

3 THE PROPOSAL

3.1 INTRODUCTION

Country Energy has identified the need for major augmentation of its electricity supply network in the Lismore, Ballina, Ewingsdale, Byron Bay and Mullumbimby areas to cater for long-term demands resulting from significant population expansion in northern New South Wales. Based on projected demand, Country Energy identified that this augmentation project needs to be progressively constructed and completed by December 2014.

3.2 FAR NORTH COAST ELECTRICITY DISTRIBUTION NETWORK OVERVIEW

The areas of Lismore, Alstonville, Ballina, Lennox Head, Byron Bay and Brunswick Heads are supplied electricity via a 66kV ringed/mesh network that originates in Lismore and terminates at Mullumbimby. To close the ring back to Lismore a dual circuit 132kV power line connects Mullumbimby to Lismore via Dunoon (refer *Figure 1.1*).

Population growth and subsequent demand for electricity in the Far North Coast region is most pronounced along the coastal strip which includes the towns of Ballina, Lennox Head, Byron Bay and Brunswick Heads. A number of options were considered for augmentation of the network in order to cater for the medium/long term electricity supply requirements of the region.

The preferred network option to meet projected increased demand is to provide a single circuit 132kV power line from Lismore to Mullumbimby via Ballina and Ewingsdale. This can be achieved by converting the existing 66kV power line from Alstonville to Mullumbimby via Ballina and Ewingsdale to 132kV and rebuilding the existing 66kV power line from Lismore to Alstonville as a dual circuit power line on the same alignment. One circuit would remain operating at 66kV as part of a smaller 66kV loop between Lismore and Alstonville, and the second circuit would operate at 132kV to complete the 132kV ring between Lismore and Mullumbimby. An additional single 66kV circuit is also required between Lismore South substation and a newly constructed switching station near the Lismore University.

County Energy is in the process of confirming preferred Project transmission line corridors and substation sites through consultation with directly affected landholders. The description of the Project elements below identifies where corridors/sites are confirmed and hence Project Approval will be sought. Those elements where assessment and consultation is ongoing will remain as preferred corridors/sites for Concept Approval (refer *Section 1.6*).

3.2.1 Staging

It is anticipated that the Project will be completed by December 2014. The key stages of the project are:

1. Upgrade, including any necessary realignments or deviations of transmission lines:
 - a. Mullumbimby substation to Ballina substation by June 2012; and
 - b. Ballina substation to Alstonville by July 2013.
2. Construction of new transmission lines:
 - a. Brunswick Heads feeder loop by December 2014;
 - b. Lismore substation to Alstonville by July 2014;
 - c. 66kV power line from Lismore South substation to the Lismore switching station by March 2010; and
 - d. two underground 66kV power lines from Lismore bulk supply point substation to Lismore South substation by September 2009.
3. Construction of new substations:
 - a. Brunswick Heads substation by December 2014; and
 - b. Suffolk Park substation by July 2009.
4. Upgrade of substations:
 - a. Mullumbimby substation by December 2011;
 - b. Ewingsdale substation by December 2011;
 - c. Lennox Head substation by December 2011;
 - d. Ballina substation by December 2011;
 - e. Lismore substation by July 2014; and
 - f. Lismore South substation by September 2009.

A series of schematics indicating the proposed staging of the project is provided as *Annex E*.

3.3 TRANSMISSION LINE UPGRADES

3.3.1 Mullumbimby to Ballina

A single circuit 66kV power line exists between Mullumbimby and Ballina. It is proposed to upgrade this to a single circuit 132kV transmission line. The work will predominantly involve upgrading infrastructure within the existing alignment and will be constructed in four sections:

- Line 8505 from Mullumbimby substation to Ewingsdale substation;
- Line 8504(1) from Ewingsdale substation to the proposed Suffolk Park substation;

- Line 8504(2) from the proposed Suffolk Park substation to the Lennox Head substation; and
- Line 8504(3) from Lennox Head substation to the Ballina substation.

Upgrade of the power line utilise some existing pole infrastructure, however, some timber poles may be replaced with new concrete power poles. This will be assessed in the field on a pole by pole basis. Where the existing infrastructure is of sufficient height and capable of supporting the extra weight and tension of the 132kV line, the existing poles will be used with replacement to concrete poles to be undertaken as part of the long-term maintenance program. Where the existing infrastructure is incapable of supporting the 132kV line, the poles will be replaced. In locations where the line exists underground (i.e. within Ewingsdale) the upgraded line will be installed underground.

The existing alignment will be followed as much as possible. However, in sensitive locations, deviations are proposed to achieve better environmental, social and economic outcomes. These deviations are described as follows:

- Line 8505:
 - The existing alignment will be deviated to the west and south of Country Energy's Ewingsdale Field Service Centre and enter the new Ewingsdale substation from the south (refer *Figure 3.1*).
- Line 8504(1):
 - the existing overhead 66kV transmission line located within predominantly private holdings will be replaced by a new underground 132kV line heading south through the adjacent rural property and thence within the road reserves of Parkway Drive, McGettigans Lane and Citriadora Drive. This will join the existing underground alignment to the east of Ewingsdale (refer *Figure 3.1*).



Figure 3.1 Proposed Ewingsdale Alignment

- Line 8504(1)
 - The proposed transmission line will deviate from the existing alignment travelling south along Yagers lane towards the lot containing the dwelling and plant nursery (former piggery). The line will then follow the proposed substation access road to the south then west leading to the substation site.
- Line 8504(2)
 - The proposed transmission line will deviate from the existing alignment between the substation site and the railway line (refer *Figure 3.2*) before rejoining the existing line 8508 to the south.



Figure 3.2 Proposed Alignment at Suffolk Park Substation

- Line 8504(3)
 - the existing 66kV transmission line is currently being relocated by the RTA as part of the Pacific Highway Ballina Bypass project. The relocation has been assessed and approved as part of the RTA's approval process. Country Energy proposes to upgrade the new alignment from 66kV to 132kV; and
 - an overhead deviation is proposed in the vicinity of a recently approved 294 lot residential subdivision east of Ballina known as Ferngrove Lots 1-3 & 5 DP 1074242, Lot 1 DP 799238 and Lots 268-269 DP 755684 (refer *Figure 3.3*). The relocation of the existing 66kV alignment has already been assessed and approved by Ballina Shire Council under a separate development application.



Figure 3.3 Proposed Alignment at Ferngrove

3.3.2 Ballina to Alstonville (Line 8507)

The majority of the existing transmission line from Ballina to Alstonville is a single circuit 66kV power line. However, the section of line from the Alstonville substation to where it meets the Bruxner Highway in Alstonville township is a dual circuit 66kV power line (shared with line 8503). Line 8507 is to be upgraded to 132kV whereas line 8503 will remain at 66kV.

Upgrade of the line will utilise existing pole infrastructure; however, some timber poles will be replaced with new concrete power poles. This will be assessed in the field on a pole by pole basis. Where the existing infrastructure is of sufficient height and capable of supporting the extra weight and tension of the 132kV line, these will continue to be used with replacement to concrete poles undertaken as part of the long term maintenance program. Where the existing infrastructure is incapable of supporting the 132kV line, these poles will be replaced.

The existing alignment will be followed as much as possible, however in sensitive locations deviations are proposed in order to achieve better environmental, social and economic outcomes. These deviations are described as follows:

- along Barlows Road the transmission line will be located further away from dwellings (refer *Figure 3.4*).



Figure 3.4 Proposed Barlows Road Realignment

- along the Bruxner Highway at the bottom of the escarpment the transmission line will be relocated to the south away from residences (refer Figure 3.5); and

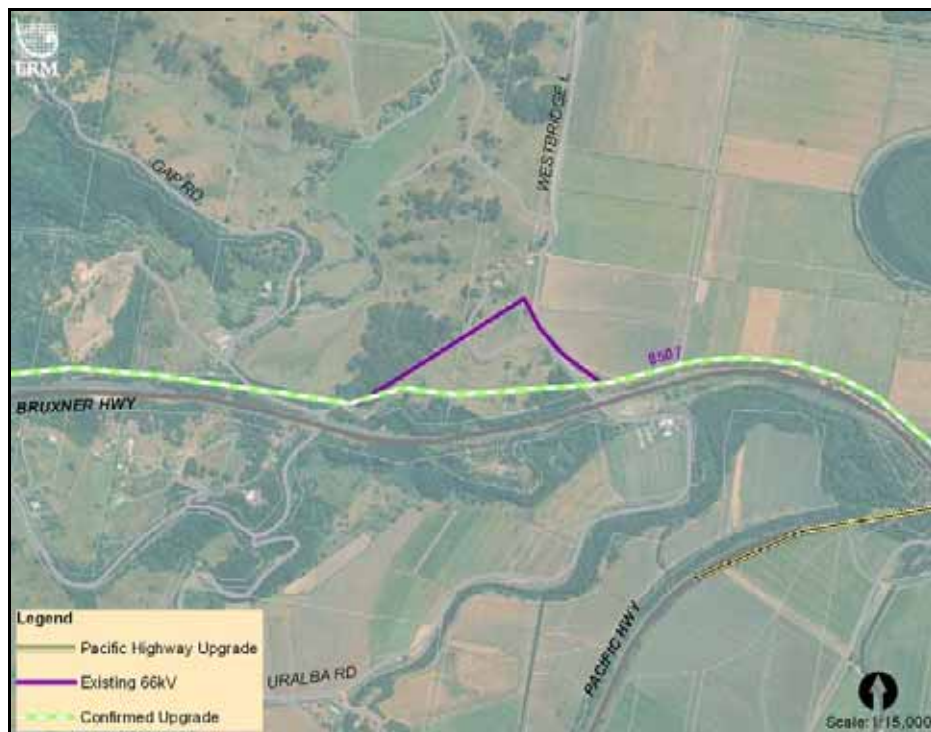


Figure 3.5 Proposed Realignment near Gap Road

- to avoid lengthy electricity outages to Country Energy's customers, the dual circuit section from the Bruxner Highway to Alstonville will be temporarily relocated within the existing power line easement to allow the upgraded dual circuit section to be constructed without removing the lines from service.

It is proposed to upgrade this section of the line to 132/66kV dual circuit by replacing the poles on the existing alignment with a type that allows for the installation of both 132kV and 66kV lines. The pole types are shown within *Annex F*.

A small variation to this section of the line route has also proposed to provide greater buffer to an existing rural infrastructure (refer *Figure 3.6*).



Figure 3.6 Proposed Realignment near Alstonville

The upgraded 132kV line 98507 will follow the existing 8507 alignment toward the Alstonville substation in dual circuit with line 8503. The alignments into and around the Alstonville substation will have some minor deviation to rationalise lines in this area. Line 98507 will then skirt the southern perimeter of the substation compound and continue west to join the 66kV line 0897 and continue as dual circuit towards Lismore.



Figure 3.7 Proposed Route around Alstonville Substation

3.4 NEW TRANSMISSION LINES AND SUBSTATIONS

3.4.1 Brunswick Heads Feeder Loop

A new 132kV feeder loop supplying the proposed Brunswick Heads substation would be constructed from Line 8505. The corridor under investigation is shown in *Figure 2.3*. Line route selection studies have not been finalised however, known constraints within the corridor include:

- significant vegetation;
- fauna corridors;
- acid sulphate soils;
- known Aboriginal relics/ sites; and
- 1 in 100 year flood inundation.

The abovementioned constraints are illustrated on *Figures 1A to 1F* of the LRS report provided as *Annex A*. Detailed environmental assessments will be undertaken to determine an appropriate transmission line route within the identified corridor.

3.4.2 Lismore to Alstonville

A 66kV sub-transmission line (line 0897) exists between the Lismore substation and a junction in the line located near Alstonville (see *Figure 2.4*). It is proposed to include a new 132kV transmission line (number 98507) with line 0897 to create a 132/66kV dual circuit by replacing the poles on the existing alignment with a type that allows for the installation of both 132kV and 66kV lines (refer *Figure 3.8*).

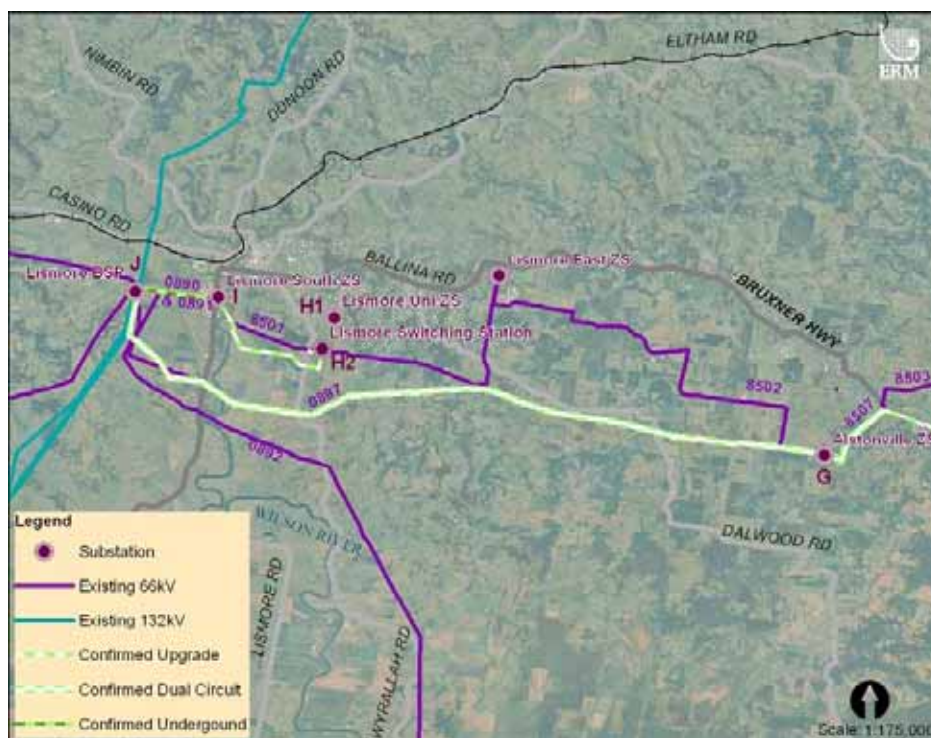


Figure 3.8 Proposed Dual Circuit Transmission Line from Alstonville to Lismore

Country Energy is rationalising the infrastructure at the western end of the Project Area as it enters the Lismore BSP substation from the south. The rationalisation involves both the 132kV and 66kV component of the dual circuit following the existing 132kV alignment from the south (refer to *Figure 3.8*). The portion of the existing 66kV line (0897) rendered redundant by this deviation will be removed. The pole types are shown within *Annex F*.

3.4.3 Lismore South Substation to Lismore Switching Station

The Lismore substation will be linked directly to the Lismore switching station. The switching station is currently fed from a 66kV line that emanates from the Lismore South substation which then continues to Lismore East substation (Line 8501).

The existing overhead 66kV line 0891 from Lismore substation to Lismore South substation will be disconnected from Lismore South substation and line 8501 will also be disconnected from Lismore South substation. Line 0891 and line 8501 will be connected to each other to form a direct link from Lismore substation to the Lismore switching station. Additionally the existing overhead 66kV line 0890 from Lismore substation to Lismore South substation will be disconnected from Lismore South substation and be connected to a new 66kV line to be constructed from near Lismore South substation to the Lismore switching station.

The new 66kV transmission line 8516 from Lismore South substation to Lismore switching station will travel south east from Lismore South substation, across the Wilson River and along East Gundurimba Road. The line will then head east generally following property boundaries within a new cleared easement to Wyrallah Road, and to the north of the Lismore landfill and sewerage treatment facilities. After crossing Wyrallah Road the line will then travel north to link to the existing Lismore switching station (refer to *Figure 3.9*).

A small deviation from existing line route 8501 is proposed to the east of the Lismore switching station. Consultation with the developer of a proposed industrial subdivision at this location identified an option to relocate the line approximately 30 metres to the south of the existing alignment. Consequently, the relocation will minimise the impact of the transmission line on the proposed subdivision.

Appropriate easements have been negotiated with affected landholders.

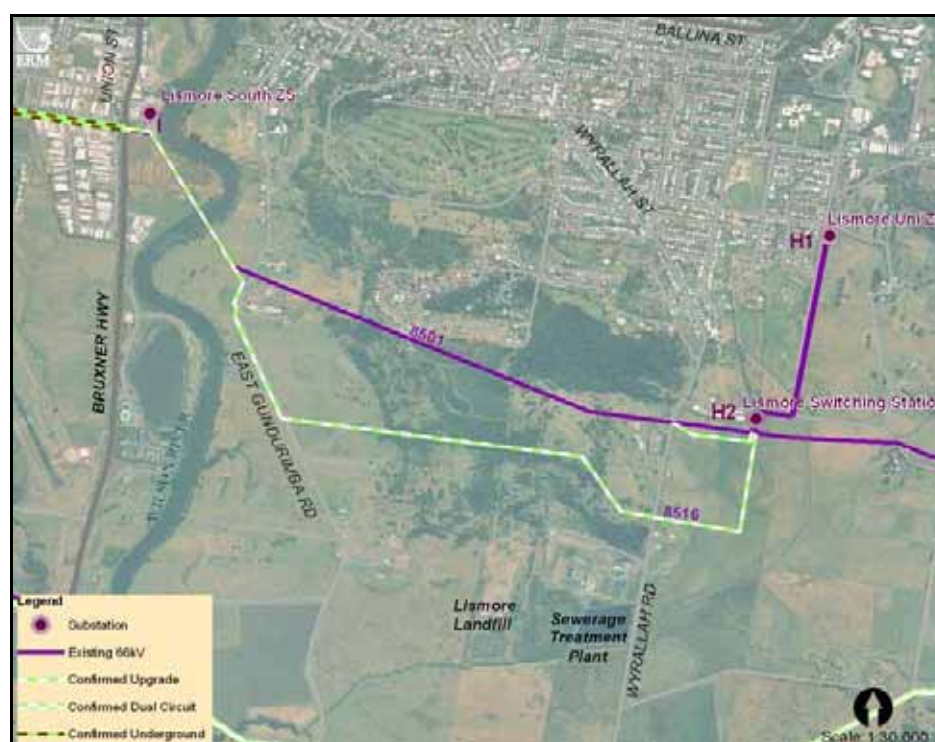


Figure 3.9 Lismore South to Lismore Switching Station Alignment

3.4.4 Lismore Substation to Lismore South Substation

Lines 0890 and 0891 follow Three Chain Road from the Lismore substation to the Lismore South substation. These lines provide 66kV electricity to the Lismore South and Lismore East substations and traverse the take-off/landing zones for Lismore airport. To improve security of supply it is proposed to install two additional 66kV underground lines in a trench within the Three Chain Road reserve (*Figure 3.10*) to connect into the Lismore South substation. Additional conduits will be installed within this trench to accommodate future potential 11kV and 66kV lines as required.

Country Energy will retain the existing 0890 and 0891 overhead lines as they are required to provide 66kV supply to the Lismore switching station.

The proposed dual circuit 66/132kV line (98507) will deviate from the existing line 0897 alignment near and to the west of the Bruxner Highway. The realignment will be undertaken to rationalise and minimise the impact on visual amenity to the residents adjoining the existing alignment and to move it to the south of an existing manufactured home/caravan estate. The existing portion of line 0897 from the Bruxner Highway to the Lismore BSP will be removed as shown of *Figure 3.10* below.



Figure 3.10 Underground Line on Three Chain Road and Dual circuit to Lismore BSP Substation from South

3.4.5 Brunswick Heads Substation

To cater for the future electricity loads in the Brunswick Heads area a new 132/11kV zone substation is required in the locality. Country Energy has commenced negotiations with the landowner to purchase a portion of Lot 12 DP 844553 on Bashforths Road, Brunswick Heads (see *Figure 2.5*) to allow construction of the Brunswick Heads substation. Detailed designs are not currently available; however a typical general arrangement of infrastructure is provided in *Annex G*.

Detailed environmental assessments are currently being prepared and will be submitted in the future to gain Project Approval for this Project element.

3.4.6

Suffolk Park Substation

To cater for the future electricity loads in the Suffolk Park/Byron Bay area and to provide the appropriate augmentation of the Project, construction of a new 132/11kV zone substation is required in the locality. The zone substation is to be constructed on Lot 9 DP 588885, at the end of Yagers Lane, near Suffolk Park. The general arrangement diagram of the substation and detailed designs for establishment of the substation have been developed and are included within *Annex G*, with the final substation layout being similar to the recently constructed substation location near Lennox Heads (as shown in *Figure 3.11*).



Figure 3.11 Example of Similar Substation Construction for Suffolk Park

A detailed description of works required to establish the new substation on site is provided within the MWH report included as *Annex Q*. Essentially, the following works will be undertaken:

Substation Compound

A compound area will be covered in aggregate or compacted gravel with two coat bitumen seal in vehicle access areas such the access road entrance and internal driveways. The access road will be a minimum of 6m wide with the remainder of the site being landscaped. The site will be surrounded by a 2.4m high chain mesh fence.

Electrical Infrastructure

The substation may initially be supplied at 66kV but will be constructed to eventually accommodate 132kV. Electrical infrastructure required to be constructed to accommodate this includes:

- two 132kV feeders;
- two 132/11kV transformers (note: 66/11kV transformers may initially be installed as an interim measure depending on load demand);

- seven 11kV distribution feeders, with ducting provision for a further five 11kV feeders; and
- a switch room building and control room building.

Substation Buildings

The substation compound area will contain two buildings, the 11kV switch room building and the control room. Both buildings will be constructed of almond colour (sandstone) split face concrete blocks and grey or green doors. Building elevations and plans are included within *Annex G*. The dimensions of the buildings are planned as follows:

- 11kV switch room building – dimensions approximately 14m by 5m and 3 – 4m high; and
- Control building – approximately 16m by 5m and 3 – 4m high.

Effluent Disposal

Disposal of any effluent generated by the on site amenities will be required to be disposed of on-site. As yet detailed designs for an on-site waste water treatment system have not yet been undertaken. A system will be designed in accordance with AS 1547:2000 and any requirements of Byron Shire Council prior to substation construction works commencing.

Access Arrangements and Road Upgrades

Access to the site will be through the presently disused piggery site to the west, with road access to the site is from Byron Bay via Yagers Lane, off Skinners Shoot Road. Due to the potential construction traffic requirements, upgrades of these roads will be required to accommodate heavy and oversized loads. The first 1km of Skinners Shoot Road through the SEPP 14 Coastal Wetland system will require some minor upgrade works. This will include pavement improvements and widening of the sealed section from 3m to 4m with bitumen surfacing within the existing wider unsealed road formation. Some trimming of overhanging vegetation (branches only) will be required to minimize potential damage from vehicle strike. A full description of road upgrades required is included within *Section 4.13.5* and *Annex A* of *Annex Q*.

3.5 EXISTING SUBSTATION UPGRADES

3.5.1 Mullumbimby Substation

Existing infrastructure within the Mullumbimby substation includes 132/66/11kV 75MVA and 132/66/11kV 40MVA power transformers and an 11kV earthing transformer. The following upgrade within the substation site is proposed:

- installation of a new 132kV line bay for the proposed 132kV feeder to Ewingsdale via Brunswick Heads;

- replacement of the 132/66/11kV power transformer with a 132/11kV transformer and removal of the 132/66/11kV 40MVA power transformer; and
- installation of new 132kV feeder bay along with a new short section of pole and line infrastructure.

The general arrangement diagram of the substation, illustrating both the new and old infrastructure is provided in *Figure 3.12*, with further detailed plans provided within *Annex G*.

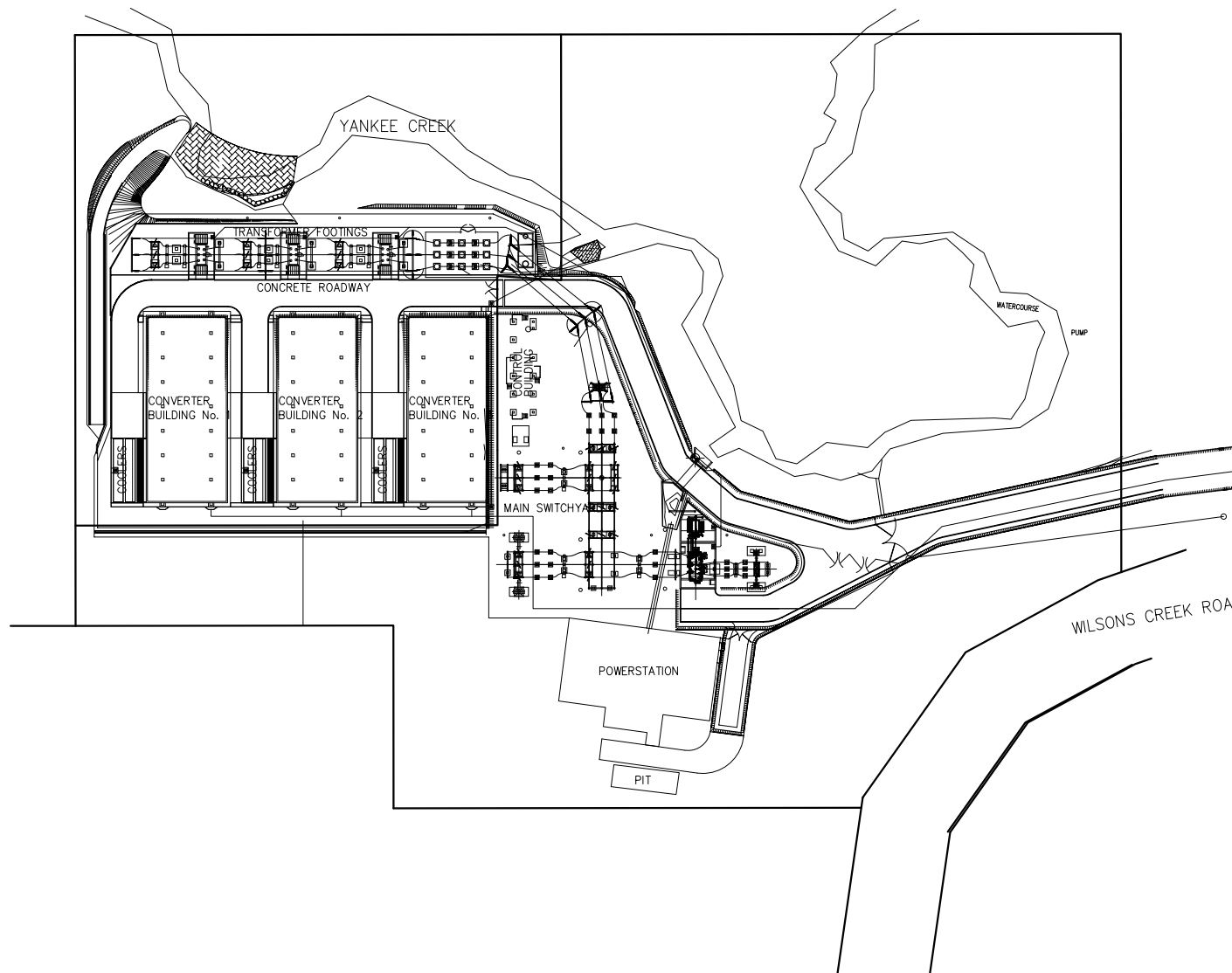
3.5.2

Ewingsdale Substation

The Ewingsdale substation is under construction in accordance with development consent from Byron Shire Council (DA 10.2007.796.1) and has been designed to allow it to be energised to 132kV in the future. The following upgrade is proposed:

- replacement of the two existing 66/11kV power transformers with two 132/11kV power transformers to allow energisation to 132kV;
- replacement of the two existing 66kV voltage transformers with two 132kV voltage transformers; and
- replacement of the existing 66kV surge arrestors with 132kV surge arrestors.

The general arrangement diagram of the substation, illustrating both the new and old infrastructure is provided in *Figure 3.13*, with further detailed plans provided within *Annex G*.



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MULLUMBIMBY
 132/66/11kV ZONE SUBSTATION
 CURRENT G.A. & SITE PLAN
 GENERAL ARRANGEMENT

Copyright © 2004 Country Energy
 SIZE: A1 SCALE: 1:500
 SHEET DRAWING NUMBER AMD
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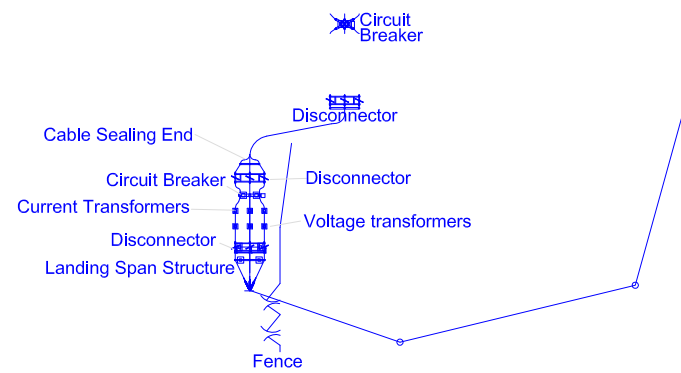
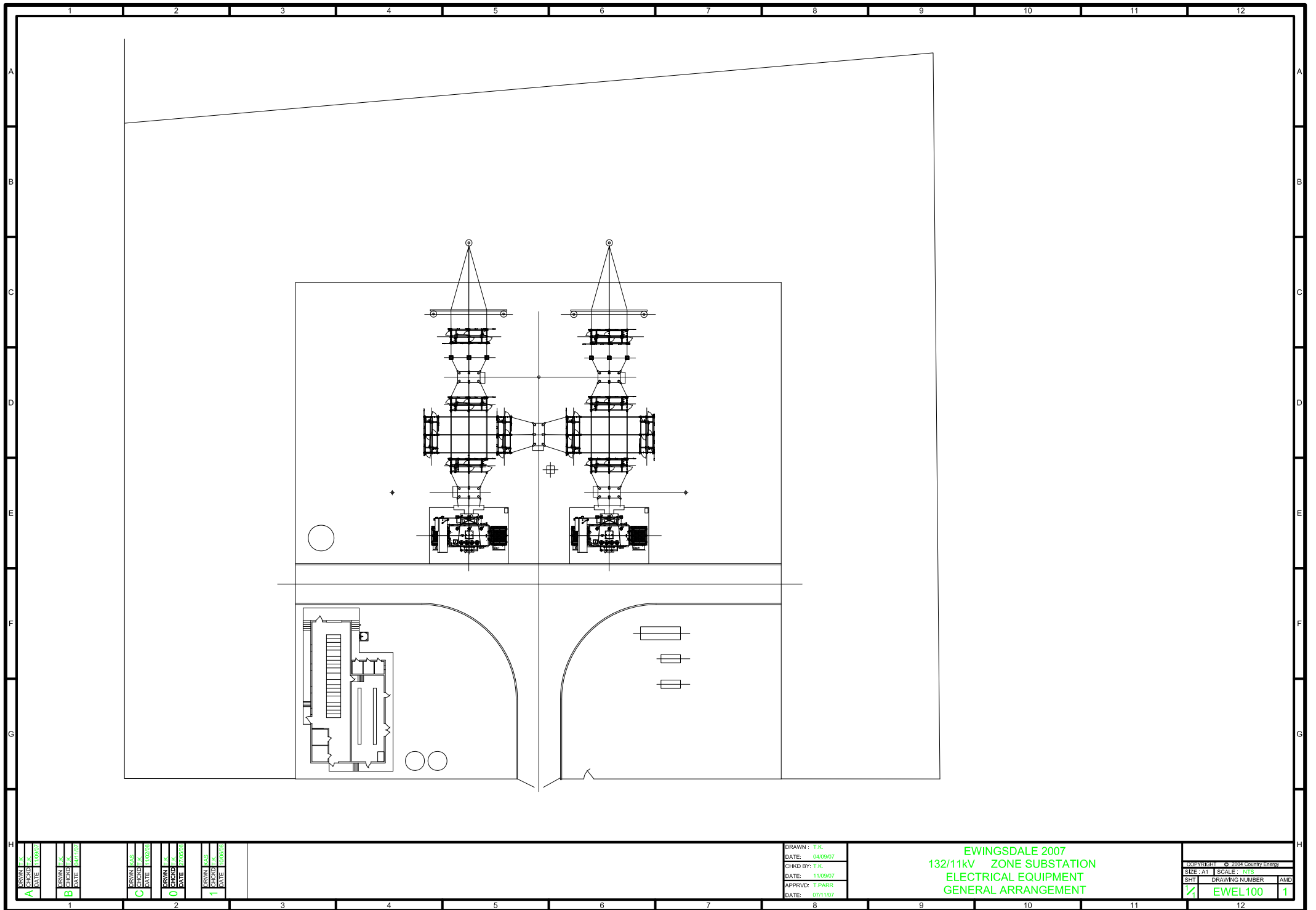


Figure 3.12 Mullumbimby Substation



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APPRVD: T.PARR	APPRVD: K.S.
DATE: 07/11/07	DATE: 07/11/07

EWINGSDALE 2007	EWINGSDALE 2007
132/11kV ZONE SUBSTATION	132/11kV ZONE SUBSTATION
ELECTRICAL EQUIPMENT	ELECTRICAL EQUIPMENT
GENERAL ARRANGEMENT	GENERAL ARRANGEMENT

COPYRIGHT © 2004 Country Energy	COPYRIGHT © 2004 Country Energy
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AMD	1

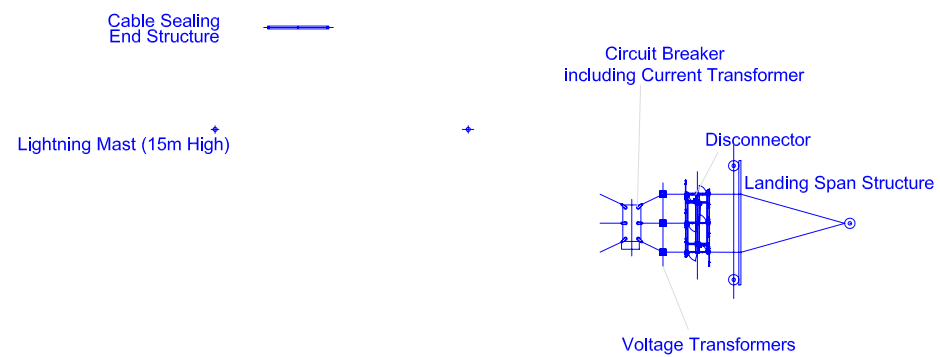


Figure 3.13 Ewingsdale Substation

3.5.3 *Lennox Head Substation*

The Lennox Head substation was constructed in 2006/07 and designed to accept 132kV in the future though has to date only been energised to 66kV. The following upgrade is proposed:

- the replacement of existing 66/11kV transformers with 132/11kV transformers to allow energisation of to 132kV;
- replacement of the two existing 66kV voltage transformers with two 132kV voltage transformers; and
- replacement of the existing 66kV surge arrestors with 132kV surge arrestors.

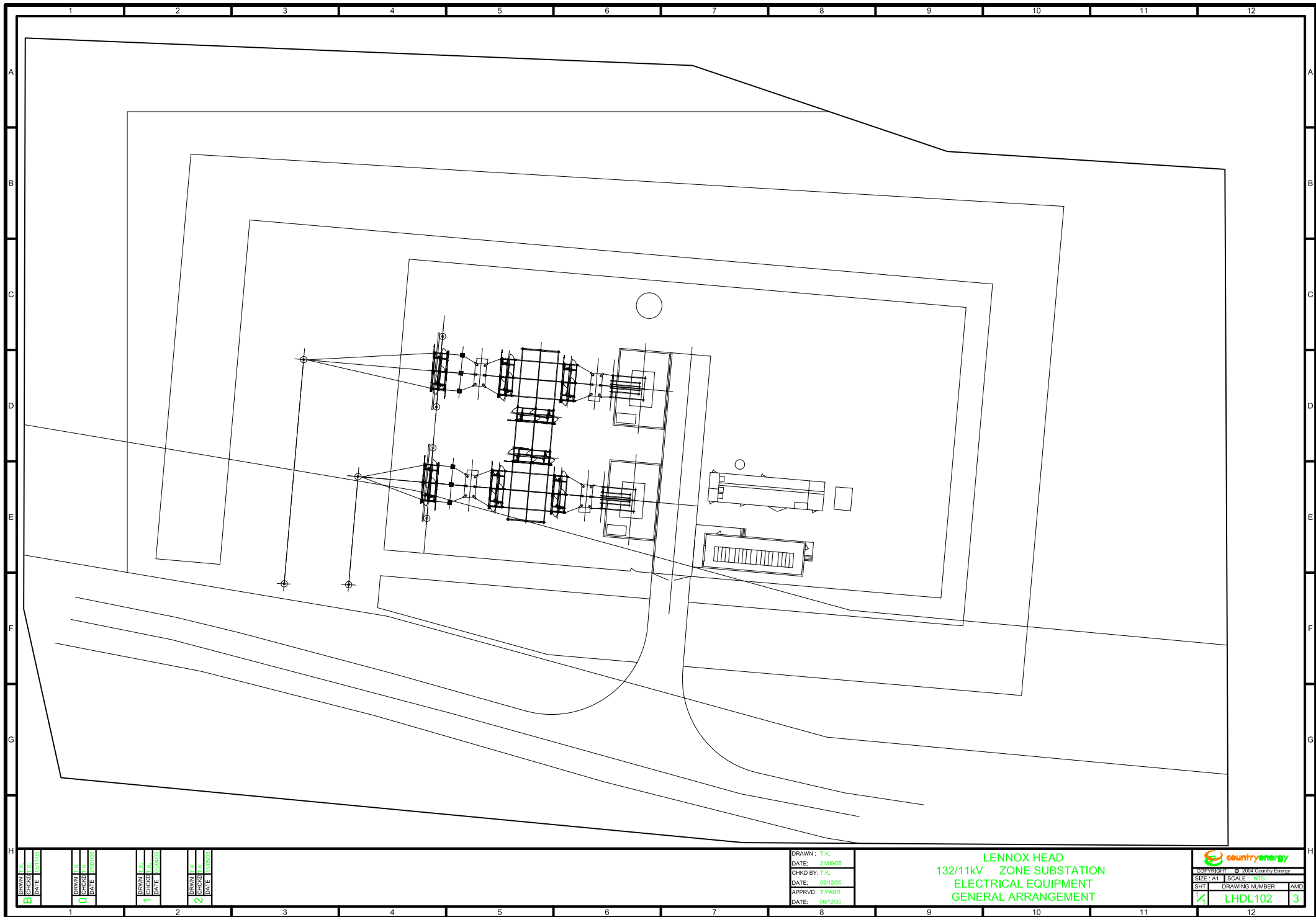
The general arrangement diagram of the substation, illustrating both the new and old infrastructure is provided in *Figure 3.14*, with further detailed plans provided within *Annex G*.

3.5.4 *Ballina Substation*

The Ballina substation is located on Lot 2 DP 222592, Temple Street, Ballina (*Figure 2.10*). It is surrounded by an array of urban land uses, including open space to the south, a natural watercourse to the west and residential to the east and north. Approval is being sought to upgrade the substation to a 132/66/11kV substation, including the following works:

- demolition of part of an existing building related to the adjoining field service centre;
- expansion of the substation compound area;
- installation of two new 132kV line bays;
- installation of one new 132kV transformer bay;
- installation of one new 66kV transformer bay;
- installation of a new 132/66/11kV 75MVA transformer; and
- landscaping works.

The existing 66/11kV infrastructure will be retained including transformers and capacitor banks. The general arrangement diagram of the substation, illustrating both the new and old infrastructure is provided in *Figure 3.15*, with further detailed plans provided within *Annex G*.

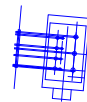


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APPRVD: T.PARR
DATE: 08/12/05

LENNOX HEAD
132/11kV ZONE SUBSTATION
ELECTRICAL EQUIPMENT
GENERAL ARRANGEMENT

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Two 132kV Transfomers

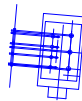
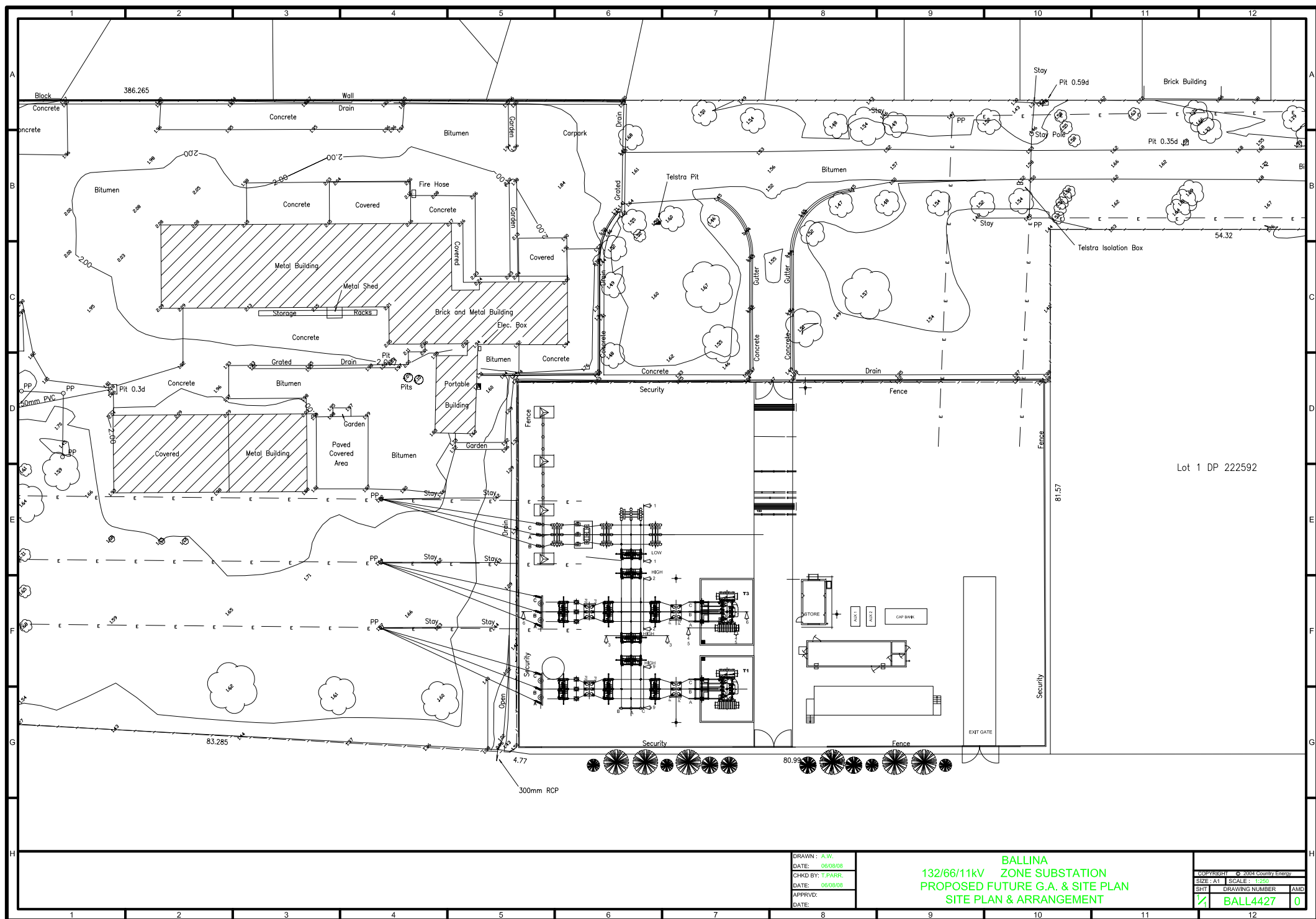


Figure 3.14 Lennox Head Substation



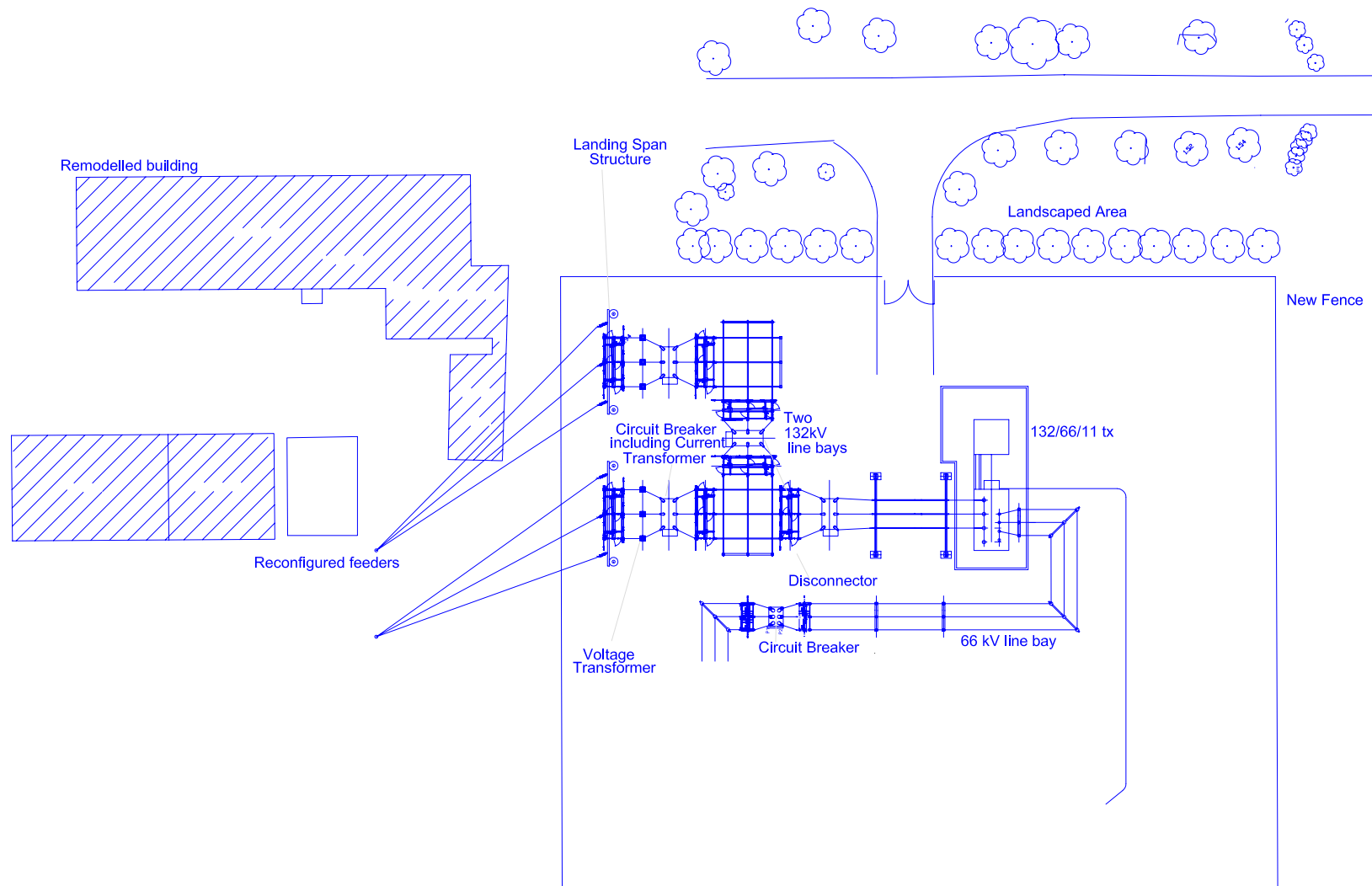


Figure 3.15 Ballina Substation

3.5.5 *Lismore (BSP) Substation*

The following upgrade is proposed:

- installation of a new 132kV line bay for the proposed new transmission line from Alstonville; and
- installation of two new 66kV line bays for the proposed 66kV underground power lines to Lismore South substation.

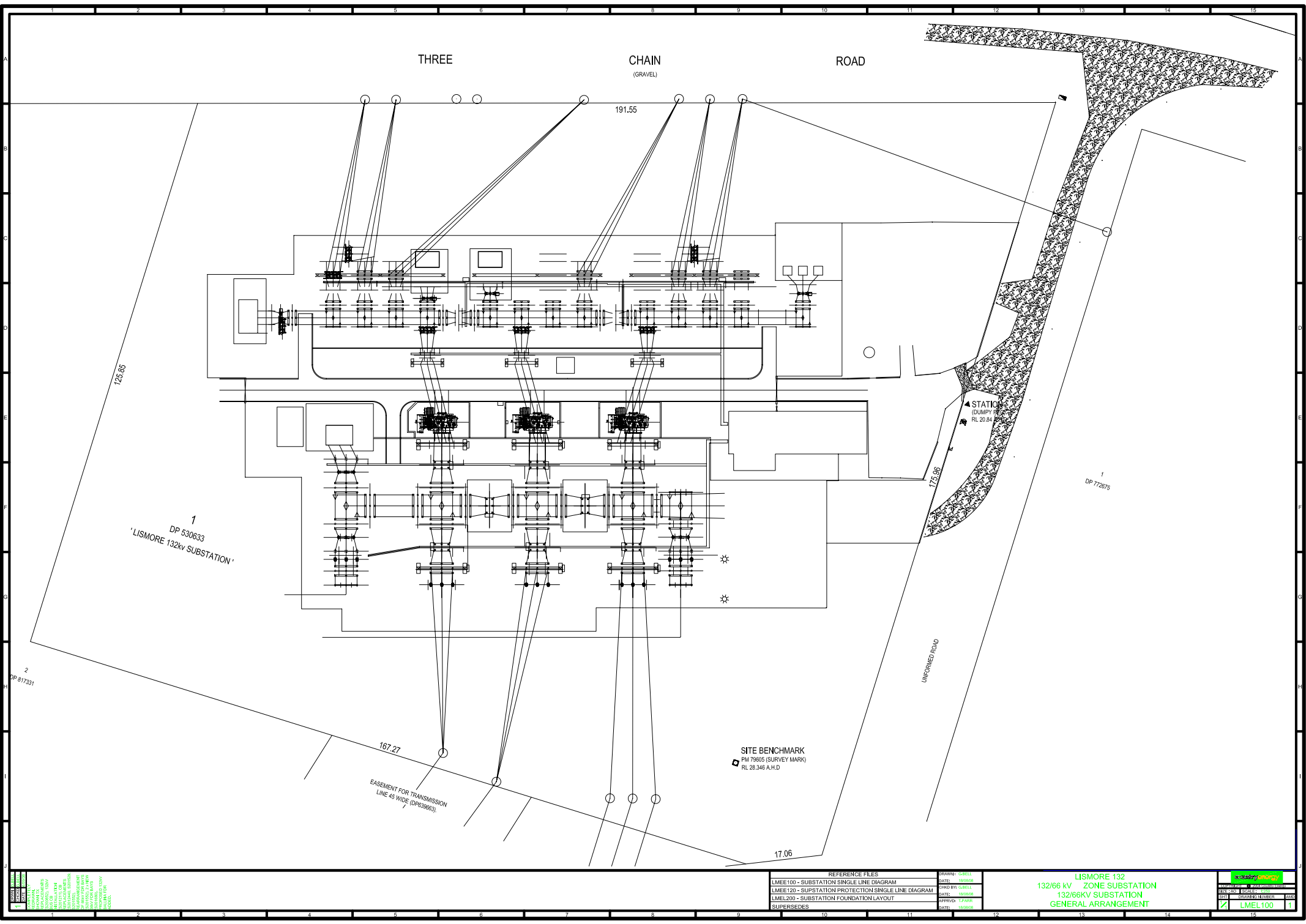
The construction of the new line bays will require the demolition of redundant storage sheds located within the substation compound. No changes to transformers and capacitor banks are proposed.

The general arrangement diagram of the substation, illustrating both the new and old infrastructure is provided in *Figure 3.16*, with further detailed plans provided within *Annex G*.

3.5.6 *Lismore South Substation*

It is proposed that the substation be reconfigured and redesigned including the relocation of bus and line bays, transformers and capacitor banks. This may involve possible demolition of the existing power station building.

Options for the final arrangement are still under investigation. Once complete detailed environmental assessments, including a Heritage Impact Assessment on the Lismore Power Station, would be prepared and will be submitted in the future to gain Project Approval for this Project element.



1
DP 530633
'LISMORE 132kv SUBSTATION'

2
DP 817351

SITE BENCHMARK
PM 79605 (SURVEY MARK)
RL 28.346 A.H.D.

STATION
(DUMPY)
RL 20.84

1
DP 772875

REFERENCE FILES		DRAWN: GLENN	LISMORE 132 132/66 kV ZONE SUBSTATION 132/66KV SUBSTATION GENERAL ARRANGEMENT	
LMEE100 - SUBSTATION SINGLE LINE DIAGRAM		DATE: 08/05/09		
LMEE120 - SUBSTATION PROTECTION SINGLE LINE DIAGRAM		DESIGNED BY: GLENN		
LMEL200 - SUBSTATION FOUNDATION LAYOUT		DATE: 04/06/09		
SUPERSEDES		APPROVED: T. J. J. J.		
		DATE: 10/06/09	LMEL100	

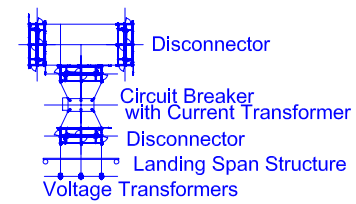
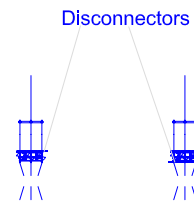


Figure 3.16 Lismore (BSP) Substation

3.6 TRANSMISSION LINE CONSTRUCTION/UPGRADE METHODS

3.6.1 Introduction

Generally the upgrading of the lines from 66kV to 132kV requires the same construction elements to be followed as the construction of new lines. These may include:

- site establishment including access;
- pole removal (if required);
- centreline surveying and service locating;
- foundation excavation and pole erection;
- conductor and earth wire installation (containing pilot wire); and
- environmental management.

Complex line construction methods such as helicopter installation and blasting of pole foundations are not considered to be necessary for the Project.

3.6.2 Site Establishment and Access

Access tracks exist within the corridor for the majority of the existing transmission line. Where possible, vehicles will utilise these tracks for access to the lines. New access tracks may be required for the proposed deviations. These tracks will be constructed within the corridor linking to the public road system at the most convenient locations.

Minimal clearing will be required for the construction of new substations and transmission lines and those sections of the transmission line that deviate from the existing route.

According to the Lismore, Ballina and Byron LES's Bushfire Prone Land Mapping significant areas incorporating the existing and proposed new transmission lines have been identified as *Category 1* and *Category 2* bushfire vegetation classed land. Therefore, throughout the life of the electricity network, management of regrowth vegetation will be necessary within the transmission line corridor to reduce the threat of combustible materials to the line and to allow access for maintenance vehicles. This will be undertaken using mechanical, hand clearing and chemical clearing methods prior to construction activities commencing and as part of ongoing maintenance activities.

Any vegetation removed will be chipped and mulched if suitable. Shrub and grass understoreys will also be maintained to assist in prevention of soil erosion.

During construction works storage compounds will be located along the transmission line route as well as using field service centres and substation compounds. No refuelling, storage of chemicals or oils will occur within these storage areas, only storage of 'hard' equipment such as poles and conductors.

3.6.3 **Pole Removal**

As the base of most timber transmission poles receives ongoing treatment with either Copper Chrome Arsenate (CCA) or Creosote for protection against termites, borers etc, their removal and disposal must be undertaken with care. There are two possible methods that may be used to remove and dispose of poles.

The first method is to excavate around the base of the pole (keeping the surface soil aside) and lift the pole out of the ground. The butt of the pole is then cut off (which is the treated section of the pole) and dropped back into the ground. The butt is then covered with the former surface soil with subsurface soils used as final cover. The remainder of the pole is usually taken to landfill or it may be reused in landscaping works if appropriate.

The second method is the same as above except the pole butt is not left in the ground but is taken to landfill. Pole butts are never reused as they are a potential source of contamination. The rest of the pole may still be reused. Pole removal and disposal will be undertaken in accordance with Country Energy Environmental Operation Manual CEM7022.06 – *Waste*. The management of contaminated pole butts is discussed in further detail in *Chapters 12 and 14*.

3.6.4 **Surveying and Service Locating**

Once poles are removed, the centreline of the existing corridor will be resurveyed to allow for the proper placement of the new transmission line. Service locating will occur upon site establishment to identify the location of any existing services such as water, sewer or telecommunications. The location of any such services will be clearly marked on the ground with all Country Energy staff and subcontractors made aware of their presence.

3.6.5 **Foundation Excavation and Pole Erection**

New transmission poles will be of concrete construction with horizontal line post insulators that would most likely be grey porcelain or polymer. Steel poles may be used in areas of difficult terrain as they offer some advantages in steep or rocky areas. The poles will be typically placed between 150m and 300m apart, with final details of pole numbers, spacing and location to occur during the detailed project design phase.

Poles will be 20m to 23m in length. Once embedded three metres into the ground their height will be 17m to 20m above natural surface level. The final height of individual poles may vary dependant upon the terrain and design constraints. The foundations for the transmission poles will be bored using a truck mounted unit. Each hole will be approximately one metre in diameter and three metres deep. Once the pole is erected, the hole will be backfilled with concrete. Spoil material would be respread around the pole and stabilised. Vehicle access to each pole would be required during construction and operation. This will be via access tracks referred to in *Section 3.6.2*.

The proposed communications tower poles to be installed at Mullumbimby zone substation and Lismore BSP substation will be of concrete construction. The poles will be approximately 30m in height and will be supported on a mass concrete foundation 6.7m square by 1.2m deep.

3.6.6 Conductor and Earth Wire Installation

Conductors and earth wires are strung by initially manually feeding light training lines between poles and then using mechanical equipment to pull the connected conductors from large drums mounted on the rear of specialised vehicles. A number of spans can be strung at once depending on location and intervening terrain.

3.6.7 Environmental Management

Given that works will be occurring in a rural environment, adjoining some sensitive natural features such as waterbodies and National Parks, environmental management during construction is critical. Mitigation measures will be implemented with regard to dust control, spread of noxious weeds, erosion and sediment control, occupational health and safety and management of site specific environmental elements. These mitigation measures are discussed in more depth within *Chapters 6 to 16*, and summarised in *Chapter 17*. These will generally be developed in accordance with Country Energy's standard environmental management practices.

Construction techniques and environmental management for transmission lines and substations is discussed further in *Chapter 13*.

3.7 SUBSTATION CONSTRUCTION

Construction of the Suffolk Park substation will be undertaken in the manner described within the MWH report, provided as *Annex Q*.