



Environnement  
Canada

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# **NHRC GENERATOR REPLACEMENT**

## **AT**

# **NATIONAL HYDROLOGY RESEARCH CENTRE**

# **DRAWINGS**

**REAL PROPERTY MANAGEMENT DIVISION, TECHNICAL SERVICES  
11 INNOVATION BLVD.  
SASKATOON, SK S7N 3H5**

**PROJECT: NHRC-005-J1301  
DATE: JUNE 21, 2016  
ISSUED FOR TENDER**

RESOURCES ROW

PRESTON AVENUE NORTH

INNOVATION BOULEVARD

GENERAL NOTES

- 1.EQUIPMENT SCREEN SHALL BE BE ARCHLOUVERS, OR ENVISOR BY CITYSCAPES. FINISHES TO BE CONFIRMED BY OWNER. SUPPLIED AND INSTALLED BY CONTRACTOR.
- 2.EXACT LOCATIONS OF GENERATOR, LOAD BANK AND FENCING TO BE CONFIRMED ON SITE.
- 3.CLEARANCE OF AT LEAST 1M SHALL BE PRESENT AROUND ALL OUTDOOR EQUIPMENT, OR TO MEET MANUFACTURERS RECOMMENDATIONS.
- 4.STRUCTURAL PAD SHALL EXTEND TO THE CURB OF THE ADJACENT PARKING LOT.
- 5.STRUCTURAL PAD MAY SHIFT WITH TEMPERATURE CHANGES. USE FLEXIBLE CABLES AT JOINTS FOR CONNECTING CONDUITS FROM THE BUILDING TO EQUIPMENT ON THE CONCRETE PAD.

LOCATION OF NHRC GENERATOR ROOM

AREA OF RENOVATION

EXISTING TEMPORARY GENERATOR

PROPOSED NEW LOAD BANK LOCATION

PROPOSED EQUIPMENT SCREEN LOCATION

PROPOSED NEW GENERATOR LOCATION

EXISTING FUEL TANK



1 SITE PLAN  
G1.0 1:250

Environment Canada  
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Real Property Management Services  
Gestion des biens immobiliers  
Services Techniques

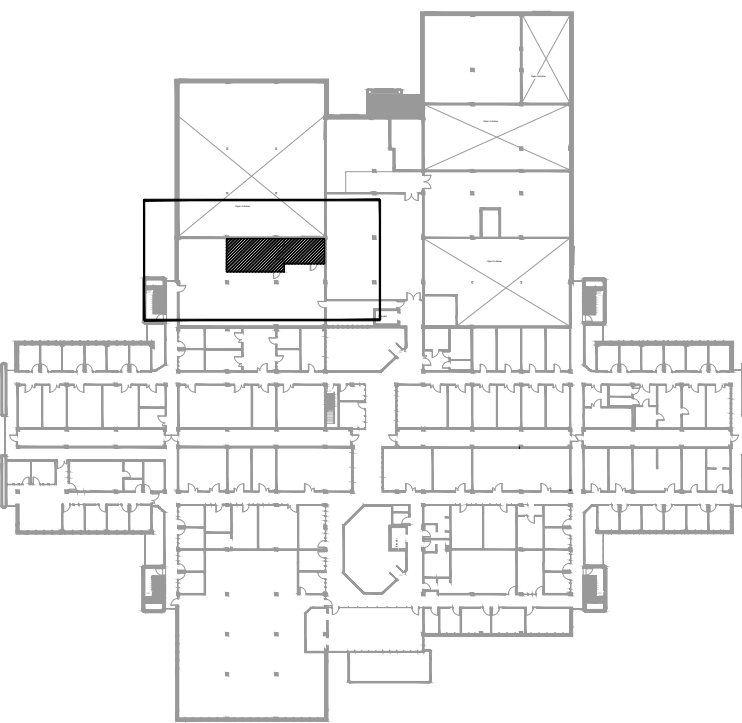
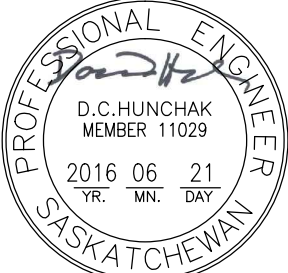
Client

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ASSOCIATION OF PROFESSIONAL ENGINEERS  
OF SASKATCHEWAN  
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RITENBURG & ASSOCIATES LTD.

NUMBER 52  
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DISCIPLINE: ELECTRICAL  
SASK. REG. NO.: 11029  
SIGNATURE: [Signature]



1	95% REVIEW SET	16/03/21
2	TENDER DRAWINGS	16/04/20

revisions	description	date
A	detail number	
B	source drawing no.	
C	detail on drawing no.	

project title  
**NATIONAL HYDROLOGY  
RESEARCH CENTRE  
GENERATOR REPLACEMENT**  
titre du projet

drawing title  
**SITE PLAN**  
titre du dessin

designed by  
DCH  
conçu par

drawn by  
MJS  
dessiné par

approved by  
[Signature]  
approuvé par

PWOSC Project Manager  
Administrateur de Projets TP50C

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project no.  
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projet no.

date  
June 2016  
date

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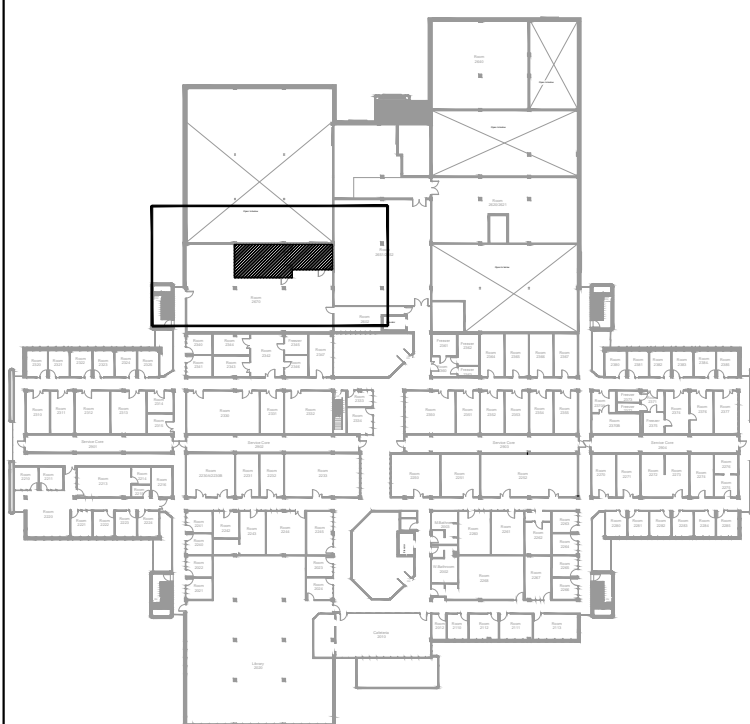
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Client





NUMBER 52

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ELECTRICAL	11029	<i>[Signature]</i>



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2	TENDER SET	16/06/21

revisions	description	date
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project title	titre du projet
<p align="center"><b>NATIONAL HYDROLOGY RESEARCH CENTRE GENERATOR REPLACEMENT</b></p>	

drawing title	titre du dessin
<h1 style="margin: 0;">ELECTRICAL</h1> <h1 style="margin: 0;">ELECTRICAL PLAN</h1>	

designed by	conçu par
DCH	

drawn by **MJS** dessiné par

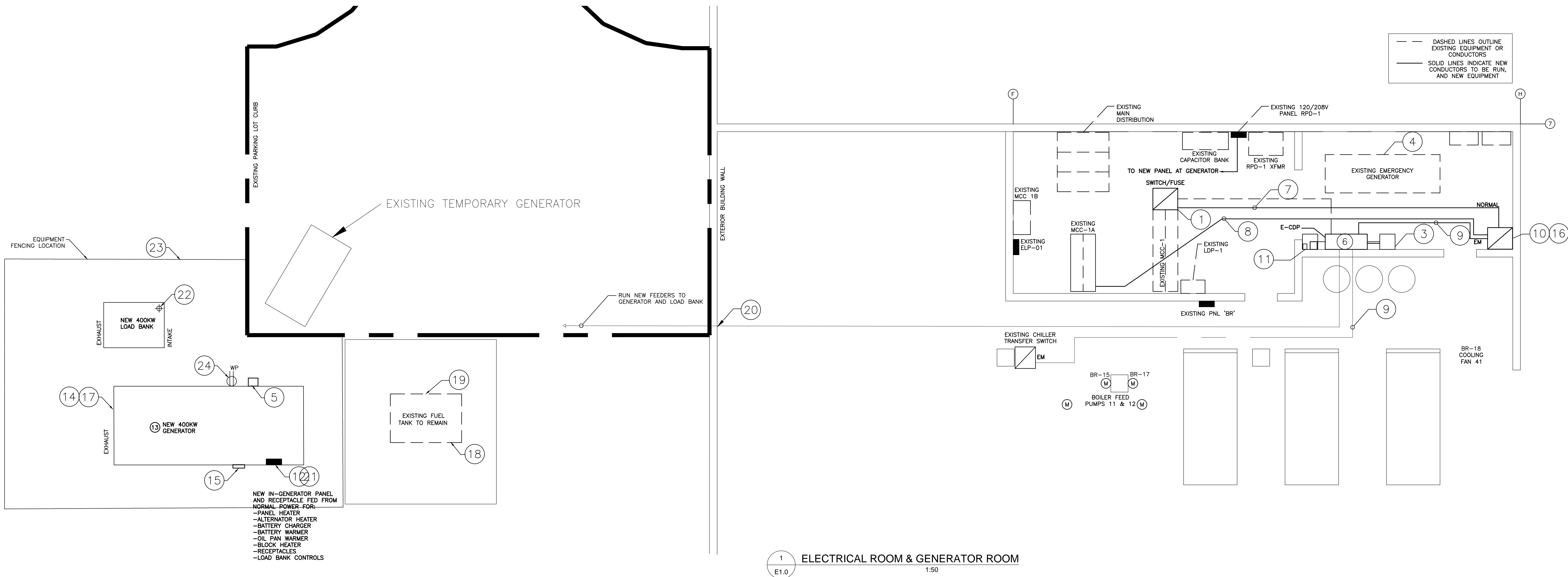
approved by	approuvé par
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PWGSC Project Manager	Administrateur de Projets TPSGC
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date	date	OF 1
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EXISTING 400A SWITCHFUSE.

UNUSED.

EXISTING MANUAL TRANSFER SWITCH TO REMAIN.

EXISTING GENERATOR TO BE REMOVED WITH ALL WIRING REMOVED BACK TO SOURCE.

EXTERIOR SPLITTER MOUNTED ON GENERATOR C/W SPARE LUGS FOR CONNECTING 400A LOADBANK. LOADBANK LUGS SHALL BE 2-600MCM LUGS/PHASE.

EXISTING EMERGENCY E-CDP.

PROVIDE NEW FEEDERS FROM 400A SWITCH FUSE TO NEW TRANSFER SWITCH.

PROVIDE NEW FEEDERS FROM EMERGENCY TRANSFER SWITCH TO MCC-1A.

PROVIDE NEW FEEDER FROM EMERGENCY TRANSFER SWITCH TO E-CDP.

NEW EMERGENCY TRANSFER SWITCH.

EXISTING 200A LOAD BANK TO REMAIN.

NEW PANEL FED FROM NORMAL POWER. FEED FROM EXISTING NEAREST 120/208V PANEL.

NEW 400KW GENERATOR C/W 400A MOLDED CASE BREAKER. REFER TO SPECIFICATIONS.

RUN CONTROL WIRING FROM TRANSFER SWITCH TO GENERATOR CONTROL PANEL FOR GENERATOR STARTUP.

CONTACTS ON GENERATOR TO RUN TO FIRE ALARM AND TO SECURITY TO SIGNAL GENERATOR STATUS.

CONTROL CONTACTS FROM TRANSFER SWITCH TO ELEVATOR CONTROL PANELS. PROVIDE ALL WIRING AND CONNECTIONS.

GENERATOR TO BE GROUNDED

EXISTING FUEL TANK TO BE BONDED TO GROUND

PROVIDE CONNECTION FROM NEW GENERATOR TO NEW TRANSFER SWITCH. ALL CONNECTIONS SHALL BE WATERPROOF. CONDUCTORS SHALL BE NEW TEBBQ AND SURFACE MOUNTED STANDOFFS WHERE RUN OUTSIDE ABOVE GRADE.

PROVIDE CORING FOR ALL EXTERIOR WALLS TO ACCEPT FEED THROUGH OF CABLEING. ALL EXTERIOR WALL PENETRATIONS SHALL BE SEALED WITH WATER TIGHT ON BOTH SIDES OF WALL TO SATISFACTION OF FACILITY PERSONNEL. ALL CORING LOCATIONS SHALL BE APPROVED ON SITE.

COORDINATE FINAL PANEL AMPACITY WITH GENERATOR SUPPLIER FOR GENERATOR ENCLOSURE BREAKER PANEL AS WELL AS ENCLOSURE ENTRANCE FOR THE CABLE.

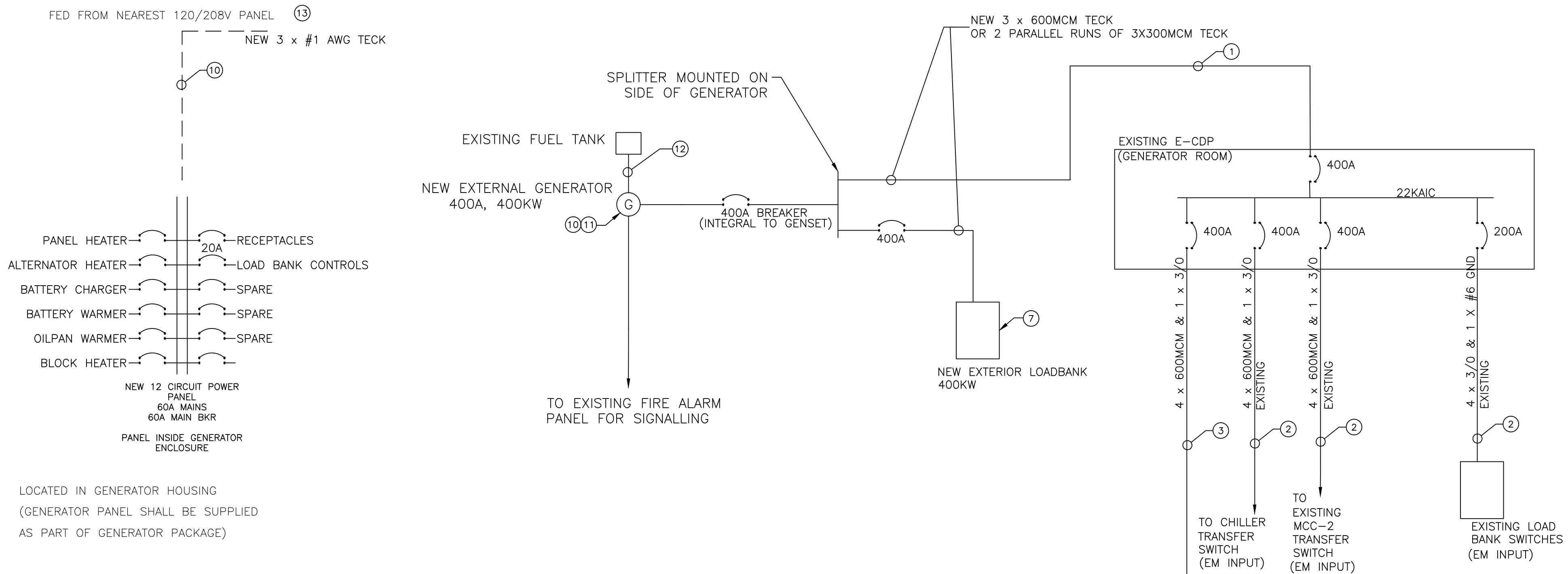
LOAD BANK FED FROM BELOW. ALL NECESSARY CABLES TO BE LAID PRIOR TO CONCRETE POURING.

EQUIPMENT FENCING SHALL MAINTAIN CLEARANCES AS PER THE MOST RECENT BUILDING CODE.

PROVIDE 20A GFI RECEPTACLE C/W METAL WHIRL IN USE COVER ON GENERATOR ENCLOSURE.

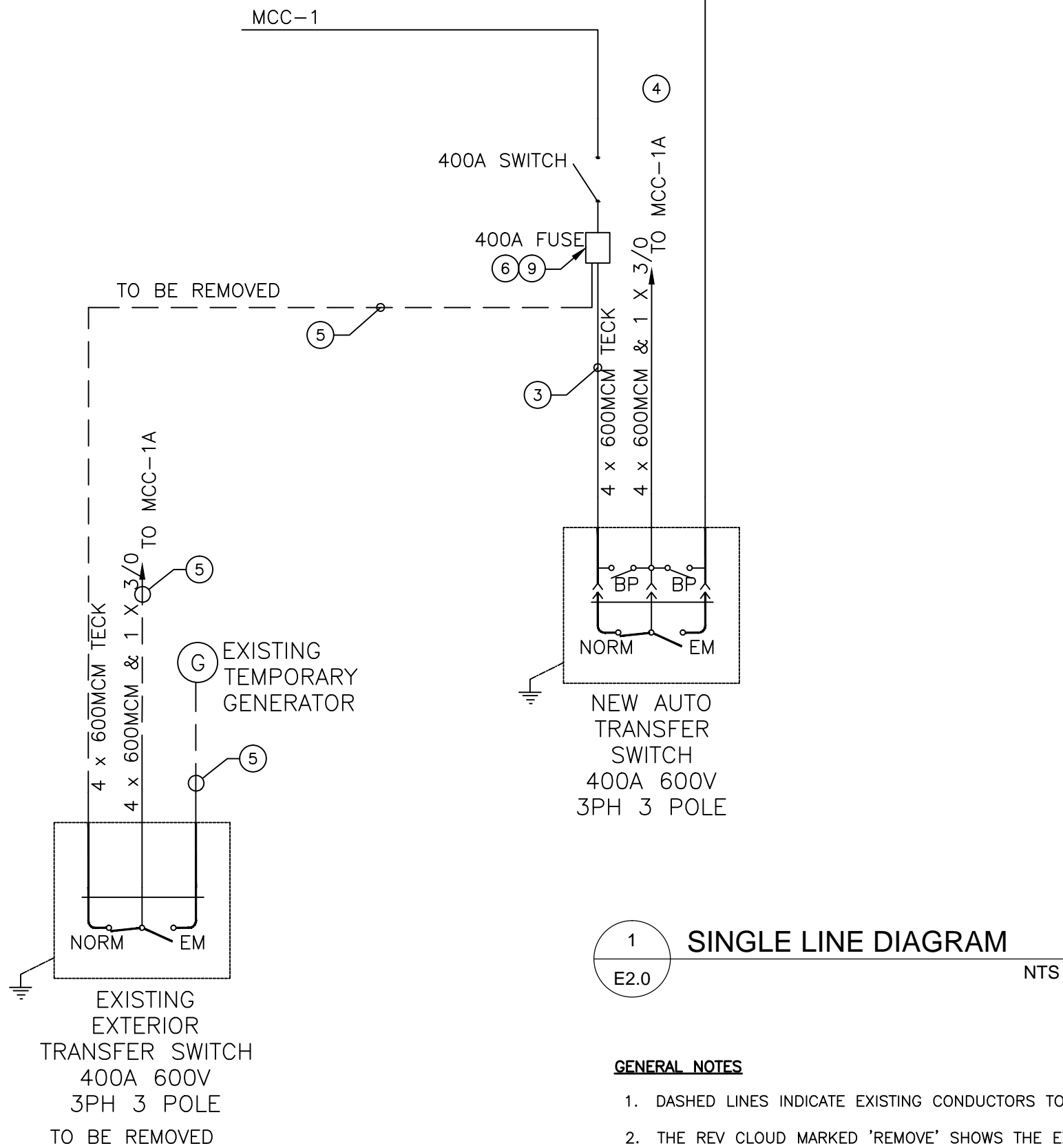
1. PROVIDE A TEMPORARY EMERGENCY GENERATOR TO RUN ALL LOADS CONNECTED TO MCC-1 WHILE THE EXISTING GENERATOR IS BEING REPAIRED. THE TRADITIONAL GENERATOR CONTROL PANEL, THIS BONDING CONTAINS CRITICAL LOADS WHICH MUST REMAIN OPERATIONAL. CONTRACTOR SHALL INCLUDE ALL COSTS ASSOCIATED WITH TEMPORARY GENERATOR INCLUDING CONNECTIONS AND FUEL.
2. ALL WORK ASSOCIATED WITH THE TRANSFER SWITCH AND GENERATOR CONTROL PANEL REPLACEMENT ARE TO BE COMPLETED AS SOON AS POSSIBLE. THE OWNER ACCEPTABLE TO THE OWNER. THE OWNER WILL NOT CONSIDER ANY ADDITIONAL CHARGES TO THE CONTRACT FOR OVERTIME.
3. BOND FUEL TANK TO STRUCTURAL LUG USING #6 GROUND.
4. FUEL PUMP SHALL BE BONDED TO TO GROUND GROUND USING #6 GROUND.
5. GENERATOR AND GENERATOR ENCLOSURE SHALL BE BONDED TO EXISTING GROUND PANEL.
6. GENERATOR CONCRETE SLAB MAY SHIFT SLIGHTLY WITH THE SOIL, AS SUCH, ALL CONNECTIONS TO THE GENERATOR SHALL BE MADE WITH FLEXIBLE CABLES SUCH AS TEKCON, AND BE WEATHERPROOF.

- SEQUENCE OF OPERATION.
1. INSTALL NEW CEMENT PAD FOR GENERATOR, RUN ALL NECESSARY CONDUITS PRIOR TO POURING THE SLAB. (COMPLETE WITH ALL UNDER SLAB CONDUIT ROUGHED IN).
2. RUN NEW FEEDERS AS REQUIRED FOR THE PROJECT. THIS WILL PREPARE THE INSTALLATION FOR THE NEW LAYOUT. THESE FEEDERS  
INCLUDE:
  - a. FEEDERS FROM SWITCH/FUSE IN MCC-1 TO NEW TRANSFER SWITCH LOCATION
  - b. FEEDERS FROM NEW TRANSFER SWITCH TO MCC-1A
  - c. FEEDERS FROM THE EMERGENCY GENERATOR TO THE NEW E-CDP
  - d. FEEDERS FROM THE E-CDP TO THE NEW TRANSFER SWITCH LOCATION.
3. SET INTO PLACE THE NEW CLOSED TRANSITION TRANSFER SWITCH AS SHOWN ON THE PLANS.
4. TERMINATE THE FOLLOWING FEEDS ONTO THE NEW TRANSFER SWITCH
  - a. UTILITY POWER FROM MCC 1.
  - b. EMERGENCY POWER FROM E-CDP
3. TAKE OVER EXISTING TEMPORARY GENERATOR CONTRACT.
4. INSTALL NEW EMERGENCY GENERATOR OUTSIDE ON NEW CONCRETE SLAB.
5. RUN NEW MECHANICAL PIPING TO NEW GENERATOR LOCATION
6. TERMINATE THE FOLLOWING FEEDERS:
  - a. FEEDER FROM THE NEW GENERATOR TO E-CDP.
  - b. FEEDER FROM E-CDP TO THE NEW TRANSFER SWITCH.
  - c. FEEDER ASSOCIATED WITH THE NEW LOAD BANK TO THE GENERATOR EXTERIOR SPLITTER.
7. REQUEST A SHUTDOWN OF MCC-1.
  - a. START TEMPORARY GENERATOR.
  - b. TERMINATE ALL FEEDERS ASSOCIATED WITH THE NORMAL POWER FEEDERS FROM MCC-1 TO TRANSFER SWITCH.
10. TEST/COMMISSION THE EMERGENCY GENERATOR TO ENSURE THAT THE NEW GENERATOR CONTROL PANEL FUNCTIONS PROPERLY, VIA LOADING FROM THE PERMANENT 400KW LOAD BANK.
  - a. TEST/COMMISSION THE EMERGENCY GENERATOR TO ENSURE THAT IT FUNCTIONS PROPERLY. TESTING SHALL INCLUDE THE FOLLOWING AND SHALL BE CONDUCTED IN THE PRESENCE OF THE CONSULTANT.
    - b. TESTING THE TRANSFER SWITCH WHILE THE GENERATOR IS 'ON' TO ENSURE THAT THE TRANSFER SWITCH CARRIES THE LOAD SEAMLESSLY UNDER TEST CONDITIONS BETWEEN UTILITY POWER AND EMERGENCY AND BACK TO UTILITY POWER AGAIN.
    - c. TESTING THE TRANSFER SWITCH WHILE THE GENERATOR IS OFF BY OPENING UP THE SWITCH/FUSE LOCATED IN MCC-1 TO ENSURE THAT THE GENERATOR STARTS AND THE TRANSFER SWITCH SWITCHES THE LOAD TO EMERGENCY POWER. THE SWITCH IN MCC-1 SHALL THEN BE SWITCH BACK 'ON' TO ENSURE THAT THE GENERATOR SWITCHES BACK TO UTILITY POWER SEAMLESSLY.
11. THE TRANSFER SWITCH SHALL BE TESTED IN MANUAL BYPASS MODE.
12. CONFIRM THAT A SHUTDOWN OF MCC-1A IS REQUIRED.
13. REMOVE THE CONDUCTORS FROM THE TEMPORARY GENERATOR TO MCC-1A AND TIE IN THE PERMANENT FEEDERS FROM E-CDP.
14. TEST THE TRANSFER SWITCH FUNCTION AGAIN UNDER THE LOAD CONDITIONS OF MCC-1A .
15. REMOVE OLD GENERATOR AND ASSOCIATED COMPONENTS.



#### DRAWING NOTES

- 1 RUN NEW FEEDERS FROM EXTERIOR GENERATOR TO E-CDR.
- 2 EXISTING FEED TO REMAIN.
- 3 RUN NEW FEEDERS AS SHOWN.
- 4 RUN NEW FEEDERS FROM TRANSFER SWITCH TO MCC-1A AS SHOWN.
- 5 EXISTING TEMPORARY GENERATOR FEEDS TO BE REMOVED. REFER TO SUMMARY OF WORK IN SPECIFICATION SECTION 01 11 55.
- 6 CONFIRM EXISTING TRANSFER SWITCH WAS REMOVED, 400A SWITCH/FUSE HAS BEEN INSTALLED (COMPLETED IN PHASE 1) AND IS PREPARED FOR INCOMING CONDUCTORS TO NEW TRANSFER SWITCH.
- 7 PROVIDE 15A CONTROL CIRCUIT FROM GENERATOR ELECTRICAL PANEL TO LOAD BANK CONTROL PANEL LOCATED IN LOAD BANK.
- 8 UNUSED.
- 9 400A SWITCH/FUSE LOCATED IN OLD TRANSFER SWITCH LOCATION IN MCC1. CONFIRM ALL LUGGING ON SWITCH/FUSE IS ACCEPTABLE FOR OUTGOING FEEDERS TO TRANSFER SWITCH.
- 10 PROVIDE NEW FEEDERS FROM NEAREST 120/208V PANEL TO GENERATOR PANEL LOCATED WITHIN GENERATOR. SEE SITE PLAN FOR LOCATION.
- 11 NEW ENCLOSED DIESEL GENERATOR C/W 400A BREAKER. GENERATOR SHALL HAVE EXTERIOR SPLITTER FOR TYING ON TEMPORARY EXTERNAL LOADBANK. REFER TO SPECIFICATIONS.
- 12 PROVIDE CONNECTION FROM THE EXISTING FUEL TANKS TO THE GENERATOR INCLUDING ALL GAS CONNECTIONS AND GROUND BONDING.
- 13 PROVIDE NEW 60A-2P BREAKER IN NEAREST 120/208V PANEL FOR GENERATOR PANEL.



#### GENERAL NOTES

1. DASHED LINES INDICATE EXISTING CONDUCTORS TO BE REMOVED OR REROUTED.
2. THE REV CLOUD MARKED 'REMOVE' SHOWS THE EXISTING GENERATOR CONTROL PANEL AND TRANSFER SWITCH TO BE REMOVED.
3. THE REV CLOUD MARKED 'NEW' SHOWS THE NEW EQUIPMENT AND THE FEEDERS TO BE INSTALLED.
4. THE CONTRACTOR SHALL BE RESPONSIBLE FOR ALL COSTS INCLUDING FUEL AND LOAD BANKS ASSOCIATED WITH TESTING OF THE EMERGENCY GENERATOR. IN ADDITION, THE CONTRACTOR SHALL BE RESPONSIBLE FOR ALL COSTS ASSOCIATED WITH A TEMPORARY GENERATOR WITHIN THE BASE CONTRACT FOR A PERIOD OF 3 WEEKS INCLUDING RENTAL, FUEL, CONNECTION COSTS, ETC. THE CONTRACTOR SHALL PROVIDE A UNIT COST FOR EACH ADDITIONAL WEEK FOR THE EMERGENCY GENERATOR IF REQUIRED.

Client

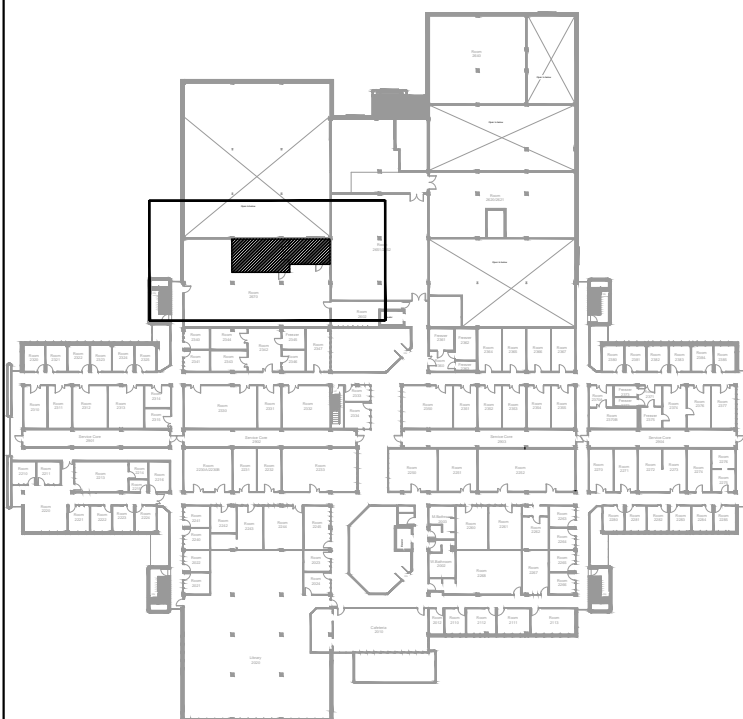
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OF SASKATCHEWAN  
CERTIFICATE OF AUTHORIZATION  
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1	90% REVIEW SET	16/03/21
2	TENDER SET	16/06/21

revision	description	date
A	detail number number du detail	A
B	source drawing no. de dessin no.	B
C	detail on drawing no. detail sur dessin no.	C

project title  
**NATIONAL HYDROLOGY  
RESEARCH CENTRE  
GENERATOR REPLACEMENT**

drawing title  
**ELECTRICAL  
SINGLE LINE DIAGRAM**

designed by  
DCH

drawn by  
MJS

approved by

PMWSC Project Manager

scale  
N.T.S.

project no.

date  
June 2016

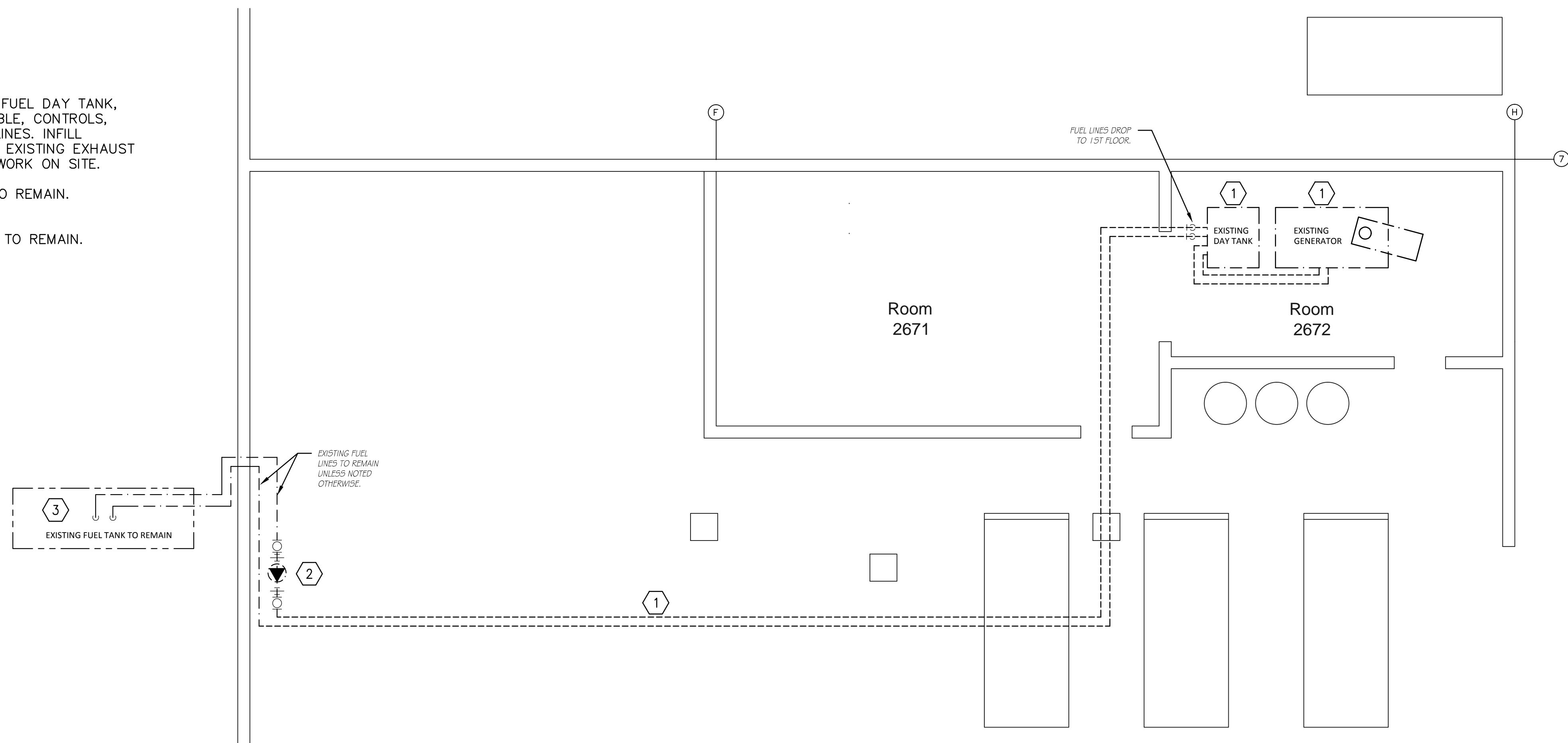
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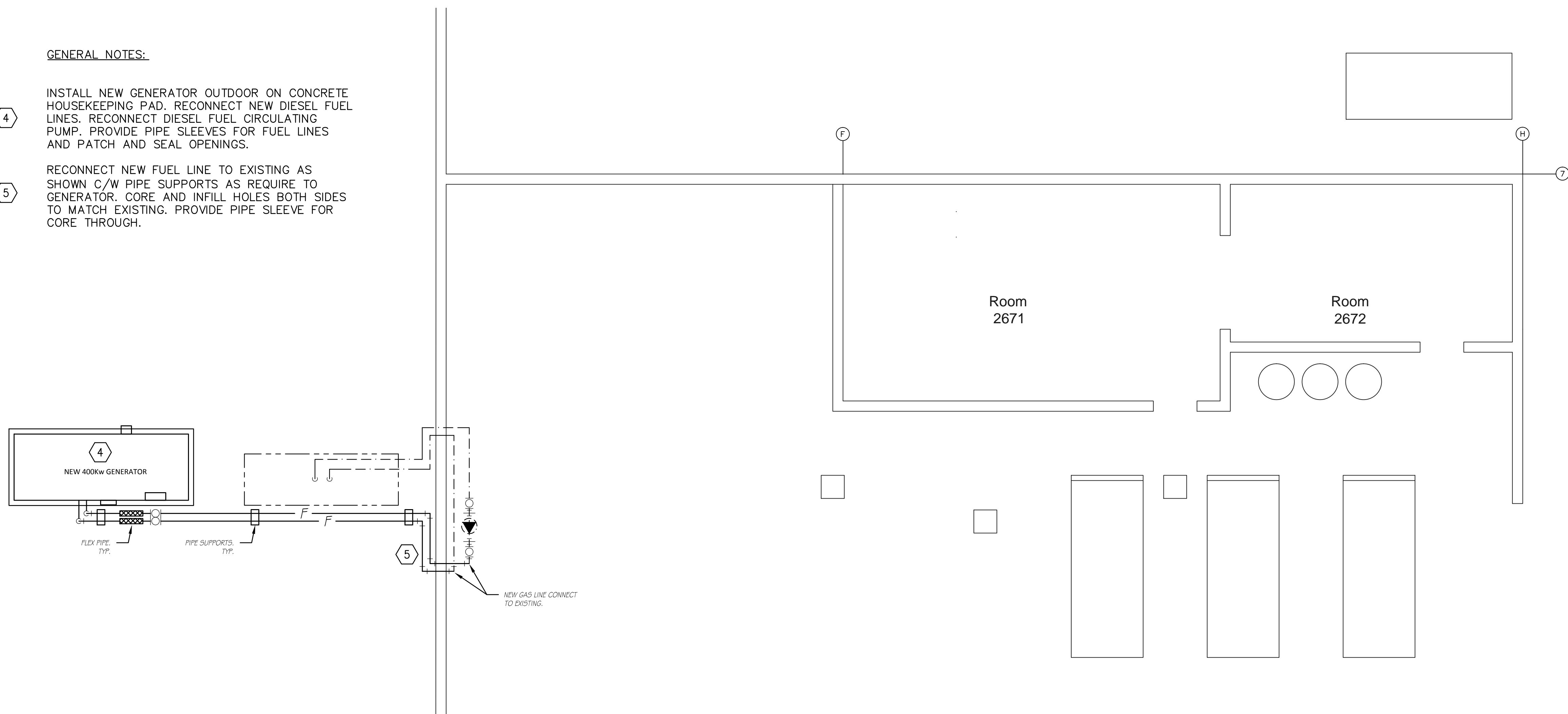


- 1 REMOVE EXISTING GENERATOR, FUEL DAY TANK, MUFFLER, EXHAUST WALL THIMBLE, CONTROLS, PANELS, HANGERS AND FUEL LINES. INFILL OPENINGS TO MATCH EXISTING. EXISTING EXHAUST LOUVRE TO REMAIN. CONFIRM WORK ON SITE.
- 2 EXISTING FUEL RECIRC PUMP TO REMAIN.
- 3 EXISTING OUTDOOR FUEL TANK TO REMAIN.

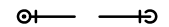



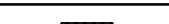


 1 DEMOLITION GENERATOR PLAN  
1.50

4. INSTALL NEW GENERATOR OUTDOOR ON CONCRETE HOUSEKEEPING PAD. RECONNECT NEW DIESEL FUEL LINES. RECONNECT DIESEL FUEL CIRCULATING PUMP. PROVIDE PIPE SLEEVES FOR FUEL LINES AND PATCH AND SEAL OPENINGS.

5. RECONNECT NEW FUEL LINE TO EXISTING AS SHOWN C/W PIPE SUPPORTS AS REQUIRE TO GENERATOR. CORE AND INFILL HOLES BOTH SIDES TO MATCH EXISTING. PROVIDE PIPE SLEEVE FOR CORE THROUGH.



2 NEW GENERATOR PLAN  
1:50

LEGEND	
SYMBOL	DESCRIPTION
VALVES & FITTINGS	
	ELBOW UP, ELBOW DOWN
	UNION
	BALL VALVE
	FLEXIBLE PIPE CONNECTION
MISCELLANEOUS	
	NEW DIESEL FUEL LINE
	DEMOLITION FUEL LINE
	EXISTING FUEL LINE TO REMAIN

 Environment Canada  
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Real Property Management Division  
Technical Services

Division Gestion des biens immobilier  
Services Techniques

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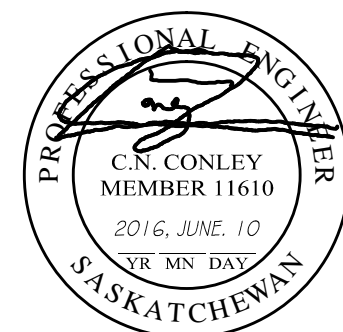
CERTIFICATE OF AUTHORIZATION

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ENGINEERING LTD.**

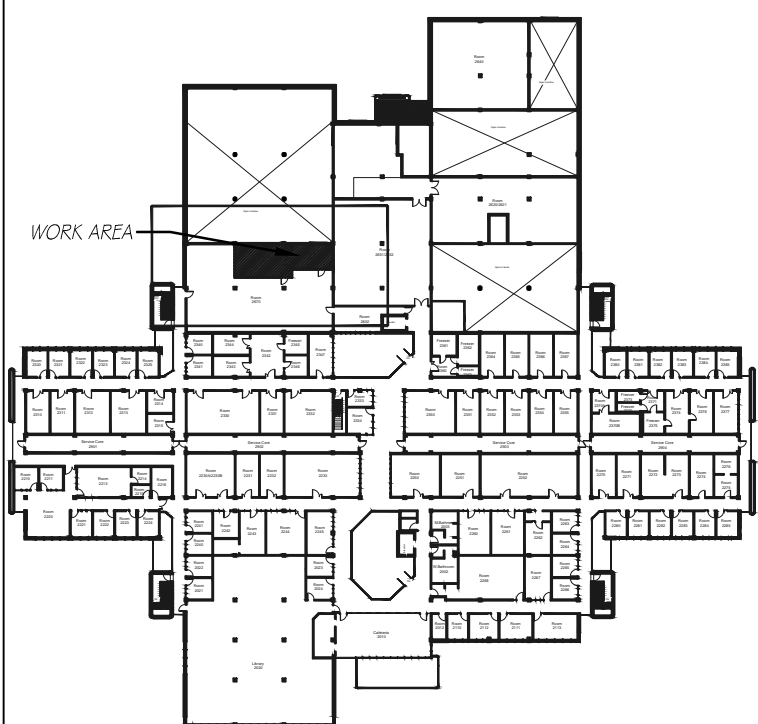
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

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revisions	description	date
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	B source drawing no. de dessin no.	
	C detail on drawing no. detail sur dessin no.	

project title titre du projet

**NATIONAL HYDROLOGY  
RESEARCH CENTRE  
GENERATOR REPLACEMENT**

drawing title	titre du dessin
<b>MECHANICAL PLAN</b> <b>LEGEND</b> <b>SITE PLAN</b>	

designed by		conçu par	
CC			
drawn by		dessiné par	
MT			
approved by		approuvé par	
PWGSC Project Manager		Administrateur de Projets TPSGC	
scale	1:50	sheet	feuille
project no.		M1.0	
project no.			
date		OF 1	
	June 10 2016		