	13
27	Electrical and Control System Installation	30 days	Wed 26-04-01	Tue 26-05-12	13
28	Staged Demolition of Existing MCC-1B and MCC-2B	30 days	Wed 26-04-01	Tue 26-05-12	13
29	Staged Installation of New MCC-B7001 and MCC-B7002	30 days	Wed 26-04-01	Tue 26-05-12	13
30	**Piping tie-ins**	**10 days**	**Wed 26-05-13**	**Tue 26-05-26**	**27**
31	Hot Water Return	10 days	Wed 26-05-13	Tue 26-05-26	29
32	Hot Water Supply	10 days	Wed 26-05-13	Tue 26-05-26	29
33	Natural Gas	10 days	Wed 26-05-13	Tue 26-05-26	29
34	Digester Gas	10 days	Wed 26-05-13	Tue 26-05-26	29
35	Piping Insulation	15 days	Wed 26-05-27	Tue 26-06-16	30
36	Electrical Tie-ins	15 days	Wed 26-05-27	Tue 26-06-16	30
37	**Pre-Commissioning (Jun. -Jul.)**	**9 days**	**Wed 26-06-17**	**Mon 26-06-29**	
38	Mechanical Equipment Pre-Commissioning Checks	9 days	Wed 26-06-17	Mon 26-06-29	23
39	AHJ Inspection Approval	9 days	Wed 26-06-17	Mon 26-06-29	23
40	**Commissioning (Jun. -Jul.)**	**40 days**	**Mon 26-06-08**	**Fri 26-07-31**	
41	Pipe Pressure and Leak Testing	14 days	Tue 26-06-30	Fri 26-07-17	37
42	Vendor Start-up	10 days	Mon 26-07-06	Fri 26-07-17	
43	Electrical Point-to-Point, Loop Checks and Meggering Tests	14 days	Mon 26-06-08	Thu 26-06-25	
44	Testing and Balancing (TAB)	14 days	Tue 26-06-30	Fri 26-07-17	
45	Mechanical Equipment Commissioning Checks	15 days	Mon 26-07-13	Fri 26-07-31	
46	System Performance Verification	15 days	Mon 26-07-13	Fri 26-07-31	
47	Training	10 days	Mon 26-08-03	Fri 26-08-14	46
48	Certificate of Substantial Performance	0 days	Fri 26-08-28	Fri 26-08-28	
49	Certificate of Total Performance	0 days	Fri 26-10-16	Fri 26-10-16	



Project: NEWPCC Boiler 5 Replacement 2025-2026
Date: March 24, 2025

Task	Summary	Inactive Milestone	Duration-only	Start-only	External Milestone	Manual Progress		
Split	Project Summary	Inactive Summary	Manual Summary Rollup	Finish-only	Deadline			
Milestone	Inactive Task	Manual Task	Manual Summary	External Tasks	Progress			

KGS
GROUP

Experience in Action