Operation & Maintenance Plan for Kugaaruk Municipal Water Licence: Water Supply Facilities
2022

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1.0 Site Description

Date this plan was prepared: February 28, 2022

1.1 Location of the water supply and water treatment plant (WTP)

Municipality: Kugaaruk
Latitude: 68°32'42.21"N
Longitude: 89°46'11.04"W

1.2 WTP History

Year of commissioning the WTP: 2014
Design life of the WTP: 2034

Figure 1 Kugaaruk Water Supply Infrastructure

2.0 Staff and Training

2.1 Staff

Role:	Senior Administrative Officer	**Name:**	Emiliano Qirngnuq
Phone:	(867)769-6281 Ext.1002	**Email:**	sao@kugaaruk.ca

Responsibilities: The SAO manages the municipal staff to ensure that:

- proper operation of the water supply system is carried out
- sampling and inspections are completed
- annual reporting to the Nunavut Water Board (NWB) is prepared by the Government of Nunavut Department of Community and Government Services (GN-CGS)

Role:	Foreman	**Name:**	Gaetan Apsaktaun
Phone:	867-219-0426	**Email:**	N/A

Responsibilities: The foreman is responsible for:

- operation and maintenance of the Water Supply Facility

Role:	WTP Operator	**Name:**	Various
Phone:	N/A	**Email:**	N/A

Responsibilities: The WTP operators oversee that daily operation and maintenance of the treatment facility including:

- chlorine solution preparation
- sampling of treated water
- monthly and annual inspections

Role:	Water Truck Drivers	**Name:**	Various
Phone:	N/A	**Email:**	N/A

Responsibilities: The water truck drivers fill truck for distribution of drinking water to the municipality. They also record and report the quantities of delivered water.

2.2 Training

Training records were last updated: 2020

Table 1 List of trainings obtained by staff

Staff member	GN Small Systems Course	GN Class I Systems Course	Other:
George Kakkianiun	☒	☐	☐
Billy Oksokitok	☒	☐	☐
Gaetan Apsaktaun	☒	☐	☐
Timothy Kayasark	☒	☐	☐
George Kakkianiun	☒	☐	☐
Pascassius Niptayuk	☒	☐	☐

3.0 Security and Control

Access Control of to the facility:

- Locks on doors
- Signage

4.0 Facility Design

As built drawings for the WTP can be found in Appendix A.

5.0 Raw Water Sources

5.1 Raw Water Source

Raw water source fill system type: Direct from River

Alterations to the natural water source have occurred due to the WTP:

None

Name of primary raw water source:	Kugajuk River
Type of raw water source:	River
Average annual quantity of water drawn:	35,000 m^3/year
Maximum allowable withdrawal:	60,000 m^3/year
Ice formation on the water source (Month):	September
Ice breakup on the water source (Month):	June or July

Equipment:

- Inclined shaft casings with submersible pumps located at a depth of approximately 5m draw water from an enlarged portion of the river impounded by rapids slightly downstream. The 300 mm HDPE intake casings are covered with granular material protected with riprap and gabions.

- 300 mm standard tee intake screen with deflector cone designed to meet Fisheries and Oceans Canada Freshwater Intake End-of-pipe Fish Screen Guidelines

5.2 Operations

Overview of the operations process:

The following procedure is followed:

1. All controls necessary for water withdrawal and truck filling are located in a control panel accessible to the truck driver from the outside of the building. The truck driver does not have access to the building interior.The WTP is designed to be a reliable and simple system to operate. Once properly installed, the operator needs only to check the main control panel (HMI touch screen) after power-up to ensure that the WTP is functioning normally.

2. The control panel of the water treatment plant has been designed such that, in the unlikely event of control failure, the plant can be run manually. Manual operation of the plant allows the operator to directly control the individual processes that allow the plant to function but should mainly be used for start-up/testing only.

3. Once the truck fill control is deactivated by the operator pressing the OFF button, the raw water pump is shut down.

4. The pumphouse is connected to the community power grid and has a standby generator, which is operated in case of failure of the line power.

5.3 Maintenance

Overview of the maintenance process:

Maintenance of the water supply facility is the responsibility of the municipal staff. Inspection and repair records should be brought to the Hamlet Office for filing annually. If any issues or problems are noted with the intake pipe, intake pump, fuel tank or overland pipeline, these should be communicated to the Foreman and/or SAO as soon as possible.

6.0 Water Treatment Process

A brief overview of the water treatment process:

Water is drawn in from the raw water reservoir adjacent to the WTP where it undergoes:

- Cartridge Filtration: The sequence of filters is 20-micron, followed by 5-micron, followed by 1-micron cartridges.
- UV Disinfection
- Chlorine Disinfection: Truck-fill arm injection

Total annual water usage:	35,000 m^3
Water distribution method:	Trucked
Treated water storage:	None
Rate of truck-fill:	1134 L/min

Operations and Maintenance:

The following document(s) are on site at the WTP and available from the GN-CGS upon request:

- Kugaaruk Water Treatment Plant Technical Manual & OM Manual

7.0 Monitoring

Regulatory Inspection: The annual Crown Indigenous Relations and Affairs Canada (CIRNAC) inspection will take place accompanied by the licensee and/or with a licensee representative from GN-CGS. The inspection will be reviewed by a GN-CGS municipal engineer and submitted with the annual report.

Table 2 Licence requirements related to O&M of the water supply facilities

Requirements	**Reported**
Monthly and annual quantities of fresh water obtained from all sources	Annual report submitted to NWB
A summary of modifications and/or major maintenance work carried out on the WTP	Annual report submitted to NWB
A list of spills and unauthorized discharges.	Annual report submitted to NWB
A summary of any studies requested for the WTP and future planned studies planned	Annual report submitted to NWB
Volume of Potable Water Supply at Post River Monitoring Program Station PEL-1	Annual report submitted to NWB

8.0 Modifications and Upgrades

Modifications or upgrades needed for the water supply facility:

None

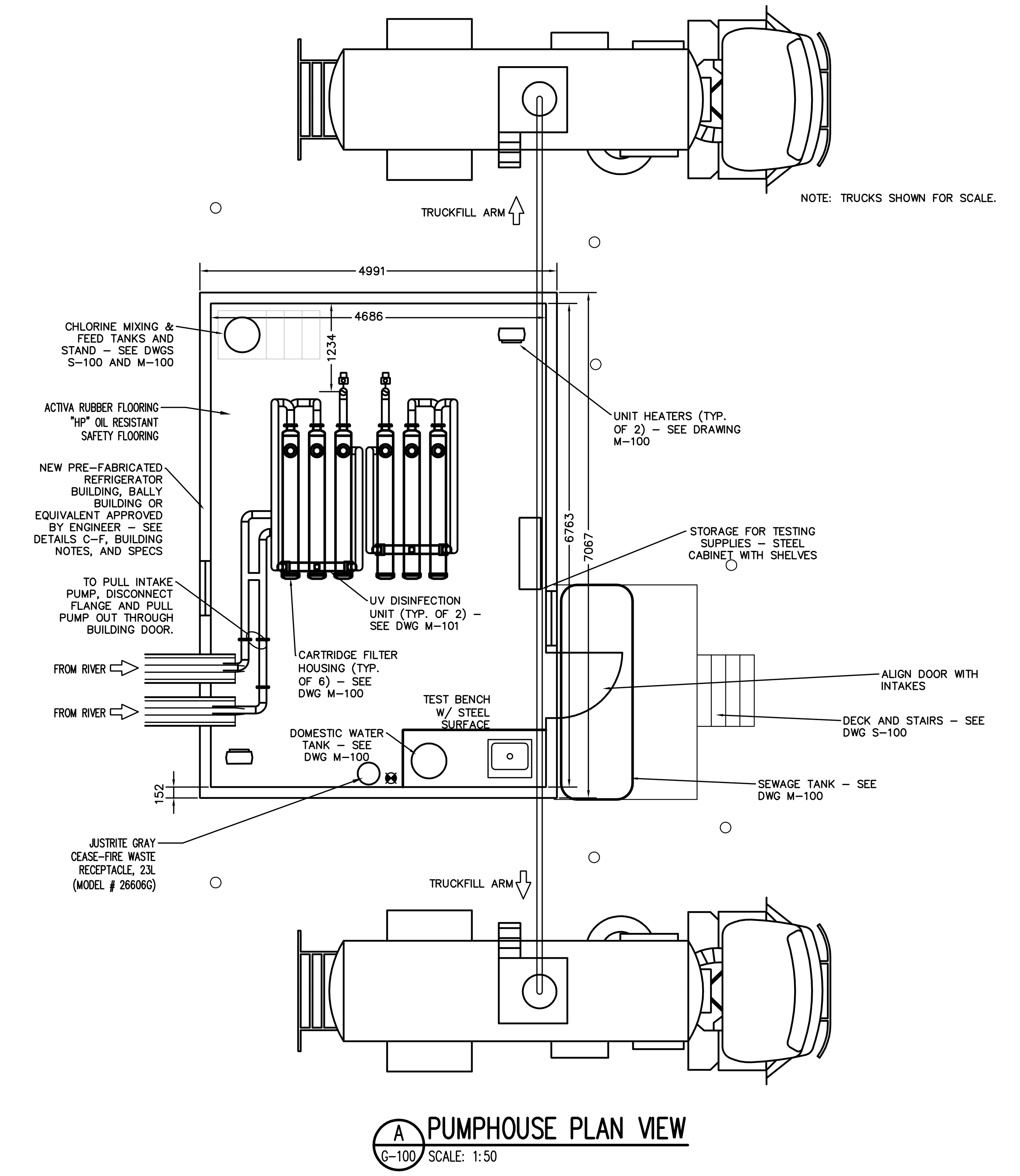
Planned modifications or upgrades:

None

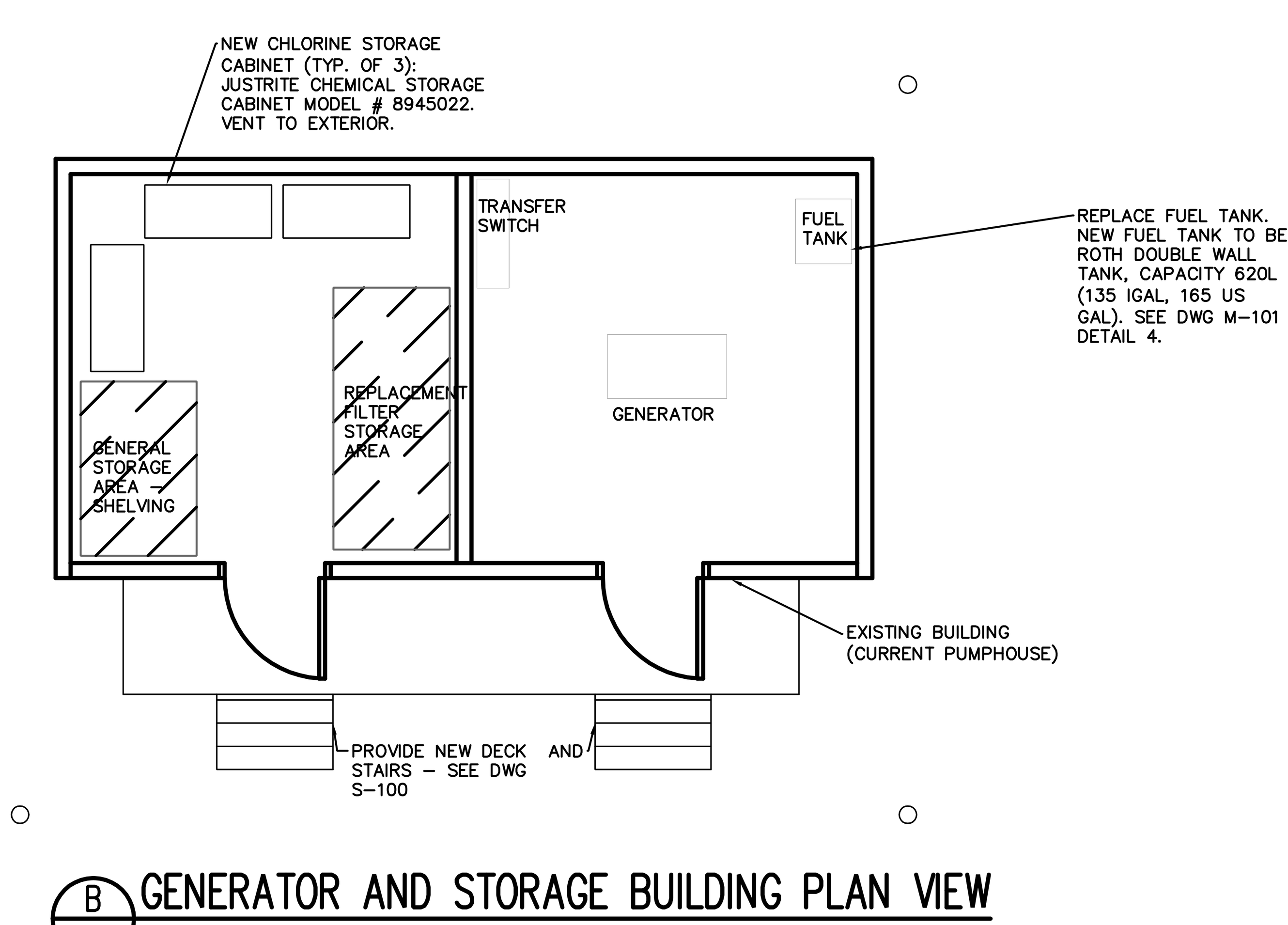
Additional Comments or Notes

None

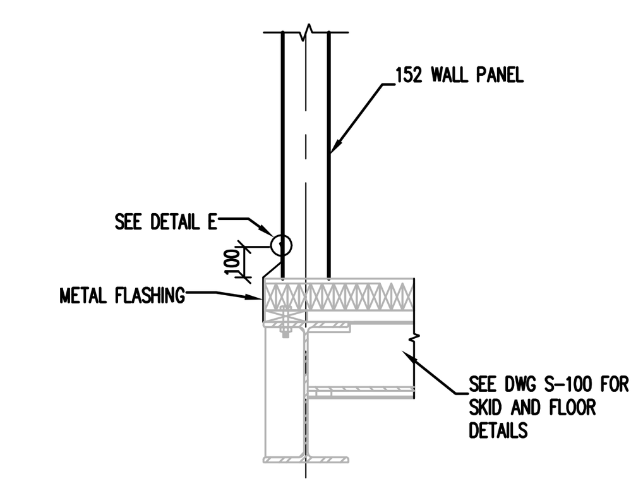
Appendix A: As-built WTP Drawings



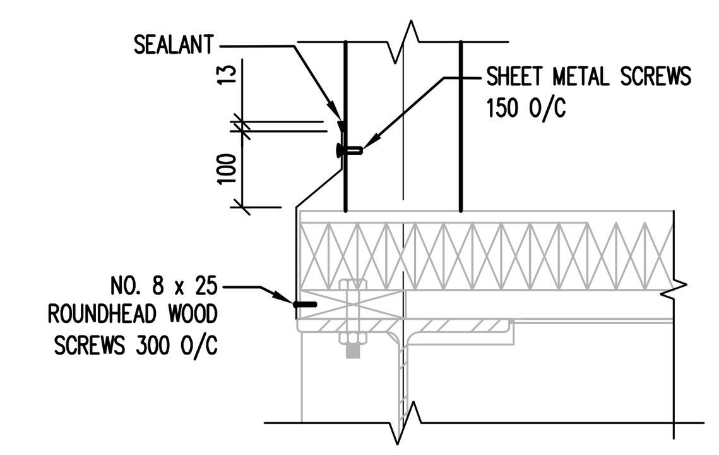
A PUMPHOUSE PLAN VIEW
G-100 SCALE: 1:50



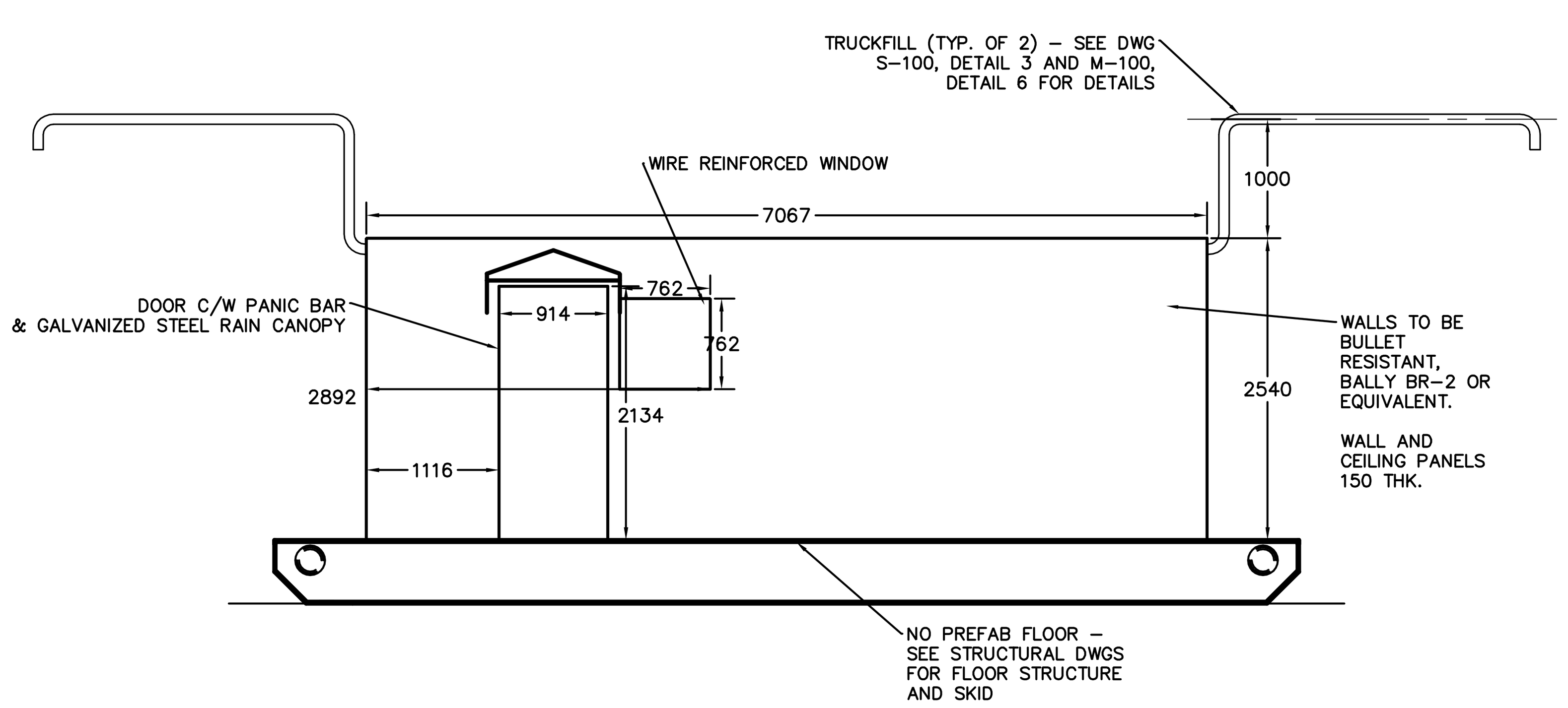
B GENERATOR AND STORAGE BUILDING PLAN VIEW
G-100 SCALE: 1:50



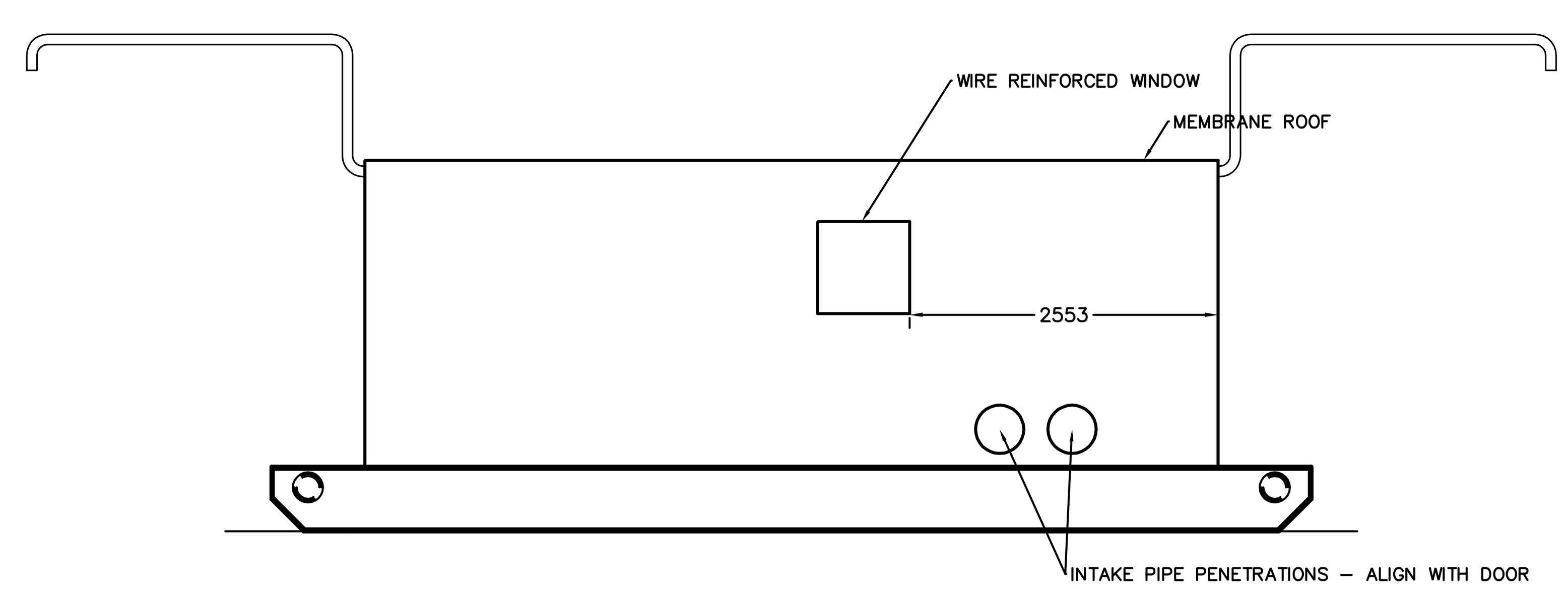
E DECKING SECTION
G-100 SCALE: 1:25



F FLASHING DETAIL
G-100 SCALE: 1:10



C PUMPHOUSE FRONT ELEVATION
G-100 SCALE: 1:50



D PUMPHOUSE REAR ELEVATION
G-100 SCALE: 1:50

BUILDING NOTES:

1. BUILDING TO BE A BALLY MODULAR STRUCTURE WITH THE FOLLOWING SPECIFICATIONS:
2. DESIGNED TO NATIONAL BUILDING CODE OF CANADA USING CLIMACTIC DATA FOR KUGAARUK, NUNAVUT (FORMERLY PELLY BAY, NT)
3. WALLS AND CEILING 152mm THICK
4. BR-2 BULLET RESISTANCE
5. MEMBRANE ROOF
6. ONE (1) DOOR 101.6mm THICK, 914mm X 2134mm, C/W HASP, CATCH, AND PADLOCK.
7. INTERIOR FINISH SMOOTH WHITE, EXTERIOR FINISH POLYESTER OVER GALVANIZED STEEL IN OWNER'S CHOICE OF COLOURS
8. ALL SHOP DRAWINGS TO BE STAMPED BY A P.ENG REGISTERED WITH THE NORTHWEST TERRITORIES AND NUNAVUT ASSOCIATION OF PROFESSIONAL ENGINEERS AND GEOSCIENTISTS (NAPEG).
9. FLOOR AND SKID NOT PROVIDED WITH BUILDING. SEE STRUCTURAL DRAWINGS FOR FLOOR AND SKID DETAILS.

REVISIONS

NO.	DESCRIPTION	YYYY.MM.DD	BY	APP.
0	ISSUED FOR TENDER	2013.01.08	JDG	JH

DRAWING NO.	DESCRIPTOR

REFERENCE DRAWINGS

FOR BEST PLOTTING RESULTS, BE SURE TO USE WILLIAMS ENGINEERING CANADA AUTOCAD PLOT CONFIGURATION FILES AVAILABLE FROM: www.williamsengineering.com

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CLIENT:

Nunavut

JOB TITLE:

WATER SUPPLY AND TREATMENT SYSTEM UPGRADES
KUGAARUK, NU

DWG. TITLE:

BUILDING LAYOUTS

DWN. BY: JDG	DES. BY: JDG	PROJ. MGR.: JH
PEER REVIEW: JH	DATE: (YY-MM-DD) 2013.01.08	SCALE: AS NOTED
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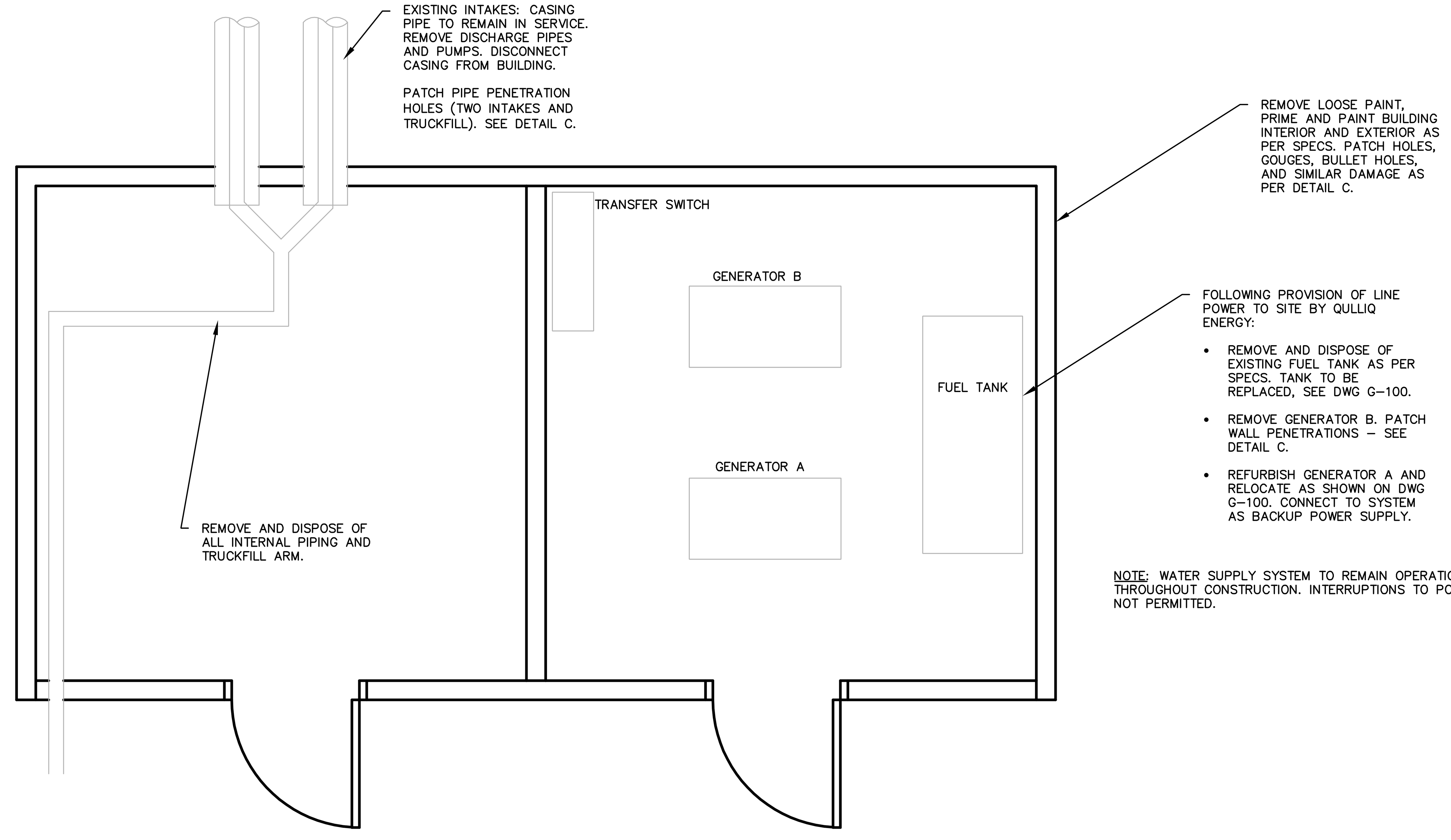
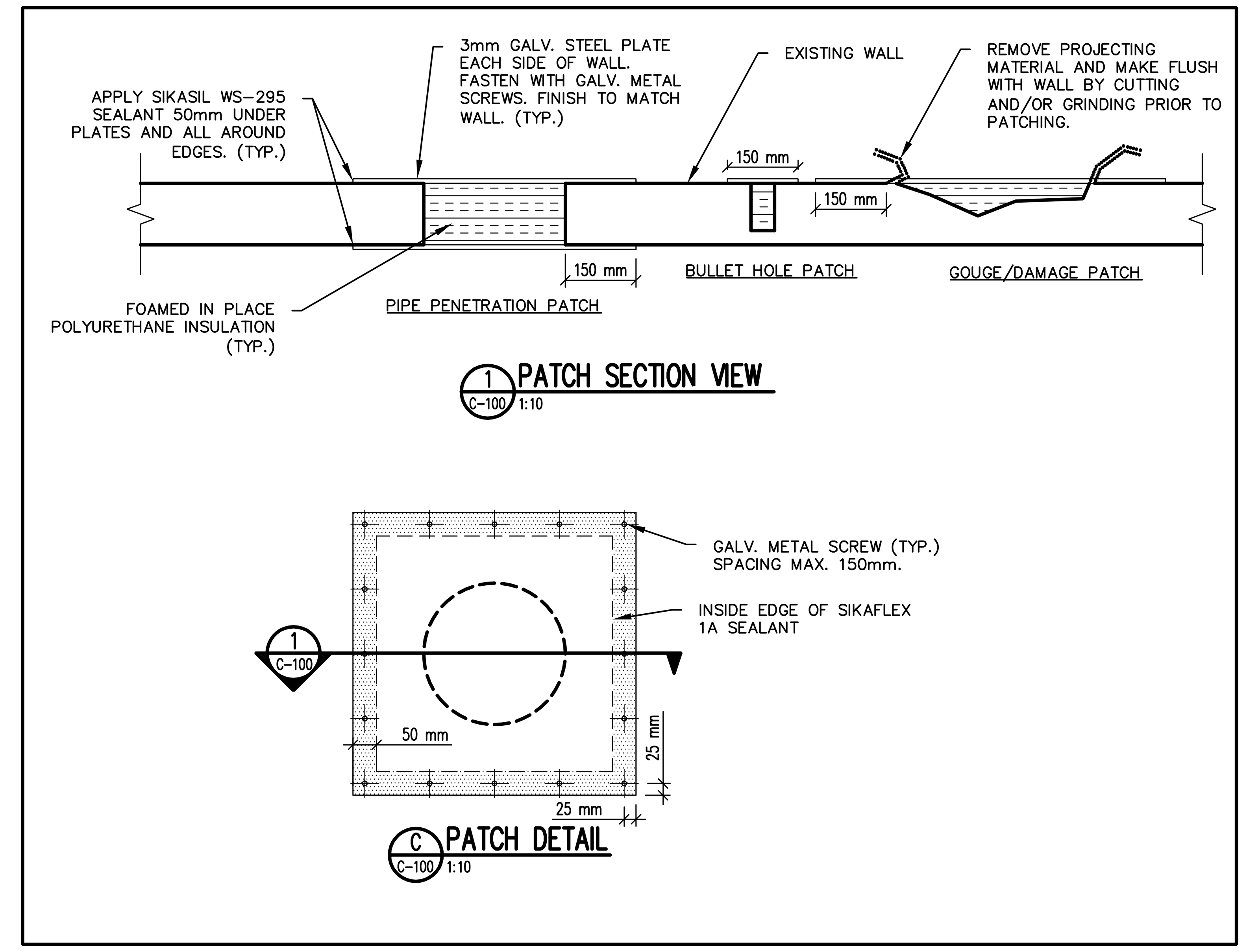
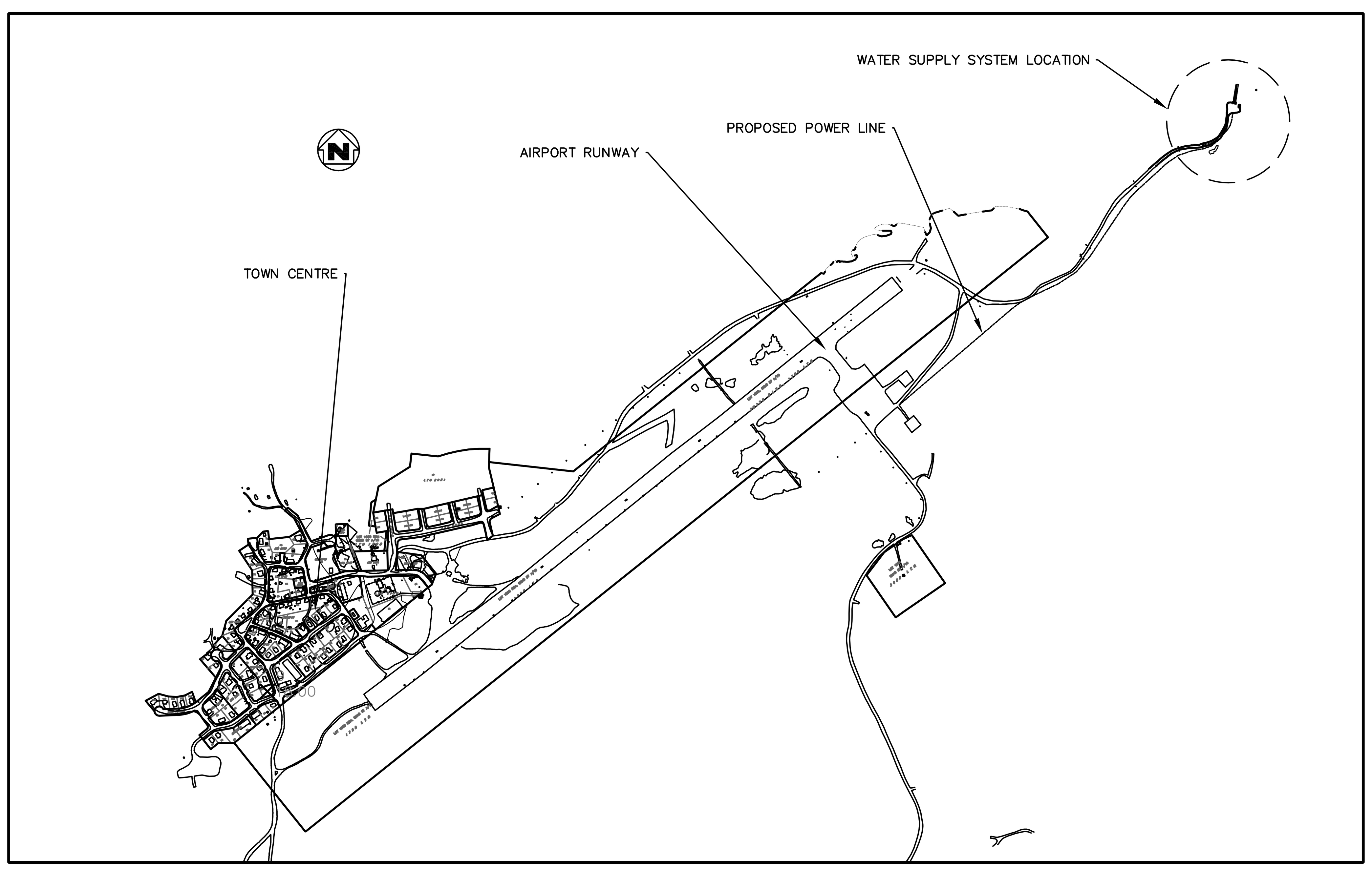
DWG #: 23893-G-100	1	REV: 0



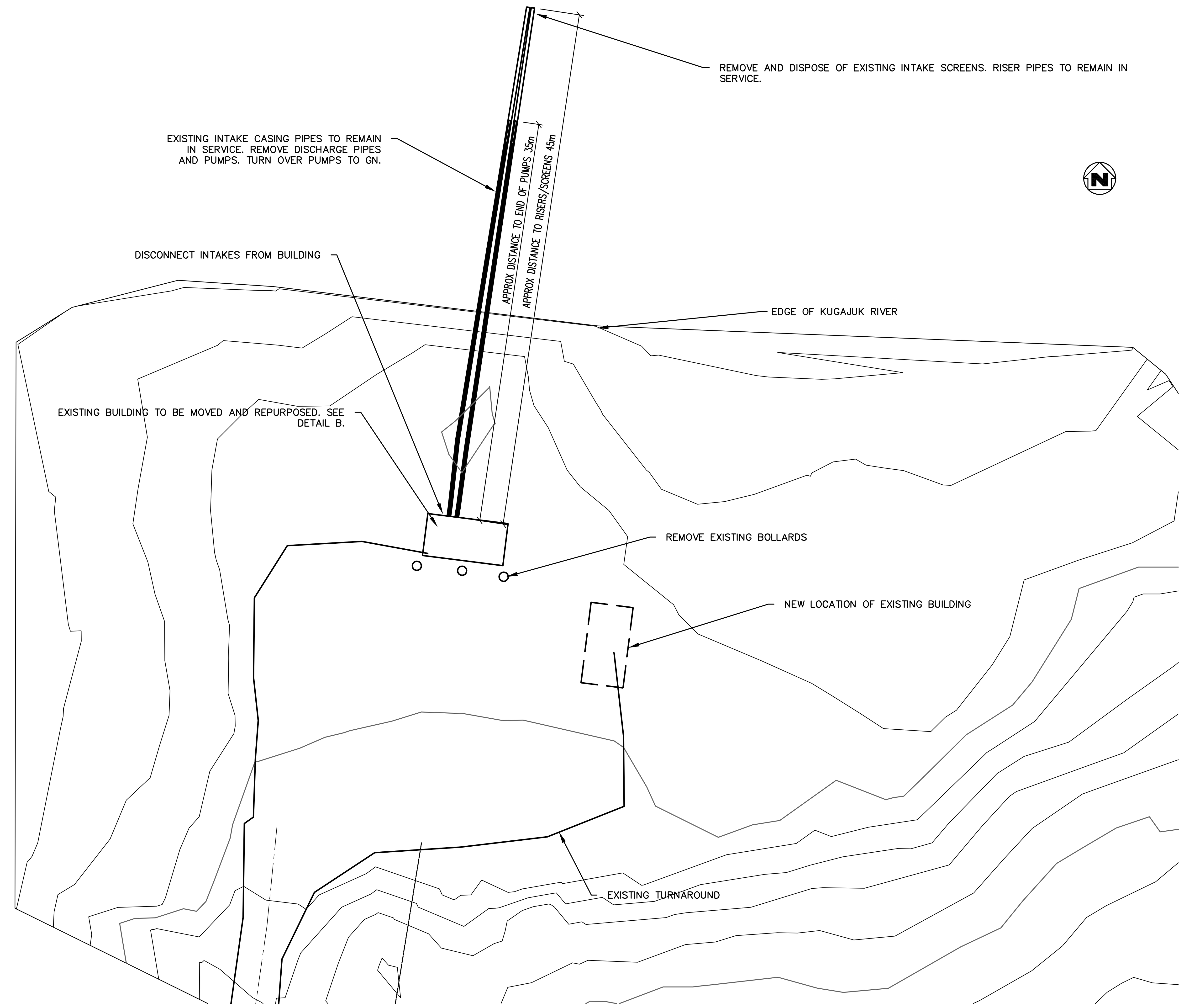
B / C-100 **EXISTING BUILDING** 1:25

NOTE: WATER SUPPLY SYSTEM TO REMAIN OPERATIONAL THROUGHOUT CONSTRUCTION. INTERRUPTIONS TO POWER SUPPLY ARE NOT PERMITTED.





D / C-100 **MAP OF KUGAARUK, NU** 1:10000



A / C-100 **EXISTING SITE PLAN** 1:250

REVISIONS				
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DRAWING NO.	DESCRIPTOR

REFERENCE DRAWINGS

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WILLIAMS ENGINEERING CANADA

CLIENT:
Nunavut

JOB. TITLE:
WATER SUPPLY AND TREATMENT SYSTEM UPGRADES
KUGAARUK, NU

DWG. TITLE:
DEMOLITION AND RELOCATION

DWN. BY: JDG	DES. BY: JDG	PROJ. MGR.: JH
PEER REVIEW: JH	DATE: (YY-MM-DD) 2013.01.08	SCALE: 1:250
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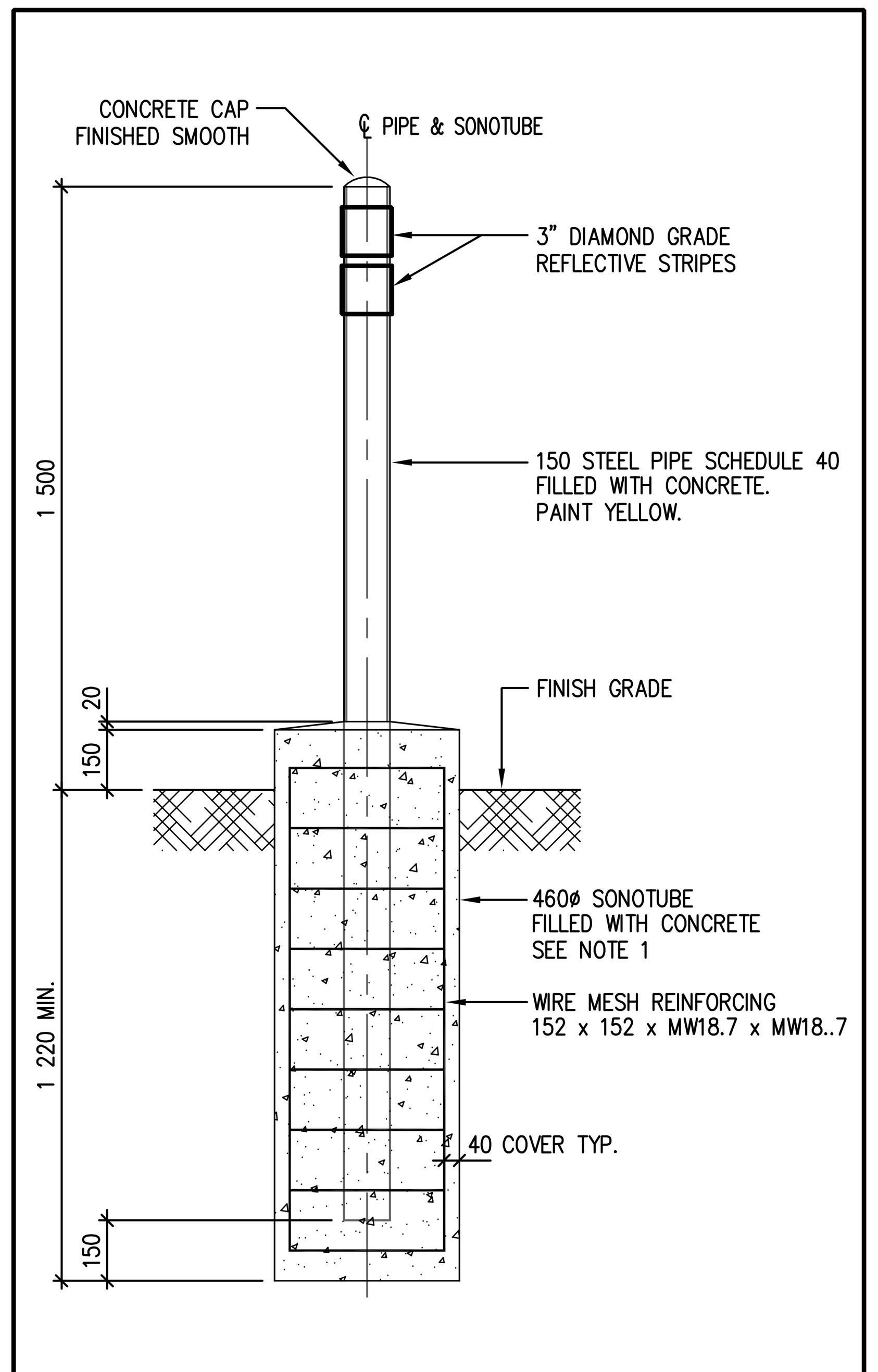


B / C-100 BOLLARD (TYP.)
NTS

Point Table

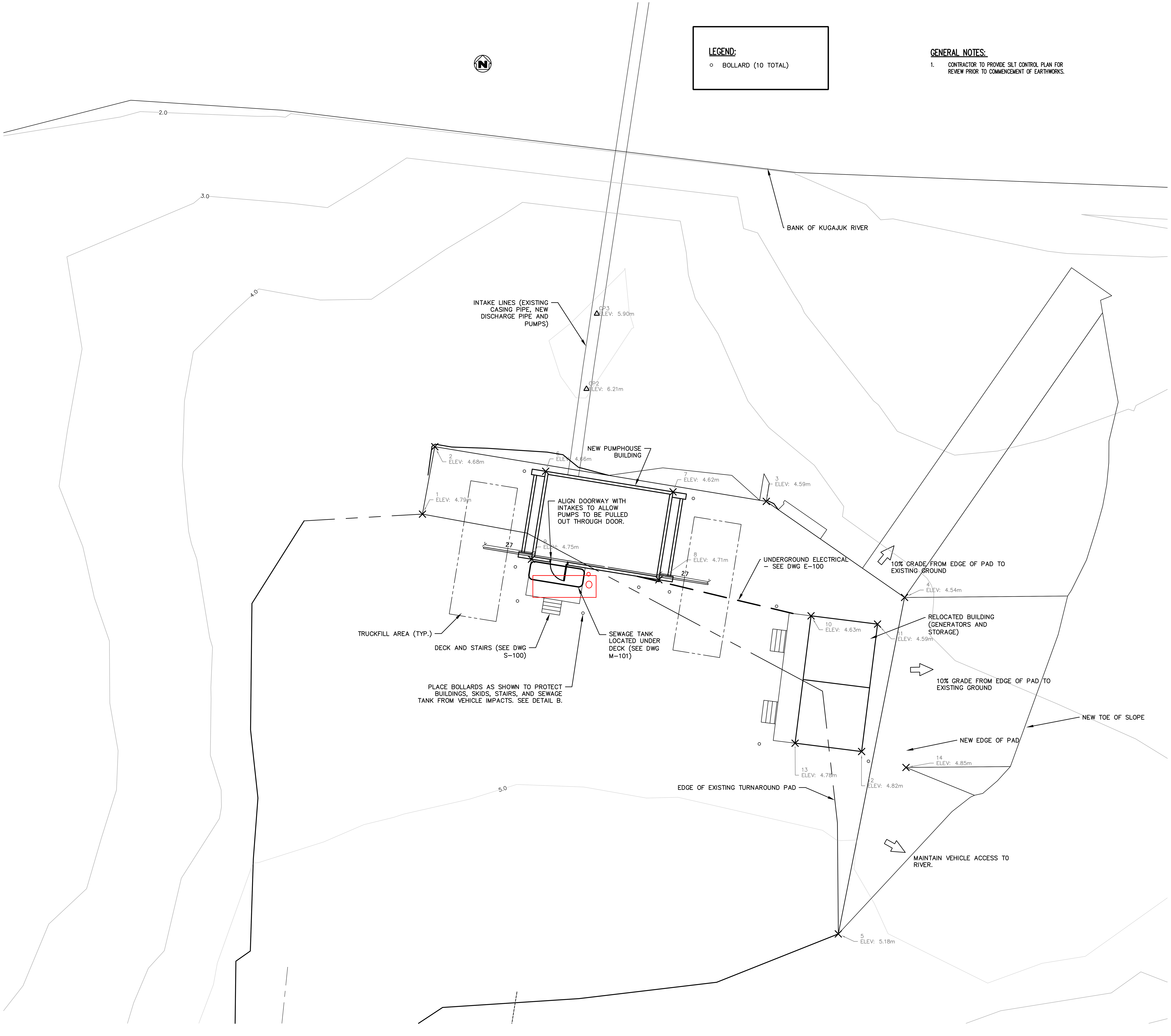
Point #	Elevation	Northing	Easting	Description
1	4.79	7606199.57	386962.92	Design Elevation
2	4.68	7606203.29	386963.60	Design Elevation
3	4.59	7606200.27	386981.87	Design Elevation
4	4.54	7606194.97	386989.49	Design Elevation
5	5.18	7606176.42	386985.84	Design Elevation
6	4.66	7606201.93	386969.71	Design Elevation
7	4.62	7606200.80	386976.73	Design Elevation
8	4.71	7606195.95	386975.95	Design Elevation
9	4.75	7606197.08	386968.93	Design Elevation
10	4.63	7606193.96	386984.34	Design Elevation
11	4.59	7606193.50	386988.01	Design Elevation
12	4.82	7606186.48	386987.13	Design Elevation
13	4.78	7606186.94	386983.46	Design Elevation
14	4.85	7606185.60	386989.58	Design Elevation
101	6.21	7606206.47	386971.96	CP2
102	5.90	7606210.62	386972.53	CP3

LEGEND:

○ BOLLARD (10 TOTAL)

GENERAL NOTES:

1. CONTRACTOR TO PROVIDE SILT CONTROL PLAN FOR REVIEW PRIOR TO COMMENCEMENT OF EARTHWORKS.



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CLIENT:
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JOB. TITLE:
WATER SUPPLY AND TREATMENT SYSTEM UPGRADES
KUGAARUK, NU

DWG. TITLE:
SITE LOCATION AND SITE PLAN

DWN. BY: JDG	DES. BY: JDG	PROJ. MGR.: JH
PEER REVIEW: JH	DATE: (YY-MM-DD) 2013.01.08	SCALE: 1:5000
CLIENT PROJ. # CT 11-3800		WE PROJ. # 23893
DWG # 23983-C-200	OF 3	REV # 0