



March 17, 2004

Mr. Emanuel DaRosa
T&D Asset and Investment Manager
Asset Management and Engineering Dept.
Transmission and Distribution Division
Great Lakes Power Limited – Transmission Division
2 Sackville Road
Sault Ste. Marie, Ontario
P6B 6J6

Dear Mr. DaRosa

***New Gartshore TS
Notification of Approval of Connection Proposal
CAA ID Number: 2003-EX173***

Thank you for the detailed information that you provided on the plan to replace the existing Gartshore TS with a new 115 kV switching station configured as a ring bus, and re-terminate the existing 115 kV circuits onto the new switching station.

The assessment concluded that the proposed upgrade would improve the reliability of the local transmission system.

The IMO is therefore pleased to grant **conditional approval** for the new Gartshore TS and the re-termination of the existing 115 kV circuits onto the new station, as detailed in the attached *System Impact Assessment Report*. Any material changes to your proposal may require a re-assessment by the IMO in accordance with Market Manual 2.10, and may nullify your conditional approval.

Final approval will be granted upon successful completion of the IMO Facility Registration process. During facility registration you will be expected to demonstrate that the project you have installed is materially unchanged from the proposal assessed by the IMO. Contact facility.registration@theIMO.com if you have not received a Facility Registration Summary package within the next 10 days.

A copy of the Report will be posted on the IMO web site: www.theimo.com.

To commence the construction process, please follow the necessary procedures and obtain the required approvals, licences and permits as may be required by the OEB and other regulatory authorities.

For further information, please contact the undersigned.

Yours truly,

Bob Gibbons
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***System Impact Assessment Report for
New Gartshore TS***

1.0 Description of Existing Facilities

Great Lakes Power -Transmission is proposing to replace the existing Gartshore TS with a new transmission switching station, thus separating the 115 kV transmission facilities from the Gartshore GS generation facilities.

The existing Gartshore GS comprises of hydraulic generating facilities as well as transmission facilities. The transmission facilities are composed of a step-up transformer to 115 kV, a 115 kV bus and associated breakers which provide electrical connection for other four 115 kV single circuit transmission lines, as shown in Figure 1.

2.0 Description of Proposal

GLP – Transmission provided a detailed description of the new Gartshore TS arrangement, modifications to the protection systems and re-termination of the existing 115 kV circuits. The description submitted by GLP-Transmission is attached in the Appendix A.

A diagram of the existing transmission system and the proposed modifications is shown in Figures 1 and 2, respectively.

The planned in service date for this project is November 2005.

3.0 Assessment

3.1 Data Verification

GLP-Transmission submitted with their application, the data associated with the modified transmission lines, circuit breakers and disconnect switches, as included in Appendix B.

The new breakers' specifications are:

- Breaker Type – SF6
- Maximum Operating Voltage - 132 kV
- Rated Interrupting Time – 50 ms
- Continuous Current Rating –1200 A
- Short circuit symmetrical duty – 40 kA

The new disconnect switches specifications are:

- Maximum Operating Voltage - 132 kV
- Continuous Current Rating –1200 A

The ratings of the new proposed equipment meet the Market Rules requirements with respect to operating voltage.

3.2 On-line Monitoring Requirements

The *Market Rules* (Chapter 4 section 7.4) require that each transmitter shall provide the IMO on a continual basis with on-line monitored quantities as specified in Appendix 4.16. It is required that GLP-Transmission provide all the equipment needed to monitor the information required by the IMO on a continuous basis. The IMO requires that the status of all isolating disconnect switches and breakers, power flows (MW, Mvar) on transformers and transmission circuits be monitored on a continual basis.

Where in-line monitoring equipment exists and is to be retained, GLP-Transmission will have to ensure that it meets the IMO performance standards. In addition GLP-Transmission is required to install all monitoring equipment that is necessary to meet the Market Rules requirements.

3.3 Protection Requirements

With respect to the protection and telecommunication requirements, the GLP-Transmission will have to follow the Transmission System Code technical requirements for transmission lines. The existing protection settings will have to be verified, modified and coordinated with the existing schemes, as appropriate.

GLP-Transmission has indicated that all protection settings will be provided to the IMO via the facility registration process.

3.4 Fault Level Assessment

Great Lakes Power T&D performed short circuit assessment to identify the effect of Gartshore TS reconfiguration on the short circuit levels that could be experienced by the stations' equipment and concluded that the proposed modification will not have a material effect on fault levels.

The interrupting capability of the new breakers is adequate for the short circuit current levels experienced in that part of the system.

3.5 Conclusions

It can be concluded that the proposed new switching station together with the re-termination of the 115 kV circuits onto the ring bus will improve the reliability of the system, by eliminating the possibility of losing all circuits for a single contingency associated with the 115 kV bus, under the existing arrangement.

4.0 Notification of Approval

It is recommended that Notification of Approval be granted to GLP-Transmission for the construction of the new 115 kV Gartshore TS and the re-termination of the five 115 kV circuits connected to the station.

This Notification of Approval is granted subject to the GLP-Transmission meeting all the requirements of the facility registration process.

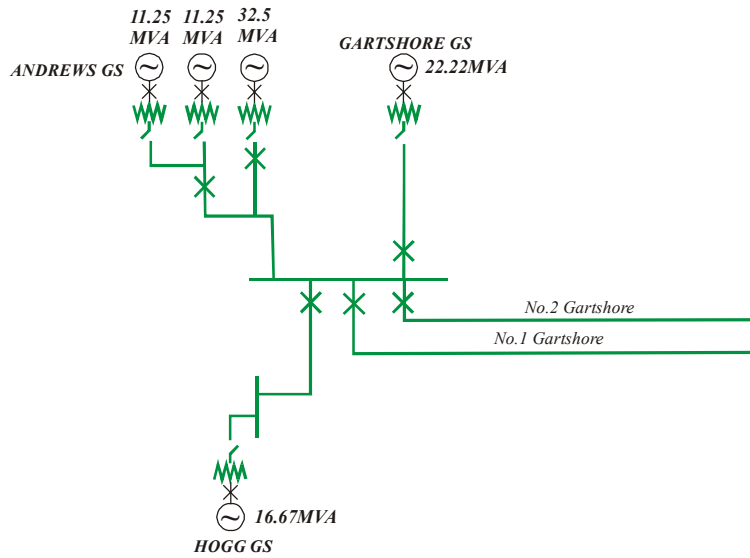


Figure 1. Existing Gartshore GS Configuration

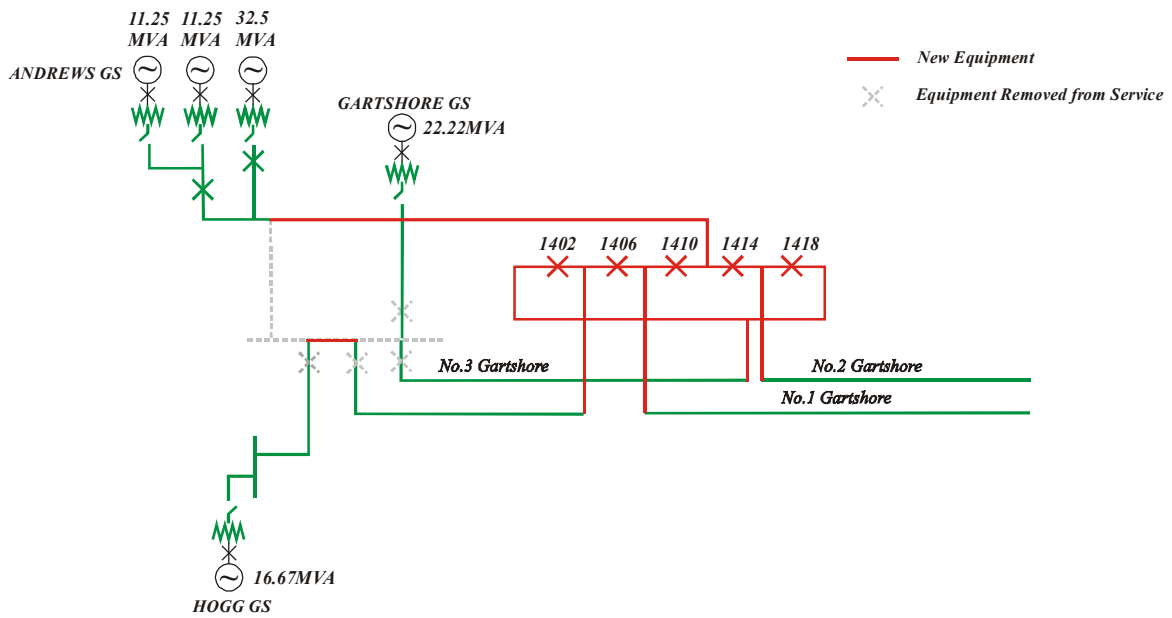


Figure 2. New Gartshore TS Configuration

Appendix A

Description of Gartshore TS Project and Single Line Diagrams for the IMO Expedited System Impact Assessment Application (SIAA)

1. Introduction

The focus of this Expedited SIA is to review the system impact of construction of a new Gartshore TS about 0.9 km east of the existing Gartshore GS adjacent to the existing No.1 and No.2 Gartshore Rights-of-Way. The existing Gartshore GS has five breakers one for each element connected (see Figure 1). The new Gartshore TS is proposed to be configured as a five breaker ring bus arrangement (See Figure 2). The present station is located at Gartshore G.S. and was originally registered under that facility name. The new facility will be registered as Gartshore T.S.

2. Line Reconfigurations

The following four lines are connected to the existing station in addition to the connection to Gartshore GS.

Four Lines:

No.1 Gartshore 115kV – Gartshore G.S. to MacKay T.S.

No.2 Gartshore 115kV – Gartshore G.S. to MacKay T.S.

Hogg 115kV – Gartshore G.S. to Hogg G.S.

Andrews 115kV – Gartshore G.S. to Andrews G.S.

The movement of the station 0.9 km to the east will require reconfiguration of the existing 115kV transmission lines. At the new Gartshore T.S. No.1 and No.2 Gartshore 115kV lines will be terminated by shortening the lines by 0.9 km.

The short 0.9 km section of No.1 Gartshore 115kV line will be connected to Hogg 115kV line at Gartshore GS to extend Hogg to the new station. The short 0.9 km section of No.2 Gartshore 115kV line will be connected to Gartshore GS and renamed No.3 Gartshore 115kv line. A new 0.9 kV line will be constructed to connect to the existing Andrews 115kV line at Gartshore G.S. to extend Andrews 115kV line to the new Gartshore T.S. The 0.9 km section of Andrews and No.3 Gartshore 115kV lines will be on a double circuit structure from near Gartshore T.S. to near Gartshore G.S.

Preliminary data for these lines has been submitted as part of this application and facility registration for the five lines and new station will be submitted prior to in service of the new station. For No.2 Gartshore line new facility registration data is being used as this line will be re-structured and re-conducted with 336 ACSR as a separate Project and will have new facility registration data sheet as per the attached information.

With the new station location only 0.9 km from the existing lines no load flow analysis has been performed as the existing lines are adequate and the new station will be designed for 1200A. There is expected to be no significant changes to short circuit values.

With the new ring bus configuration contingency simulation analysis will be improved as no single stuck breaker will remove both No.1 and No.2 Gartshore lines and all the generation in the area. Maintenance of breakers will be performed without line outages or loss of generation capacity.

The impact on the Transmission System is expected to be minimal with improved reliability because of the new configuration. GLP will conduct a CIA with the affected Transmission Customers if required.

3. Protection System Description

The protections will be similar to or an improvement to the existing protections for No.1 Gartshore, No.2 Gartshore, Hogg and Andrews. The new protection system on No.3 Gartshore line will be similar to or an improvement to the existing Hogg line.

All five breakers will have breaker failure protections. There will not be auto reclosing schemes on any of the five lines.

4. Control System Description

The new station will have a new RTU installed which will allow monitoring and control of the station from the GLP System Control SCADA. This will allow GLP to meet the IMO Monitoring Requirements as outlined in the Market Rules Chapter 4 Appendix 4.16

Status:

Five Breakers
Five Line Disconnect Switches

Metering:

MW and MVAR quantities for each of the five lines

5. Station Schematic Diagrams

The following Station Schematic Diagrams are being provided to show the existing and proposed configuration.

- Figure 1: Existing Configuration – Gartshore G.S. (115kV) – Presently Registered as Gartshore G.S.**
- Figure 2: Proposed Configuration – Gartshore T.S. (115kV) – Rebuild Station in New Location with Ring Bus**
- Figure3: Line Configuration – Gartshore G.S. (115kV) – After In Service of the new Gartshore T.S.**

Existing Configuration – Gartshore G.S. (Figure 1)

- i. Four existing lines connected directly to the existing in line 115kV breakers and Gartshore GS connected via a fifth existing in line 115kV breaker
- ii. Five manual disconnect switches to connect breakers to BUS 1
- iii. BUS 1 including existing CVT's to connect all the five existing breakers
- iv. Existing Protection and Control equipment
- v. CT/CVT-M1 metering unit at Gartshore GS is owned by the Generator

Proposed Configuration – Gartshore T.S. (Figure 2)

- i. Five new breakers with manual disconnect switches on both sides, configured in a new ring bus to create five two breaker diameters
- ii. Four existing modified lines connected to new 115kV two breaker diameters and Gartshore GS connected via a fifth line designated No.3 Gartshore 115kV
- iii. Five new motorized line disconnect switches with manual ground switches
- iv. Station Service supplied from the LG3 Bus through a manual transformer disconnect switch
- v. Modified or install new Protection and Control equipment as required.

Proposed Configuration – Gartshore G.S. (Figure 3)

- i. The short 0.9 km section of No.1 Gartshore 115kV line will be connected to Hogg 115kV line at Gartshore GS to extend Hogg to the new station.
- ii. The new 0.9 km line section will be connected to Andrews 115kV line at Gartshore GS to extend Andrews to the new station.
- iii. A short 0.9 km section of No.2 Gartshore 115kV line will be connected Gartshore GS to the new station.
- iv. Breaker 753 will be removed leaving M1 metering unit, disconnect switch 754 and T1 at Gartshore GS.

Existing Configuration

Gartshore G.S. (115kV)

Presently Registered as Gartshore G.S.

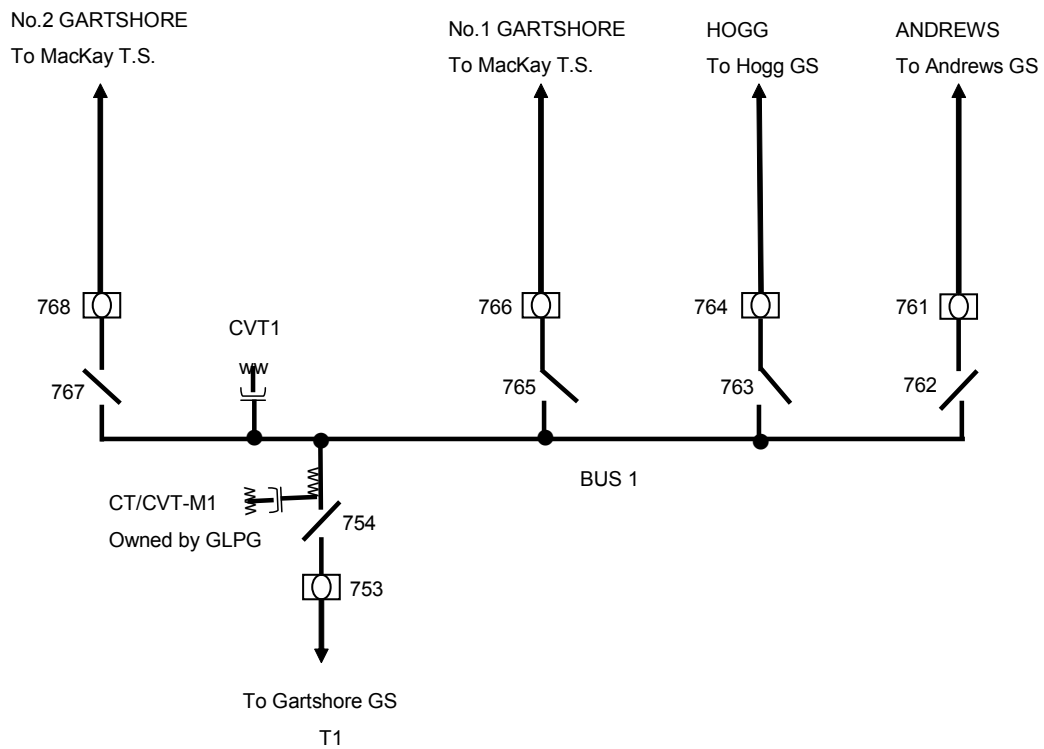
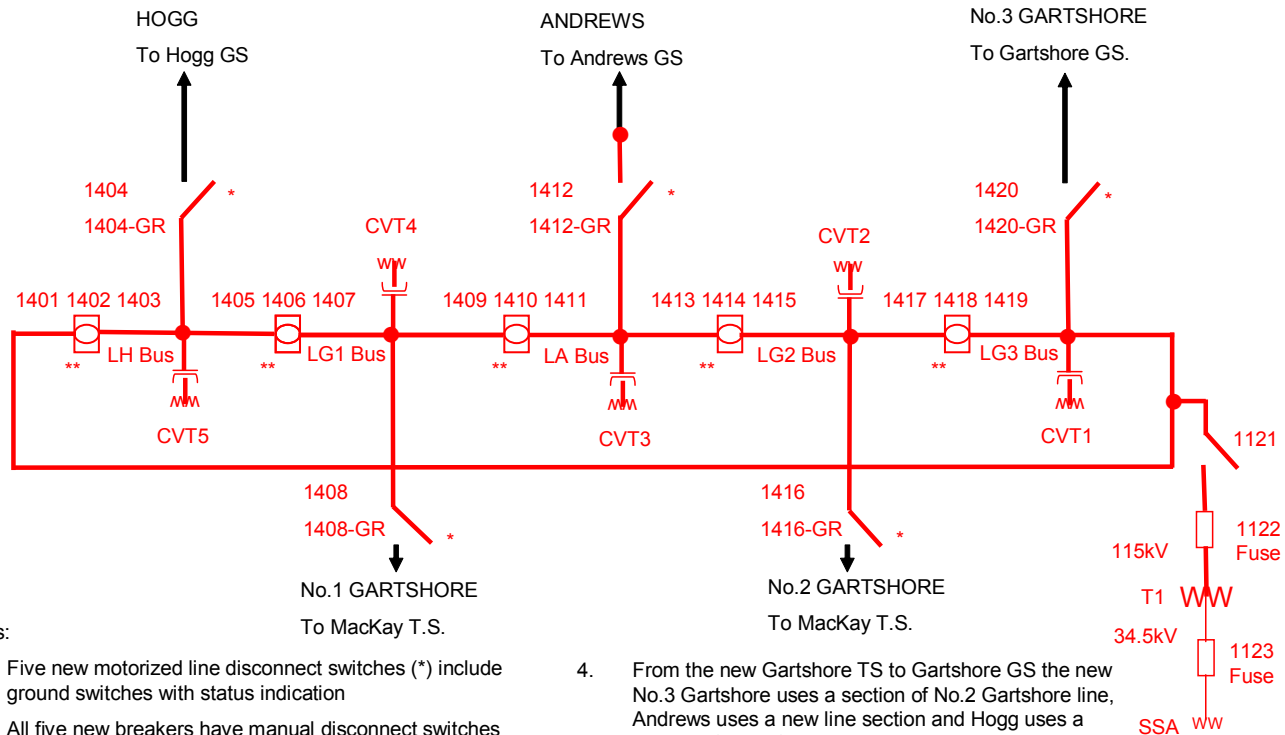


Figure 1

Proposed Configuration

New Gartshore T.S. (115kV)

Rebuild Station in New Location with Ring Bus



Notes:

1. Five new motorized line disconnect switches (*) include ground switches with status indication
2. All five new breakers have manual disconnect switches (**) on each side.
3. Five new CVT's required with dual windings for the line protections
4. From the new Gartshore TS to Gartshore GS the new No.3 Gartshore uses a section of No.2 Gartshore line, Andrews uses a new line section and Hogg uses a section of No.1 Gartshore

Figure 2

Line Configuration

Gartshore G.S. (115kV)

After In Service of the new Gartshore T.S.

— New Line Connections
 Existing Gartshore Station Isolated for removal of equipment

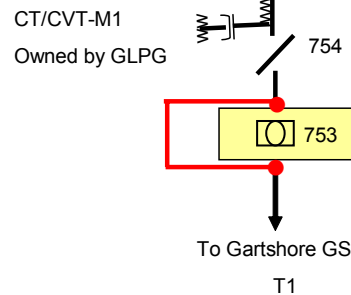
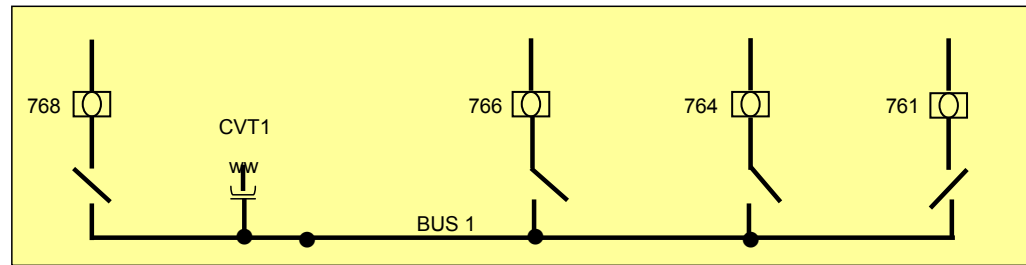
No.3 GARTSHORE
 To Gartshore T.S.
 (0.9 km of reconducted No.2 GARTSHORE line on double circuit structures)

ANDREWS
 To Gartshore T.S.
 (0.9 km of new line on double circuit structures)

HOGG
 To Gartshore T.S.
 (0.9 km of existing No.1 GARTSHORE Line)

HOGG
 to Hogg GS

ANDREWS
 to Andrews GS



- Note:
1. Breaker 753 will be removed leaving M1 metering unit, disconnect switch 754 and T1 at Gartshore GS.

Figure 3

6. Tentative Schedule

The entire project will take approximately one year to complete with the station construction and in service completed by late November 2005. Since detailed engineering has not been completed, staging of construction may change depending on engineering and operational considerations. The assumption is the IMO Expedited SIA process will be completed with approval from the IMO by the early December 2003.

7. Preliminary Construction Outage Details

Once the new station and the short line have been constructed, there will be line outages to terminate the reconfigured lines to the new station to complete the Gartshore TS Project. This will require careful staging of the changes and outage planning. The tentative outage steps are described in the autocad drawing that is attached as figure 4.

A preliminary construction schedule will be developed as part of the in service of the new station. The new station will be located to minimize the outages to the existing lines and to the existing Gartshore GS when it is constructed.



GARTSHORE SINGLE LINE.dwg

Figure 4

Appendix B

Generic Information

<i>Bold-Italic</i>	Essential
	Typical values will be assumed if data not provided
	Only required upon request

In-Service Dates	<i>Initial in-service date (start of commissioning):</i>	November 2005
	<i>Permanent in-service date:</i>	November 2005
Protection System Description	<p><i>A functional description of all protective schemes shall be provided to allow a detailed analysis of all credible contingencies.</i></p> <p><i>These descriptions shall include, but are not limited to, the following:</i></p> <ul style="list-style-type: none"> <i>Operating times for protection components (e.g. primary relaying, auxiliary relaying, communication),</i> <i>General models for normal and delayed (breaker failure) fault clearing, and</i> <i>Exceptions to the general model (e.g. LEO, HIROP).</i> <p><i>For all recognized contingencies, the functional description must enable fault clearing times at all terminals to be determined for both normal and delayed clearing.</i></p>	See the file entitled "Description of Gartshore TS Project and Single Line Diagrams for the IMO ESIAA Oct03 R1"
Detailed Single-Line Diagram(s)	<p><i>A detailed single-line diagram showing the equipment and the protection and telemetry points. The locations of the proposed connections on to existing lines, or into existing transformer/ switching stations, are also to be included.</i></p> <p><i>Details are to be included of any existing facilities that are to be replaced or removed from service. Out-of-service dates are to be provided whenever these do not coincide with the in-service dates for the new facilities.</i></p>	See the file entitled "Description of Gartshore TS Project and Single Line Diagrams for the IMO ESIAA Oct03 R1"
Control Schemes	<p><i>Describe any control schemes that are to be used to automatically change the tap positions for any of the transformers, or to switch into-service or out-of-service any capacitors or reactors.</i></p> <p><i>If the Project is to include a generation rejection or load rejection scheme, these should also be described.</i></p>	Not Applicable

Transmission Facilities

<i>Bold-Italic</i>	Essential
	Typical values will be assumed if data not provided
	Only required upon request

Overhead Circuits (For each section)	<i>Identifier</i>	No.1 Gartshore 115kV (shortened 0.9 m)		
	<i>Terminal station(s)</i>	MacKay T.S.	Gartshore T.S.	
	<i>Voltage (kV)</i>	115kV		
	<i>Length (km)</i>	12.14km		
	<i>Identifier(s) and length of circuit(s) on common towers</i>			
	<i>Positive sequence impedance (R, X, B)</i>	0.0163	0.0457	0.0055
	<i>Zero sequence impedance (Ro, Xo, Bo)</i>	0.0421	0.1235	later
	Winter (10°C) continuous and 15 minute thermal ratings (A)	later	N/A	
	<i>Summer (30°C) continuous and 15 minute thermal ratings (A)</i>	500A	N/A	
Overhead Circuits (For each section)	<i>Identifier</i>	No.2 Gartshore 115kV (shortened 0.9 km and reconducted 336)		
	<i>Terminal station(s)</i>	MacKay T.S.	Gartshore T.S.	
	<i>Voltage (kV)</i>	115kV		
	<i>Length (km)</i>	12.14km		
	<i>Identifier(s) and length of circuit(s) on common towers</i>			
	<i>Positive sequence impedance (R, X, B)</i>	0.0163	0.0457	0.0055
	<i>Zero sequence impedance (Ro, Xo, Bo)</i>	0.0421	0.1235	later
	Winter (10°C) continuous and 15 minute thermal ratings (A)	later	N/A	
	<i>Summer (30°C) continuous and 15 minute thermal ratings (A)</i>	500A	N/A	
	<i>Rated symmetrical short circuit capability (A)</i>			
Overhead Circuits (For each section)	<i>Identifier</i>	No.3 Gartshore 115kV (0.9km of existing No.2 Gartshore 115kV reconducted 336)		
	<i>Terminal station(s)</i>	Gartshore T.S.	Gartshore G.S.	
	<i>Voltage (kV)</i>	115kV		
	<i>Length (km)</i>	0.9km		
	<i>Identifier(s) and length of circuit(s) on common towers</i>	Andrews	Three Structures	
	<i>Positive sequence impedance (R, X, B)</i>	0.00121	0.00339	0.00041
	<i>Zero sequence impedance (Ro, Xo, Bo)</i>	0.00312	0.00916	later
	Winter (10°C) continuous and 15 minute thermal ratings (A)	later	N/A	
	<i>Summer (30°C) continuous and 15 minute thermal ratings (A)</i>	500A	N/A	
	<i>Rated symmetrical short circuit capability (A)</i>			

Overhead Circuits (For each section)	<i>Identifier</i>	Andrews (0.9km new line section)		
	<i>Terminal station(s)</i>	Gartshore T.S.	Gartshore G.S.	
	<i>Voltage (kV)</i>	115kV		
	<i>Length (km)</i>	0.9km		
	<i>Identifier(s) and length of circuit(s) on common towers</i>	No.3 Gartshore	Three Structures	
	<i>Positive sequence impedance (R, X, B)</i>	0.00121	0.00339	0.00041
	<i>Zero sequence impedance (Ro, Xo, Bo)</i>	0.00312	0.00916	later
	Winter (10°C) continuous and 15 minute thermal ratings (A)	Later		N/A
	<i>Summer (30°C) continuous and 15 minute thermal ratings (A)</i>	500A		N/A
	<i>Rated symmetrical short circuit capability (A)</i>			
Overhead Circuits (For each section)	<i>Identifier</i>	Andrews (existing line)		
	<i>Terminal station(s)</i>	Gartshore G.S.	Andrews G.S.	
	<i>Voltage (kV)</i>	115kV		
	<i>Length (km)</i>	5.25km		
	<i>Identifier(s) and length of circuit(s) on common towers</i>			
	<i>Positive sequence impedance (R, X, B)</i>	0.0142	0.0243	0.0023
	<i>Zero sequence impedance (Ro, Xo, Bo)</i>	0.0289	0.0709	later
	Winter (10°C) continuous and 15 minute thermal ratings (A)	later		N/A
	<i>Summer (30°C) continuous and 15 minute thermal ratings (A)</i>	300A (Note 1)		N/A
	<i>Rated symmetrical short circuit capability (A)</i>			
Overhead Circuits (For each section)	<i>Identifier</i>	Hogg (0.9km of existing No.1 Gartshore 115kV)		
	<i>Terminal station(s)</i>	Gartshore T.S.	Gartshore G.S.	
	<i>Voltage (kV)</i>	115kV		
	<i>Length (km)</i>	0.9km		
	<i>Identifier(s) and length of circuit(s) on common towers</i>			
	<i>Positive sequence impedance (R, X, B)</i>	0.00121	0.00339	0.00041
	<i>Zero sequence impedance (Ro, Xo, Bo)</i>	0.00312	0.00916	later
	Winter (10°C) continuous and 15 minute thermal ratings (A)	N/A		N/A
	<i>Summer (30°C) continuous and 15 minute thermal ratings (A)</i>	500A		N/A
	<i>Rated symmetrical short circuit capability (A)</i>			
Overhead Circuits (For each section)	<i>Identifier</i>	Hogg (existing line)		
	<i>Terminal station(s)</i>	Gartshore G.S.	Hogg G.S.	
	<i>Voltage (kV)</i>	115kV		
	<i>Length (km)</i>	5.25km		
	<i>Identifier(s) and length of circuit(s) on common towers</i>			
	<i>Positive sequence impedance (R, X, B)</i>	0.0112	0.0231	0.0023
	<i>Zero sequence impedance (Ro, Xo, Bo)</i>	0.0280	0.0699	later
	Winter (10°C) continuous and 15 minute thermal ratings (A)	later		N/A
	<i>Summer (30°C) continuous and 15 minute thermal ratings (A)</i>	340A (Note 1)		N/A
	<i>Rated symmetrical short circuit capability (A)</i>			

Note 1: For conductor @ 75° C, air at 25° C, wind @ 2.25 km/hr, frequency = 60 cycles (Continuous).

Transmission Facilities

<i>Bold-Italic</i>	Essential
	Typical values will be assumed if data not provided
	Only required upon request

Buses	Identifier	Bus LG1, LH, LG2, LA & LG3
	Station	Gartshore T.S.
	Maximum operating temperature (°C)	later (designed for 1200A)
	Conductor size (kcmil)	later
	Conductor type (ASC, ASCR, Al tube)*	later

Transmission Facilities

<i>Bold-Italic</i>	Essential
	Typical values will be assumed if data not provided
	Only required upon request

Circuit Breakers	<i>Identifier</i>	1402, 1406, 1410, 1414 & 1418
	<i>Station</i>	Gartshore T.S.
	Manufacturer	TBD
	Serial Number	TBD
	<i>Rated voltage (kV)</i>	121kV
	<i>Interrupting time (ms)</i>	50ms
	Interrupting media (e.g. air, oil, SF ₆)	SF6
	<i>Rated continuous current (A)</i>	1200A
	<i>Rated symmetrical short circuit capability (A)</i>	40kA

Transmission Facilities

<i>Bold-Italic</i>	Essential
	Typical values will be assumed if data not provided
	Only required upon request

Switches	Identifier	Line Disconnect Switches Motorized (5 Required)
	Station	Gartshore T.S.
	Manufacturer	TBD
	Serial number	TBD
	Voltage rating (kV)	121kV
	Type (e.g. disconnect, interrupt)	Disconnect
	Continuous current rating (amps)	1200A
Switches	Identifier	Line Ground Disconnect Switches Manual (5 Required)
	Station	Gartshore T.S.
	Manufacturer	TBD
	Serial number	TBD
	Voltage rating (kV)	
	Type (e.g. disconnect, interrupt)	Ground
	Continuous current rating (amps)	
Switches	Identifier	Breaker Disconnect Switches Manual (10 Required)
	Station	Gartshore T.S.
	Manufacturer	TBD
	Serial number	TBD
	Voltage rating (kV)	121kV
	Type (e.g. disconnect, interrupt)	Disconnect
	Continuous current rating (amps)	1200A
Switches	Identifier	Transformer Disconnect Switch Manual (1 Required)
	Station	Gartshore T.S.
	Manufacturer	TBD
	Serial number	TBD
	Voltage rating (kV)	
	Type (e.g. disconnect, interrupt)	Disconnect
	Continuous current rating (amps)	Later