

# Lower South Island Power System Reliability

Update on Transmission Needs  
and Possible Long List of options

11 December 2008

TRANSPower



# The “Need” to Ensure Reliability

- Increasing demand in the 110 kV network supplying coastal Southland and Otago
  - Low voltages
  - Maintenance difficulties
  - Constraints on generation south of Roxburgh
- Change in arrangements at Tiwai post 2012
  - no obligation between Meridian and Transpower for minimum generation at Manapouri
  - potential for more reliance on transfer through Roxburgh



# The “Need” to Ensure Reliability (2)

- Limitations on supply into region through Roxburgh when Southland generation low
  - can't run Clyde and Roxburgh at high output
  - Roxburgh power station constrained by connection to 110 kV network
- Increasing demand - identifying limitations on the performance of the Otago/Southland power system as a whole



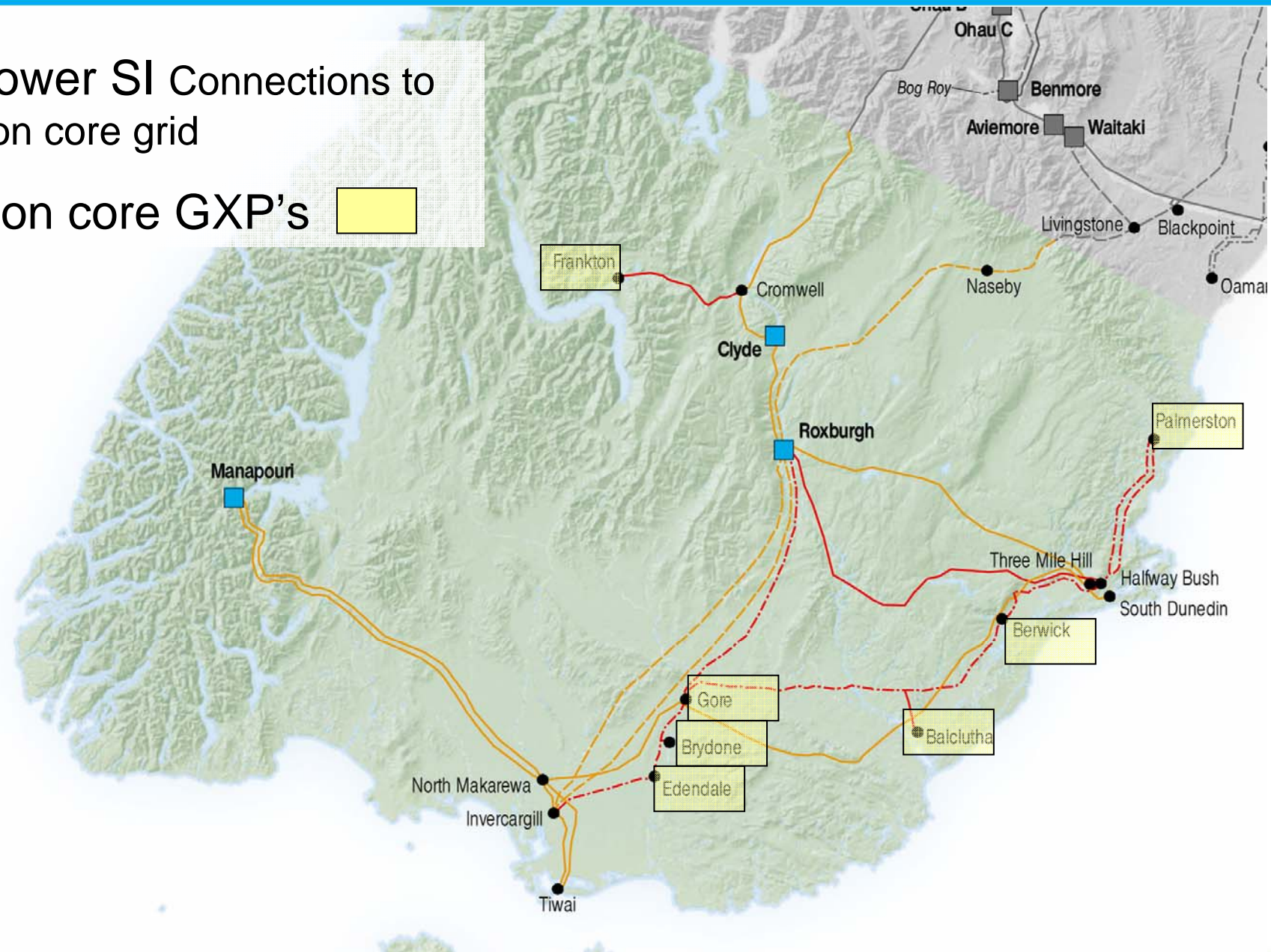
# Identification of Grid Issues

- Based on load forecast and studies to date
- Solutions not only transmission
  - supply (generation), and demand side need to be considered
  - opportunity to integrate with distributor plans
- Retention of “n-1” on non core grid
  - Must be economically justified

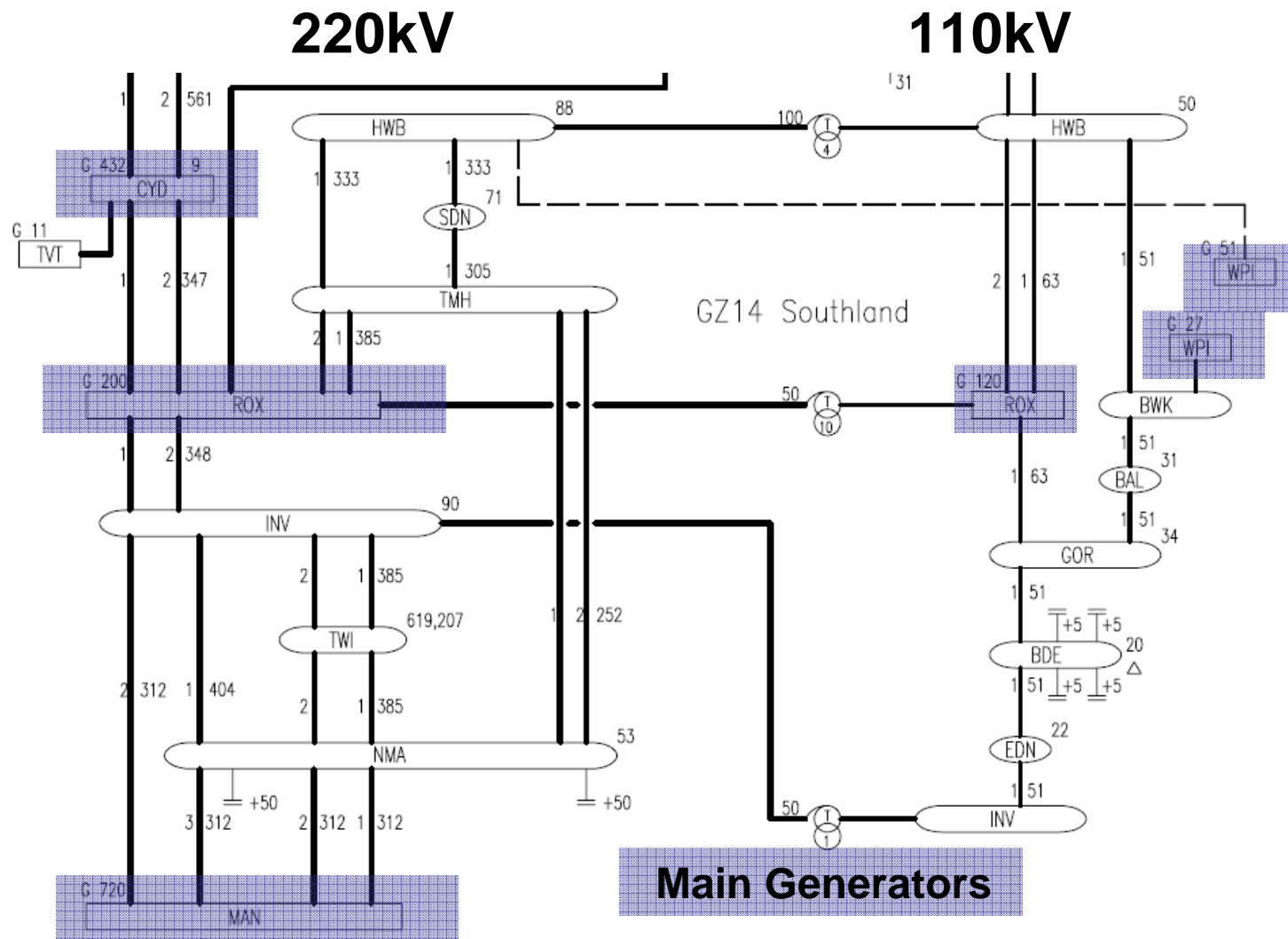


Lower SI Connections to non core grid

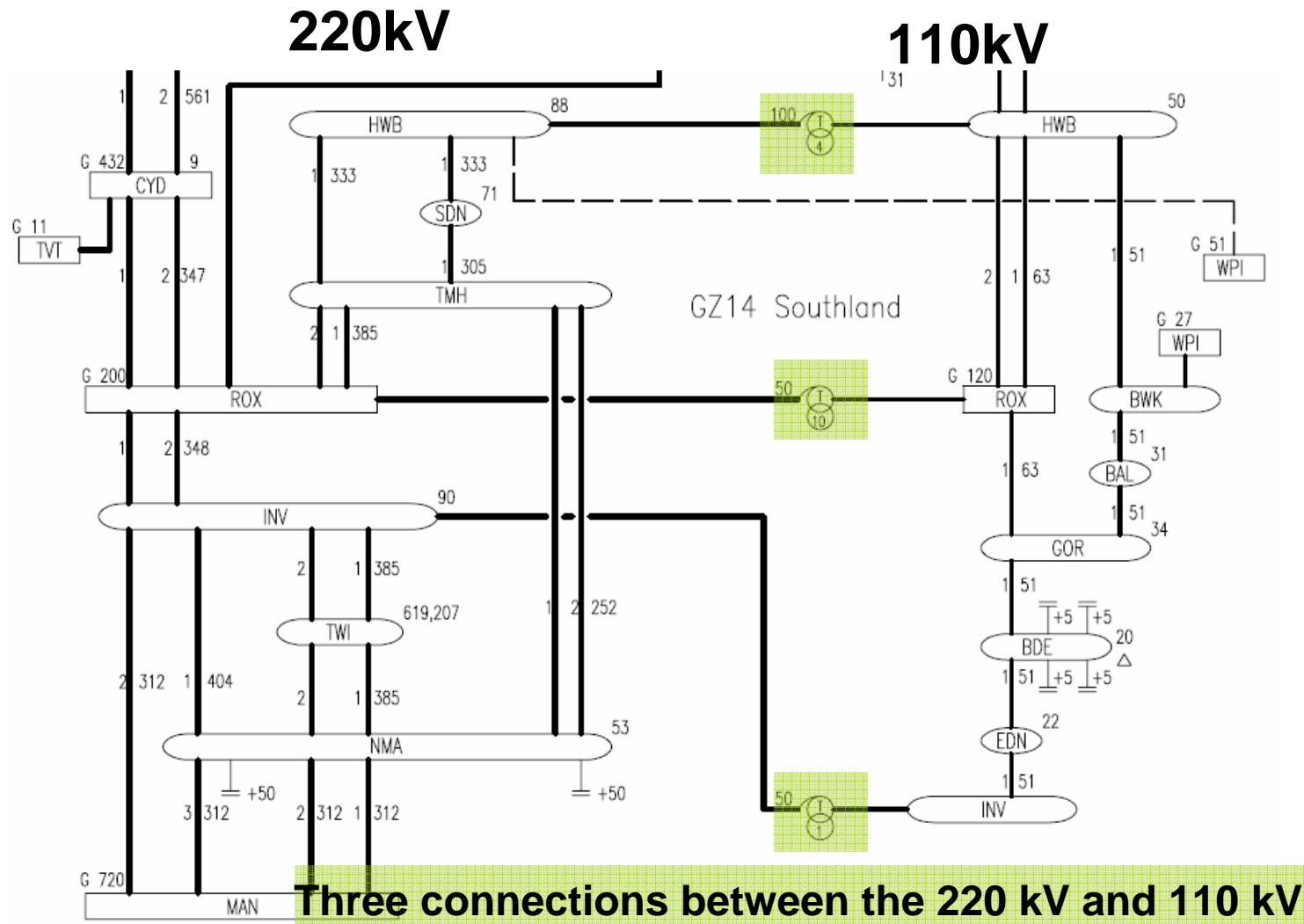
Non core GXP's 



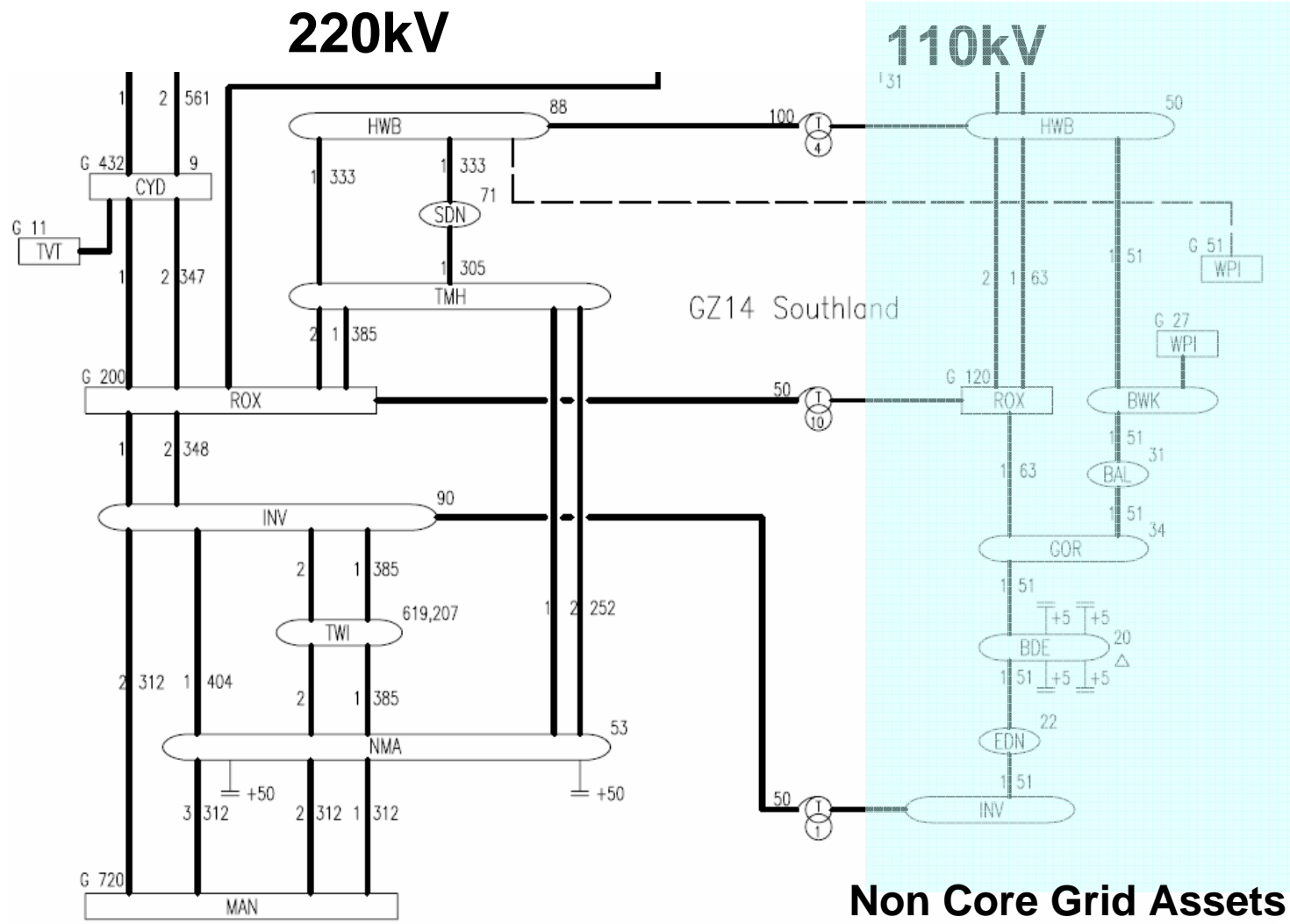
# Present network



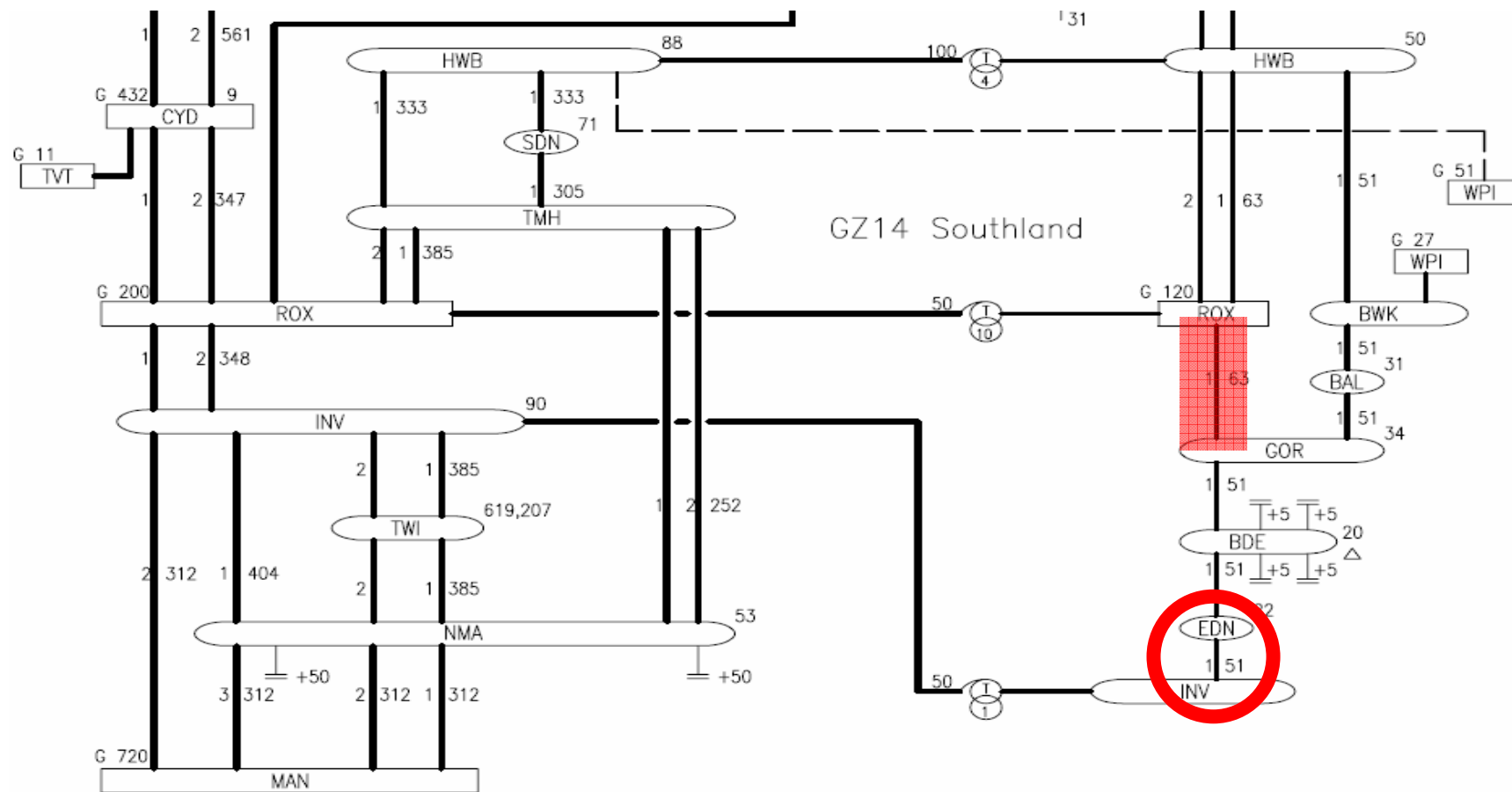
# Present network



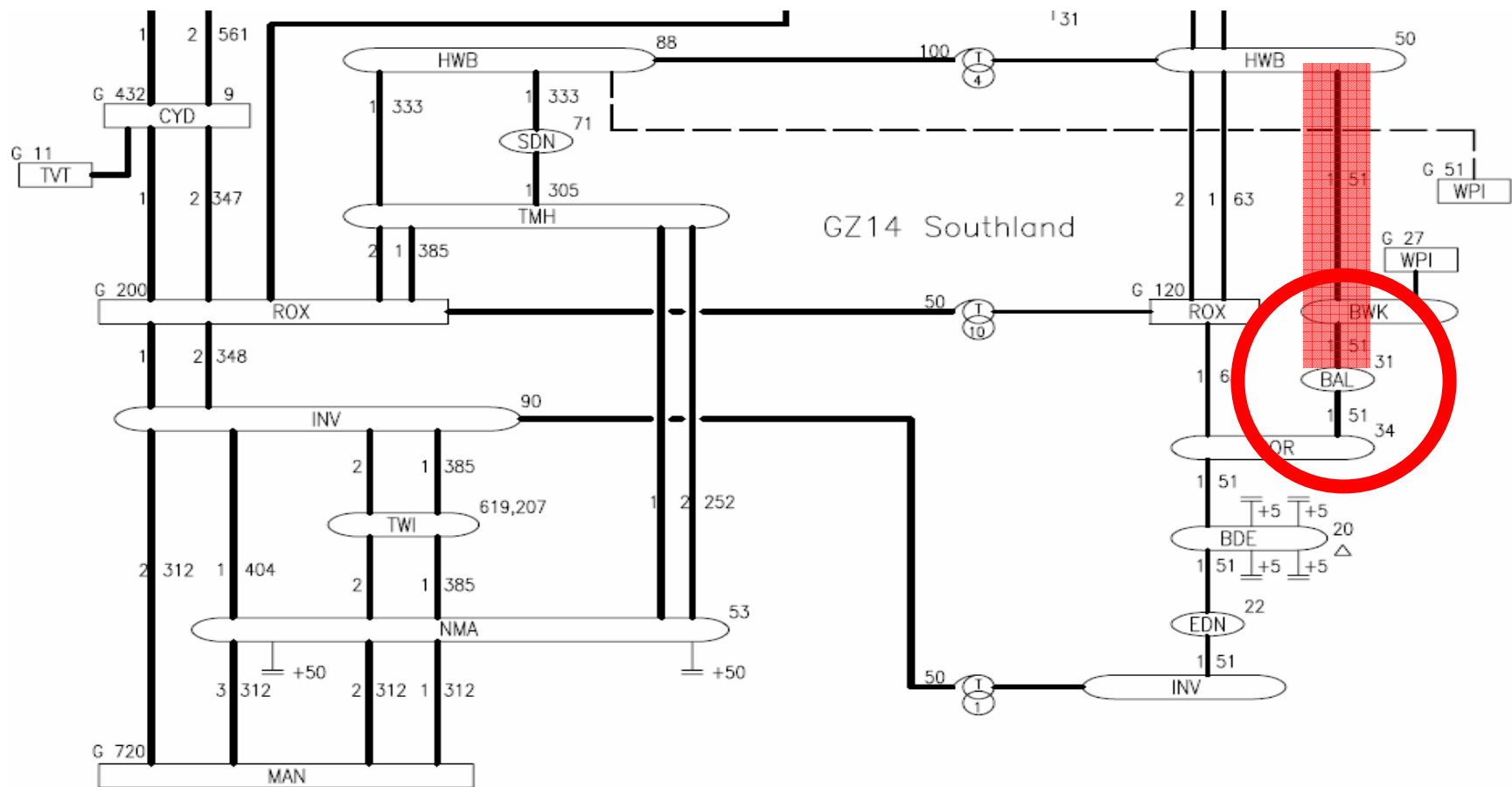
# Present network



Constraint	Voltage	Issue	Contingency
EDN-INV	110kV	Overload	GOR_ROX 110kV line



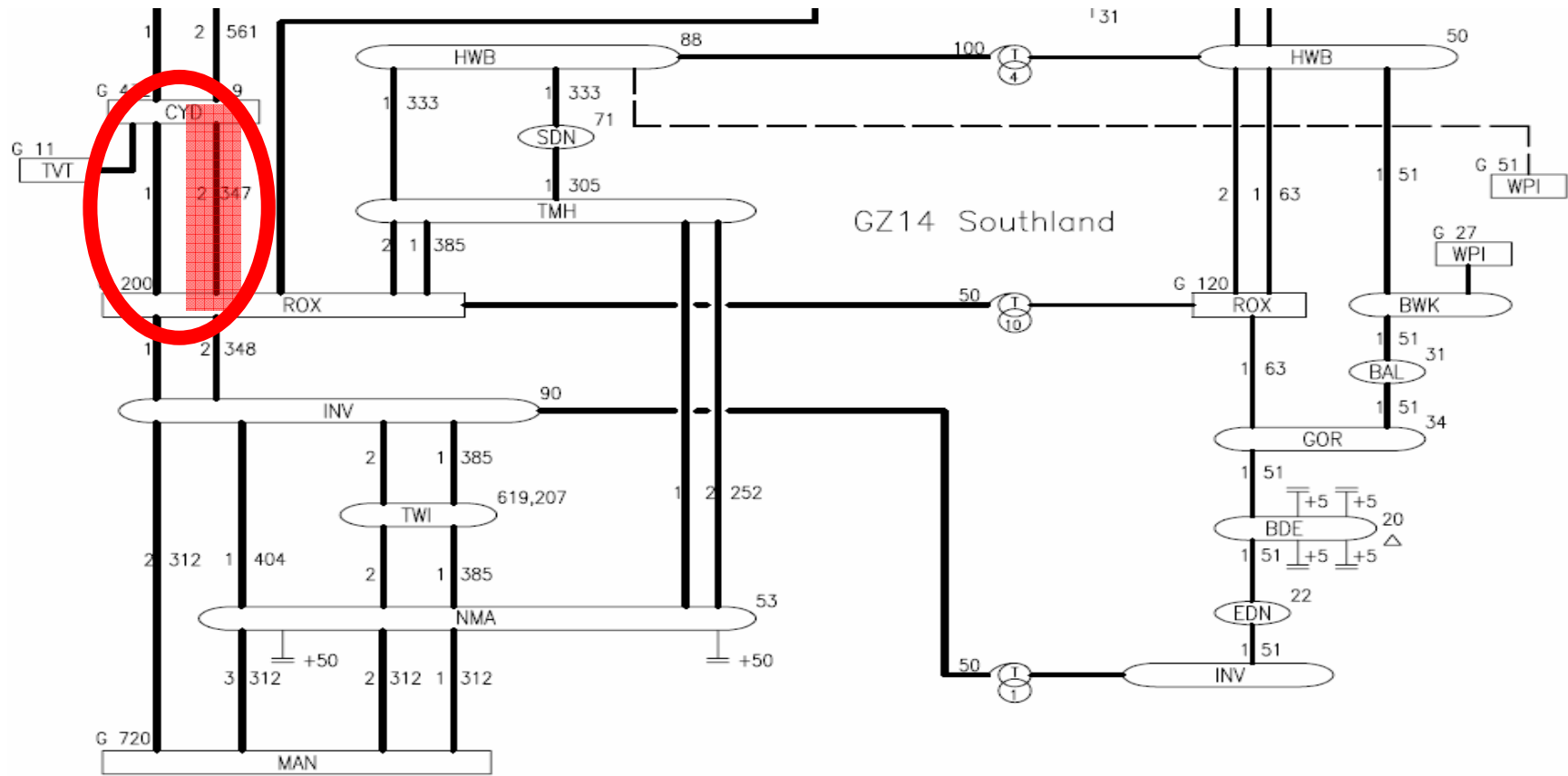
Constraint	Voltage	Issue	Contingency
BAL GXP	110kV & 33kV	Low voltages	HWB-BAL 110kV line







Constraint	Voltage	Issue	Contingency
CYD-ROX	220kV	Overload	CYD-ROX



# Maintenance Issues

- Difficulties in securing maintenance outages on the 110 kV network
  - Driven by lack of spare capacity due to load growth and flat load over year
  - Outages currently require
    - Extensive load control
    - Generation agreements
    - Significant amount of grid equipment removed from service
- Others?



# Long Listing

- EC requires us to consider ALL options. The assess these against a set of criteria to produce a Long List of possible options.
  - Feasible
  - Practical
  - Economic
  - Security
  - Good Electrical Practice



# Generic Long List of Options

- Non Transmission Alternatives
  - Supply Side alternatives
  - Generation proposals
  - Generation Runback
  - Demand Side Alternatives & Management
  - Reliance on market price signals
  - Fuel switching
  - Load transfer
  - Energy Efficiency
  - Demand Side Participation Contract



# Generic Long List of Options

- Transmission options – Many possibilities
  - Voltage
  - Capacity upgrades to lines or new lines
  - Upgrades to substations and new substations
  - Special protection schemes



# Possible Non Transmission options

- Constrain generation to avoid grid build
  - limitations due to variability of inflows, wind, etc
- Shift load within PowerNet network
  - PowerNet takes less load in Gore area and more from Invercargill area
- Demand reduction at peak times



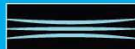
# Possible Transmission Options

- Rationalise 110 kV to meet GRS
  - n-1 connection not automatically justified to non core grid
- Capacitor at Balclutha
  - improve voltage
- Choke at Gore
  - reduce flow in 110 kV
- New connection to 220 kV at Gore
  - reduce loading in 110 kV or move Gore load off 110kV

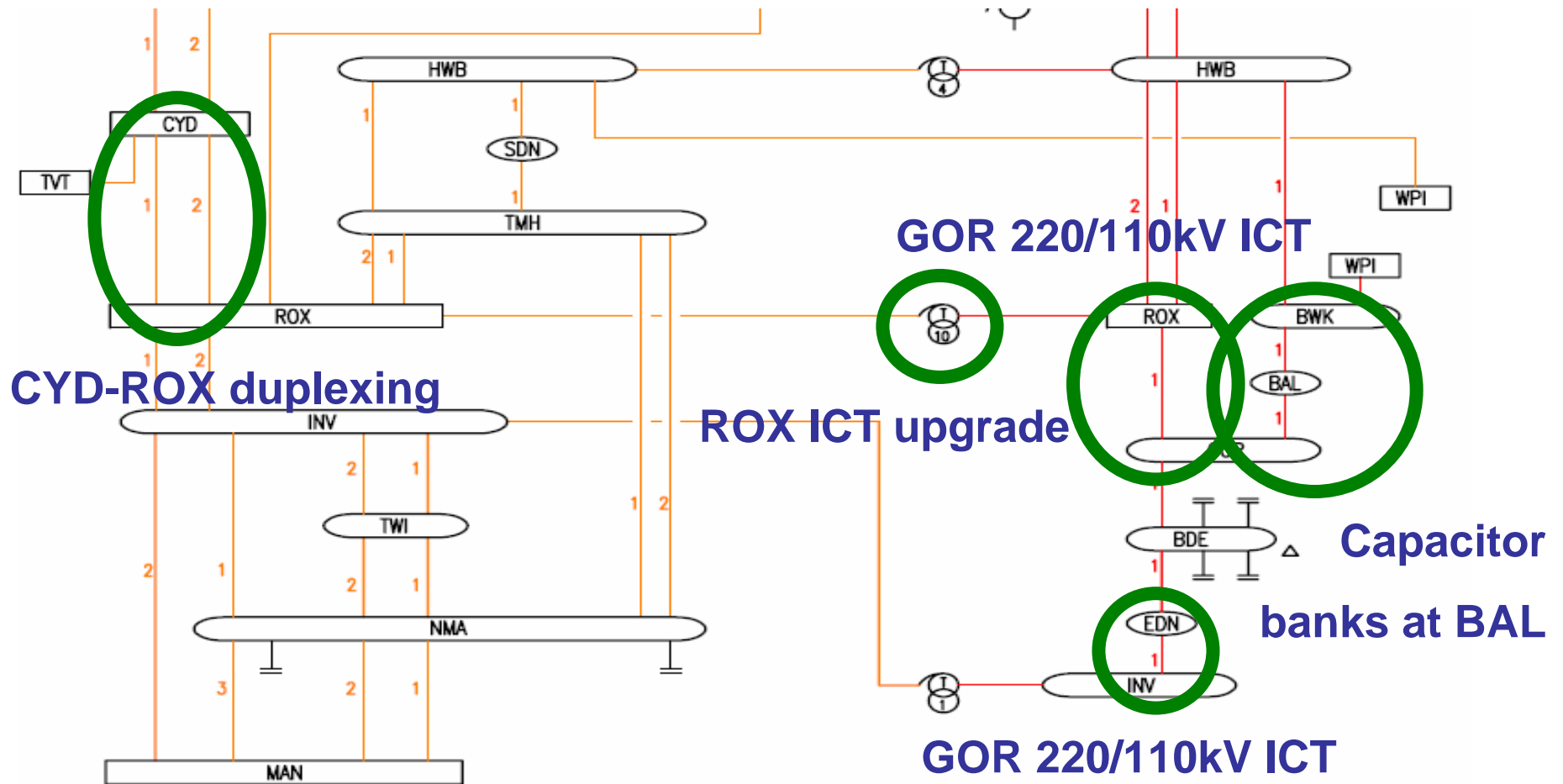


# Possible Transmission Options

- New substations on 220 kV rather than 110 kV
- Upgrade connection to 220 kV at Roxburgh
- Capacity upgrade 220 kV lines Clyde to Roxburgh
- Capacity upgrade 220 kV lines Invercargill to Roxburgh
- New 220 kV line or options to allow better use of line from Dunedin to Invercargill



# Possible Transmission Options



# Next Steps

- Long List analysis at a High Level.
- Develop short list of 4-6 options for more detailed study.
- Then aim to chose preferred option for submission to EC.
- Preferred option is likely to include development plan with progression of projects.

Stakeholders will be engaged all the way through.



# Challenges for the Process

- What extent can we rely on generation in the region?
- How feasible are other non transmission options?
- Non core grid – what security is economically justified?
- What to do in the interim period?

