HumeLink

Fact sheet

Gugaa substation

JUNE 2025

What is HumeLink?

HumeLink is one of Australia's largest energy infrastructure projects connecting renewable energy sources to the grid, increasing availability and market competition and helping to put downward pressure on energy prices in Australia. The project consists of 365 kilometres of 500 kV overhead transmission lines connecting Wagga Wagga, Bannaby and Maragle substations.

The project is being delivered in two sections, by two joint venture partners, HumeLink East: Acciona and Genus and HumeLink West: UGL and CPB Contractors. To view HumeLink's interactive route map go to transgrid.com.au/humelink.

Gugaa substation

The new 500 kV substation at Gregadoo, known as the Gugaa 500 kV substation, approximately 11 kilometres south-east of the existing Wagga 330kV substation. The Gugaa substation is needed as the Wagga 330 kV substation does not have space to support the HumeLink project's infrastructure needs.

The substation includes new transformers and reactors, overhead electrical components, auxiliary services buildings and associated facilities (e.g. for drainage).

The existing Wagga 330 kV substation on Ashfords Road, Gregadoo, will accommodate new and/or modified 330 kV transmission lines including modifications to electrical equipment, footings, steelwork and drainage within the existing substation fence. On the eastern portion of the alignment, the existing Bannaby 500 kV substation on Hanworth Road, Bannaby will be expanded and modified to accommodate the new 500 kV transmission lines.

This will include a substation bench extension and modifications to electrical equipment, footings, steelwork, drainage, external fence, substation roads and other minor infrastructure.

The project will connect to the future Maragle 500 kV substation approved under the Snowy 2.0 Transmission Connection Project.

Image: Wagga 330 kV substation and new Gugaa 500 kV substation

Gugaa Substation layout

The Gugaa substation will occupy an area of about 22 hectares. The infrastructure and equipment in the new substation will include:

- split substation bench with a 20 metre buffer area around each of the benches
  - the buffer area would include (but wouldn't be limited to) the Asset Protection Zone (APZ), stormwater, drainage, and oil containment infrastructure, wastewater infrastructure, access and parking
- two auxiliary services buildings: a 500 kV auxiliary services building and a 300 kV auxiliary services building
- gantries, which at approximately 33 metres high are the highest structures at the substation
- seven new single-phase 500/330 kV transformers. (including one spare transformer)
- four three-phase 500 kV reactors (including one spare reactor) a range of supporting 500 kV and 330 kV electrical components including overhead conductors, busbars and gantries. Two of these reactors including the spare are part of the HumeLink approved scope and two proposed as part of the VNI-West project
- 500 kV and 330 kV circuit breakers, current transformers, voltage transformers, disconnectors, earth switches and other high voltage equipment
- three 330 kV diameters and four 500 kV diameters. Two 330 kV and 500 kV diameters are part of the HumeLink approval scope and one 330 kV and two 500 kV diameters are proposed as part of the VNI-West project
- 125 volt DC and 400 volt alternating current electrical distribution systems
- drainage infrastructure and oil containment system.

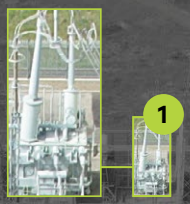
Auxiliary services buildings for HumeLink will include secondary systems such as control, automation, protection and communication systems and ancillary services such as fire detection, security system and air conditioning.

Image: A transformer being transported.

Image: A three phase 500kV shunt reactor.

Design features of a substation

1. **A transformer** manages electrical voltage levels, typically stepping up the voltage for efficient long-distance transmission over power lines or stepping down the voltage for local distribution to end-users.

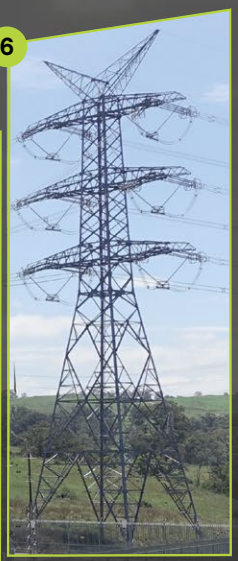


2. **A firewall** in a substation acts as a protective barrier to contain fires and prevent them from spreading. It can also help to reduce noise from electrical equipment.

3. **Control rooms** in substations are central hubs where operators monitor and control the electrical grid. It oversees equipment, manages electricity flow, detects and responds to faults.

4. **High-voltage switch gear** controls and manages the flow of electricity at elevated voltage levels. It consists of circuit breakers, disconnect switches, and protective relays.

5. **A gantry** provides structural support for various components of electrical equipment such as circuit breakers and busbars. Gantry structures are designed to withstand the mechanical forces, environmental conditions and loads imposed by the equipment they support.



6. **A 500 kV tension tower** is a type of transmission tower that supports high-voltage transmission lines. Tension towers are the first and last towers of long sections of conductors and maintain the proper spacing and tension of transmission lines.

7. **A security fence** around a substation establishes a vital perimeter, deterring unauthorized access and protecting critical equipment from theft or vandalism.

Gugaa substation

Temporary material laydown and equipment storage compounds are required along the alignment to support the construction stage of the project.

One of these is the Gregadoo compound, located within the Gugaa substation property.

Safety and security

Fencing around the substation will be approximately three metres high around all sides of the switchyard. To comply with Transgrid's safety requirements, the following additional security measures will be implemented:

- security cameras within the substation
- operational lighting
- safety and public information signage at the substation
- an APZ, which would be an area kept clear of all trees and vegetation that may affect the substation during a bushfire; the APZ would comply with Transgrid's design and safety standards.

The safety and welfare of our people, delivery partners and the broader community is our highest priority. To find out more about how Transgrid safely operates visit the Community Safety section of the Transgrid website.

Traffic and transport

Vehicle movement

During the construction of the project, workers, construction materials and equipment will be required to be transported to and from the substation and compound.

There will be minimal traffic associated with maintenance and inspection activities during operation.

Access and parking

A dedicated access point and road will allow access for maintenance and operational workers from Livingstone Gully Road into the substation.

Parking for a small number of maintenance and heavy vehicles would be provided within the substation boundary.

Lighting

External lighting will be installed around the perimeter and above the doors of the auxiliary services building to ensure visibility and enhance security. The building-mounted lights will be controlled by a photoelectric (PE) cell for automatic dusk-to-dawn operation. Within the substation yard, LED streetlight-type fittings will be mounted on steel poles to provide uniform illumination.

These lights will be controlled via motion sensors integrated with the security system for automatic activation upon detecting movement. Additionally, manual control will be available to support operational access when required.

Stormwater and drainage

The Gugaa substation will be built with consideration of suitable drainage infrastructure to capture and discharge stormwater collected from within the substation during operation.

Fire mitigation

To ensure safety during a fire event and to reduce the available fuel loading around the substation, the design of the substation adopted an APZ clearance buffer as prescribed by the NSW Rural Fire Service standards. For more information, please read the Bushfire Risk Assessment Factsheet.

Connect with us

Transgrid is committed to working with landowners and communities through the development of HumeLink. Please connect with us for more information.

Transgrid

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