

Health Infrastructure Tweed Valley Hospital Infrastructure Management Plan

Revision 3 | 17 October 2018

This report takes into account the particular instructions and requirements of our client.

It is not intended for and should not be relied upon by any third party and no responsibility is undertaken to any third party.

Job number 262011

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ARUP

Document Verification

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Job title		Tweed Valley Hospital		Job number	
				262011	
Document title		Infrastructure Management Plan		File reference	
Document ref					
Revision	Date	Filename	Infrastructure Report.docx		
Draft 1	6 Aug 2018	Description	First draft		
			Prepared by	Checked by	Approved by
		Name	Charlotte Ware	Ed Caine	Ed Caine
		Signature			
Revision 1	31 Aug 2018	Filename	Infrastructure Report.docx		
		Description	Issue		
			Prepared by	Checked by	Approved by
		Name	Charlotte Ware	Ed Caine	Ed Caine
		Signature			
Revision 2	3 Oct 2018	Filename	Infrastructure Report.docx		
		Description	Issue		
			Prepared by	Checked by	Approved by
		Name	Charlotte Ware	Ed Caine	Ed Caine
		Signature			
Revision 3	17 Oct 2018	Filename	Infrastructure Report.docx		
		Description	Issue		
			Prepared by	Checked by	Approved by
		Name	Charlotte Ware	Ed Caine	Ed Caine
		Signature			
Issue Document Verification with Document <input checked="" type="checkbox"/>					

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1 Executive Summary

The Tweed Valley Hospital is a \$534 million investment by NSW government for the development of a new state-of-the art hospital on a greenfield site. The Project is located on a portion of 771 Cudgen Road, Cudgen, legally described as Lot 102 DP 870722 (Project Site).

The Project consists of a staged State Significant Development (SSD) Application under section 4.22 of the Environmental Planning and Assessment Act 1979 (EP&A Act), which will consist of:

- a concept development application and detailed proposal for stage 1 early and enabling works (this stage); and
- a second development application for stage 2, which will include detailed design, construction and operation of the Tweed Valley Hospital.

The intent of this document is to support the SSD application by identifying key infrastructure within the electrical and ICT design.

The Concept Proposal is informed by service planning to 2031/32 and has an expected gross floor area in the range 55,000m² to 65,000m².

The Masterplan has been developed with consideration to the campus as a whole. Electrical and ICT distribution strategies have been developed to allow for the proposed hospital and the future Masterplan which may include education, research and private hospital buildings.

Essential Energy have been consulted and the Project Site will require a new dedicated high voltage supply. It is anticipated that the campus demand up to 2031/32 will be within the capacity of a single 11kV feeder and private HV switching station. Where the campus load exceeds 8MVA, a new Essential Energy owned 66kV zone substation with associated external transformers will be required on the Project Site. In the current Masterplan space provision has been allocated for a future zone substation to allow for development beyond 2032.

Cudgen Road provides access to the major communications carrier services. The Project Site is well positioned to allow for diverse fibre lead-ins. A major Telstra fibre connection runs along the front of the Project Site and may need to be diverted. Other existing services on the Project Site are limited to minor communications and power connections to an existing house, shed and small irrigation pump.

2 Introduction

The Stage 1 (early and enabling works) scope includes augmentation and connection of permanent services for the new facility for electricity and communications. This report highlights existing utility services that may need to be relocated and new connections required to serve the development. The relevant

utility owners have been consulted in the preparation of the infrastructure management plan. See section 3 of this report for consultation history.

Preliminary works include installation of the following electrical infrastructure:

- Temporary Project Site entrance lighting;
- Disconnection and demolition of the irrigation pump supplies and associated poles and wires;
- Disconnection and demolition of existing buildings and sheds;
- Reconnection of 100kVA pole mounted transformer to temporary distribution board feeding the Project Site supplies.

Stage 1 early and enabling works include installation of the following electrical and communications infrastructure:

- 11kV circuit breakers and associated protection in Cudgen Zone Station (Level 3 ASP);
- Project Site perimeter Essential Energy ring main units for electrical point of connection to the Essential Energy 11kV network (Level 3 ASP);
- Public road lighting at new intersections (Level 3 ASP);
- Private HV switching station;
- Electrical and communications infrastructure highways including pit and pipe systems;
- Communication lead-in conduits from the Project Site boundary to future intake rooms;
- Diversion of Telstra fibre cables along Cudgen Road;
- Diversion of Optus fibre cables along Cudgen Road;
- 11kV connection from existing above ground feeders on Cudgen Road to feed new Essential Energy temporary kiosk substation;
- Temporary construction Project Site 1000kVA Essential Energy kiosk substation;
- Temporary external LV switchboard fed from temporary 1000kVA kiosk substation to feed temporary Project Site supplies;
- External lighting and power distribution boards to supply permanent external lighting and power (not construction Project Site power);
- External distribution board temporary supplies from the temporary external switchboard and associated pit and pipe systems;
- External distribution board pit and pipe systems to facilitate future permanent supplies from the hospital building;

- Pit and pipe system to support future external communications racks/equipment and security equipment;
- Pit and pipe systems to support future small power connections.

As the Project is located on a greenfield site, used for farming, there are no underground services running through the centre of the Project Site, however there may be utilities running through the South West edge of the Project Site. There are two roads bordering the Project Site: Cudgen Road and Turnock Street that have utility services running parallel to them. There will need to be significant road works to accommodate the new hospital development and as part of these works these services may need to be rerouted. There is minimal street lighting that may need relocating and is likely to require expansion to cover routes into the wider campus. There are electricity poles running along Cudgen Road and through the North West of the Project Site that may need to be relocated due to road widening.

A dial before you dig investigation was carried out by the consulting surveyors B&P surveys on 30/11/2017, a second dial before you dig investigation was carried out by Arup on 18/07/2018, due to there being missing information. B&P surveys have produced a level and detail survey document for the Project Site which indicates service routes and pits, they have also sketched the pit sections, identifying conduit and cable sizes and types. Note, not all pits were openable during their inspection. A second-high level Project Site survey was carried out by Arup on 02/08/18.

Spare capacity has been confirmed at Cudgen Zone Station, owned by Essential Energy, to serve the Project Site at 11/33/66kV.

3 Consultation history

This section of the report provides an overview of all consultation with utility companies and key outcomes to be considered within the Project.

3.1 Essential Energy

A preliminary connection enquiry for 8MVA (predicted 2032 load) increasing to 20MVA (future load) was submitted at Lot 102, DP870722 on 13/06/18. This was followed up by a voice conference on 16/06/18 with Essential Energy, where he told us the following key information:

- There is approximately 60MVA spare capacity at Cudgen Zone Station at 66/33/11kV
- Cudgen zone station is approximately 2.1km from the Tweed Valley Hospital Project Site
- On the 8MVA load a 2N redundancy transformer supply can be taken from Cudgen Zone Station at 11kV
- 8MVA maximum on an 11kV feeder

- Over 1.5MVA capacity as an LV customer tariffs increase
- For an HV customer, the HV intake to the Project Site will be an underground or overground intake to a customer owned HV switchboard
- The intake will be from the first pole within the customer boundary, for which a 10m easement will need to be respected
- Relocation of power lines will be considered at the start of early works
- There is a dual circuit arrangement currently along Cudgen Road
- There is an existing 100kVA 3 phase supply to a pump site on the Tweed Valley Hospital site, this could be utilised for temporary works
- For temporary works 1000kVA/1500kVA pole/pad mounted substation can be added to the existing 11kV network

A preliminary response was received from Essential Energy on 08/08/2018, see Appendix A. The key information from this response is listed below:

- Maximum demand on 11kV with dual redundant feeders is 8MVA from Cudgen Zone Station
- Preliminary studies show that 8MVA is the upper limit of the 11kV network
- A tie would be required between the 2 no. 11kV feeders at Tweed Valley Hospital in addition to a tie at the existing Cudgen Zone Station for contingency
- For a maximum demand greater than 8MVA, Essential Energy have proposed a new 66/11kV zone station on the Project Site
- An underground supply from Cudgen Zone Station to the Project Site has been requested by the local planner for Cudgen
- A Project Site earthing study will need to be carried out for Essential Energy

The Essential Energy Major Connections Manager assigned to the Project is Darren Elliot who we will be engaging with to make a formal Connection Application.

3.2 NBN

Several applications were submitted to NBN from 29/05/18 – 09/07/2018.

Kristine Lam, Account Associate from NBN confirmed that as the Project contains less than 100 premises and is outside of existing service availability it is not eligible for nbn fixed line connectivity.

It was recommended that we contact Telstra for a solution in an email received on 09/07/18.

3.3 Telstra

Several enquiries were submitted to Telstra from 29/05/18 – 14/08/2018. On 23/07/18 Mark Melville Land Development Liaison Specialist confirmed that Telstra will not accept applications over 6 months before project completion. This restriction is due to a government plan for nbn roll out by 2020 when 90% of fixed lines will be nbn owned.

However, he confirmed diverse connections are possible and multiple nodes for connection in that area. He also informed us that Cudgen Road is a main fibre route with 72 fibres running in parallel underground.

In parallel to this Arup has received Telstra dial before you dig information on 02/08/18 that was missing from the original survey carried out 30/11/17. We are now able to engage with Telstra Network Integrity who will need to carry out a survey to quote for moving Telstra assets.

3.4 Optus

An enquiry was submitted to Optus on 29/05/18.

Andrew Porm, Enterprise Business Manager confirmed that there is no Optus fibre available to serve the Project Site but there is Telstra fibre availability. On 02/08/2018 a Project Site visit was carried out by Arup and Optus fibre markers were observed within the Project Site boundary this is discussed in section 4.4.

We have consulted the damages, asset and relocation team about existing services in Cudgen Road as they are likely to be affected by road widening and Project Site entrances. The next step is to locate the cables on the Project Site by engaging with an Optus accredited locator. Following this Optus will survey the necessary works and provide a quote for the works.

3.5 AARNet

AARNet were consulted on 14/08/2018 to identify any impact on existing AARNet assets due to road widening or new Project Site entrances on Cudgen Road. From the as built received the Project Site works are unlikely to affect AARNet fibre, however as the works are to be carried out within 10m of AARNet assets an accredited locator under the supervision of an accredited plant location contractor will need to expose or locate the AARNet assets. AARNet have confirmed that tracer wires are installed within their pipes.

4 Project Site visit

A non-intrusive Project Site visit was carried out by Arup on 3/08/18, where by above ground services were compared to dial before you dig information and B&P survey information. Observations from the Project Site visit are listed below.

4.1 Essential Energy

- The Essential Energy lighting and power poles are best represented by the B&P survey information as opposed to the Essential Energy information
- There are 5 electricity poles located within the Project Site boundary that can be removed
- There is a kiosk substation located off the Project Site at the North end of Turnock Street, owned by Essential Energy
- The LV poles crossing through the middle of the Project Site appear to be feeding a 40A metered consumer unit serving a shed next to Cudgen Road and a second 50A consumer unit serving an irrigation pump next to the dam, further investigation is required by B&P to ensure that this supply is only feeding loads for the farm that are no longer required
- The overhead lines running along Cudgen road appear to have 2 no. HV feeders and 1 no. 400V feeder, these appear to supply many of the buildings by overhead cabling either side of Cudgen Road
- There are number of stay wires and poles either side of Cudgen road that appear to be holding the electricity poles upright, these may need to be relocated because of road widening or Project Site access
- Lighting within bus stops does not appear to be connect to the Essential Energy network and appears to be connected to a small PV panel on top of each bus stop

4.2 NBN

No services were observed.

4.3 Telstra

There are Telstra pits located either side of the road, these locations matched the B&P survey information.

4.4 Optus

- Fibre Optic markers were observed running through the tree line along the West side of Cudgen road, these need to be further surveyed by B&P
- Optus line markers in the tree line, opposite building 752 – fruit and veg store, indicate the duct bank crossing under the road towards the store
- After this no more Optus markers were found running East on Cudgen Road

4.5 AARNet

One AARNet pit was found, located close to TAFE on the far side of the road from the Project Site.

5 Existing electrical services

The dial before you dig surveys identified several existing utilities along Cudgen Road. It also highlighted Essential Energy within the Project Site boundary.

Essential Energy has been contacted to establish the extent of their existing assets within the Project Site boundary. Arup shall work with them to determine the extent and scope of works required to relocate these assets.

Street lighting is minimal at the proposed hospital entrance, consideration will need to be given to moving street lighting poles and adding additional street lighting for pedestrian and driver safety.

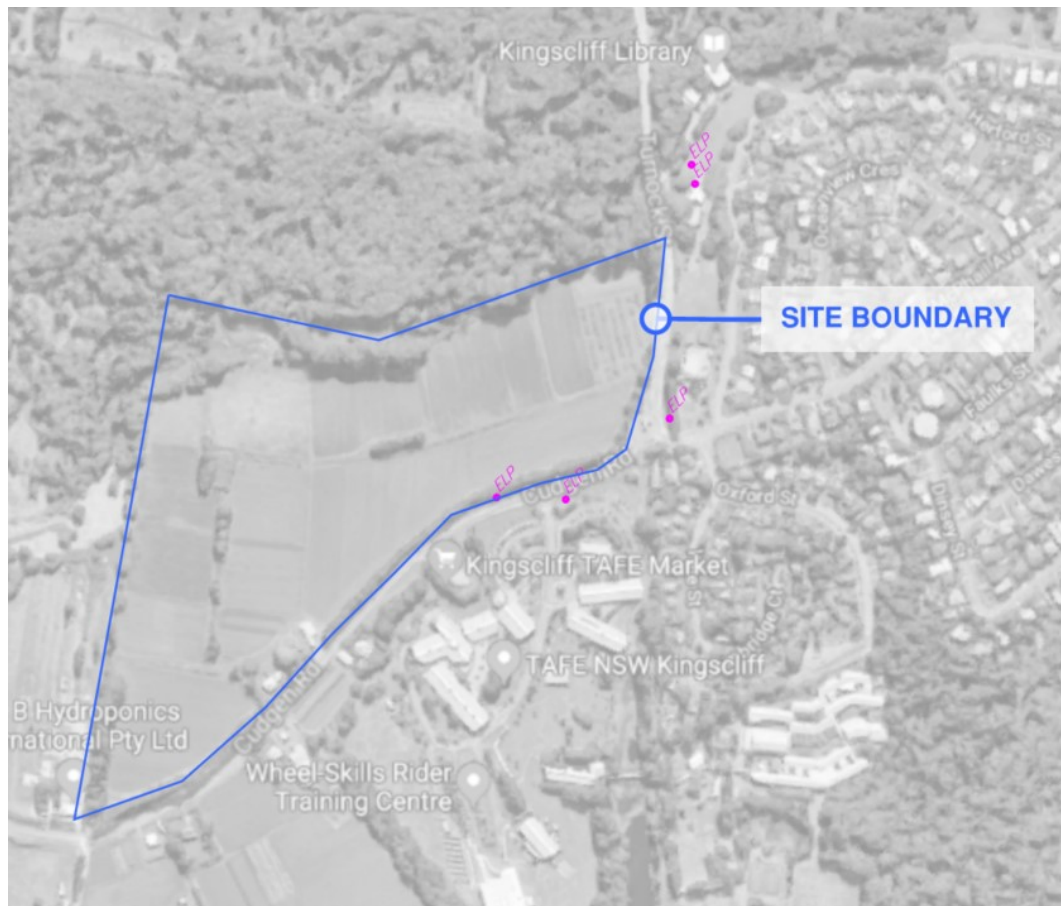


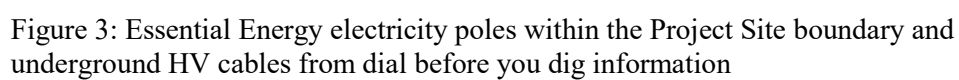
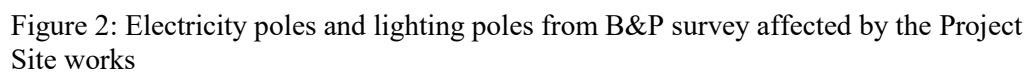
Figure 1: Existing lighting poles at the Project Site boundary from B&P survey

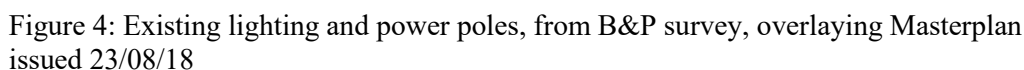
Electricity poles are located on the far side of the road away from the Project Site. The current Masterplan includes a new bus stop on the far side of the road, poles in this area will need to be relocated. Where poles are on the near side of the street they appear to serve existing buildings on the Project Site, street lighting and/or

stay wires. These poles may need to be removed or relocated as part of the works due to road widening.

There are HV and LV electrical conduits running underground along the far side of Turnock Street to and Essential Energy kiosk substation, the proposed works are not expected to affect these Essential Energy assets.

The B&P survey information and the dial and dig information show conflicting information. The B&P survey shown in figure 2 looks to be the most accurate from the Project Site survey carried out by Arup. There are 5 electricity poles located within the Project Site boundary supply LV electricity to a 40A metered consumer unit serving a shed next to Cudgen Road and a second 50A consumer unit serving an irrigation pump next to the dam. These are both for the Project Site's previous use as a farm and therefore it is likely that the electrical poles can be removed and the pole mounted transformer will be redundant.





6 Existing communication services

The Telstra dial before you dig information shows conduits running under the South West edge of the Project Site then along the side of the road closest to the Project Site. In a telephone conversation on 23/07/18 Telstra confirmed that Cudgen road is a main fibre route with 72 cores running parallel. These services

appear to supply residences in the surrounding area. Where the road is to be widened on the nearest side to the Project Site, duct banks and pits will need to be relocated so that they can continue to be safely accessed from the footpath.

From the Project Site survey Optus fibre markers were observed running along the Project Site boundary within the tree line. This information is contradictory to conversations with Optus who have confirmed there are no Optus assets at the Project Site. Further inspection is required by B&P surveys. If there is Optus fibre along the tree boundary of the Project Site it will be affected by the Project Site works and the works will need to be coordinated with Optus.

From the dial and dig information and upon inspection the AARNet services appear to run on the far side of Cudgen road into TAFE. These services may be affected by road widening on the far side of the road for the new bus stop. The duct bank and pit may need to be relocated to maintain safe access.

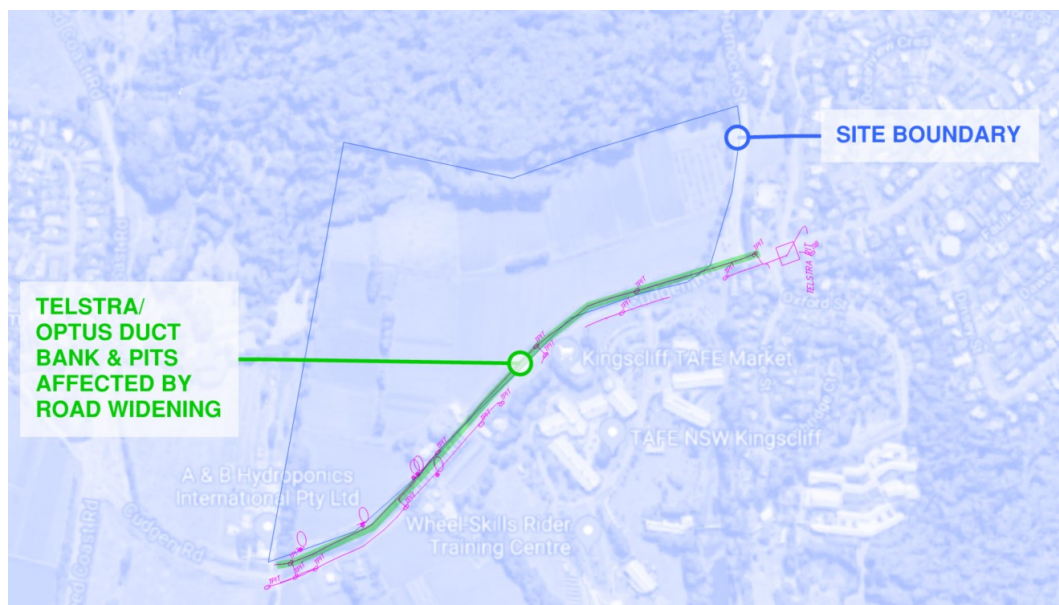


Figure 5: Existing underground communications duct banks from B&P survey

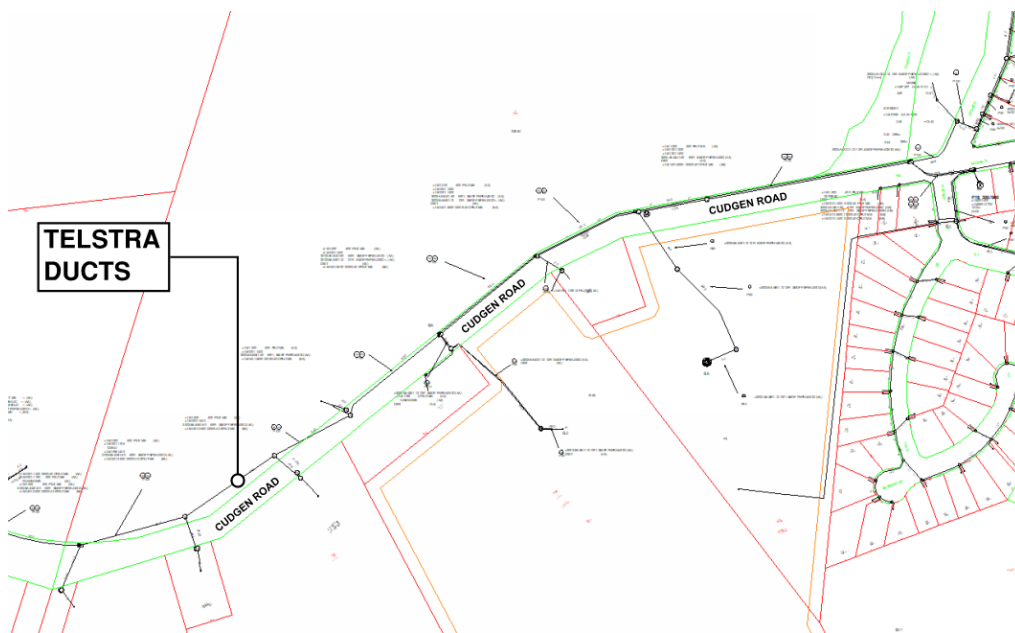


Figure 6: Existing Telstra underground ducts from dial before you dig information

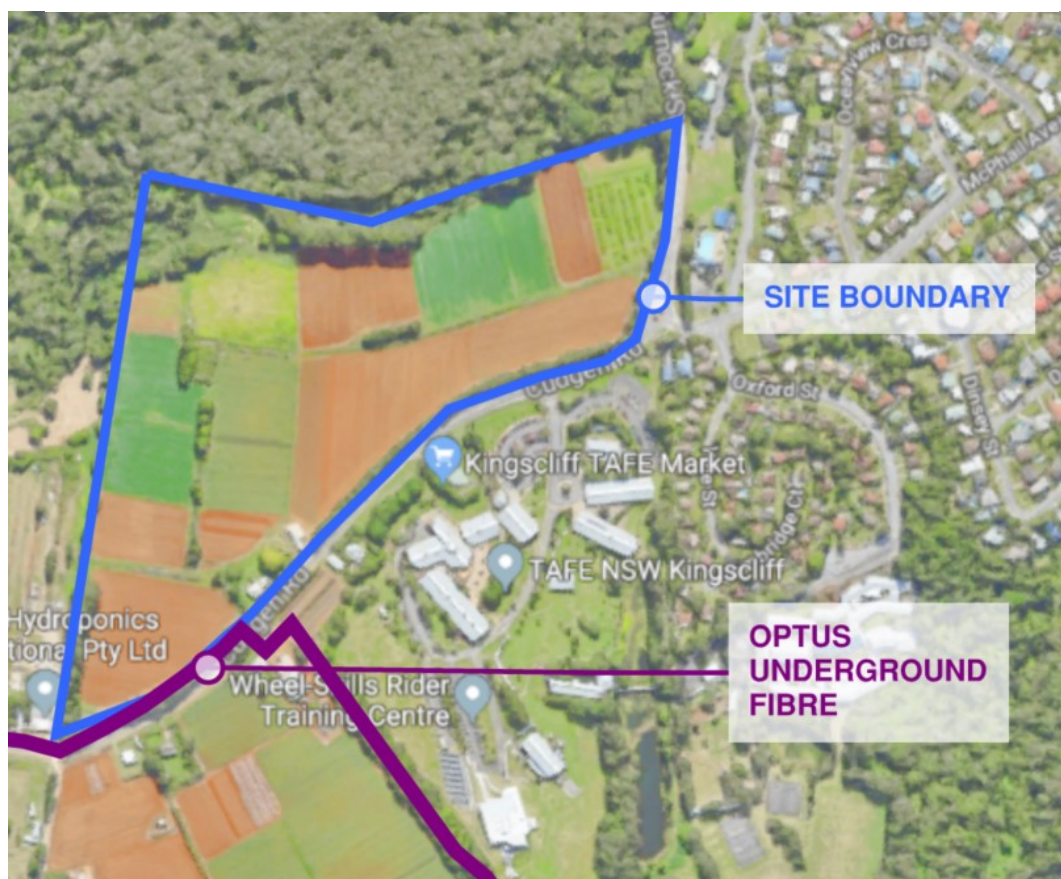


Figure 7: Existing Optus underground fibre from dial before you dig information



Figure 8: Existing AARNet underground fibre from dial before you dig information
AARNet as built are included in Appendix E.

7 New electrical services

The permanent supply to the Project Site shall be included within in Stage 1. A preliminary maximum demand for Tweed Valley Hospital has been calculated to establish the electrical requirements for the new development.

The preliminary MD for the Concept Proposal based on a 2032 planning/design horizon for a new hospital with a gross floor area up to 65,000m² was calculated at 7.2 MVA for the hospital and 7.7 MVA for the campus including precinct developments. A preliminary application has been submitted to Essential Energy for an 8MVA supply to the Project Site.

A voice conference meeting was held with the Major Connections Case Manager from Essential Energy on 16/06/2018. They confirmed availability of 8MVA capacity from Cudgen zone station - 2.1km from the Project Site. Capacity is available from 66, 33 or 11kV feeders, with 2N redundancy across transformers, if required.

The Connection Enquiry Preliminary Response from Essential Energy confirmed 8MVA spare capacity at 11kV with dual redundancy at transformer level from Cudgen Zone Station. Over 8MVA Essential Energy confirmed that a new 66kV zone station would need to be built on the Project Site. Provision for expansion including a new zone station is included within in the Masterplan.

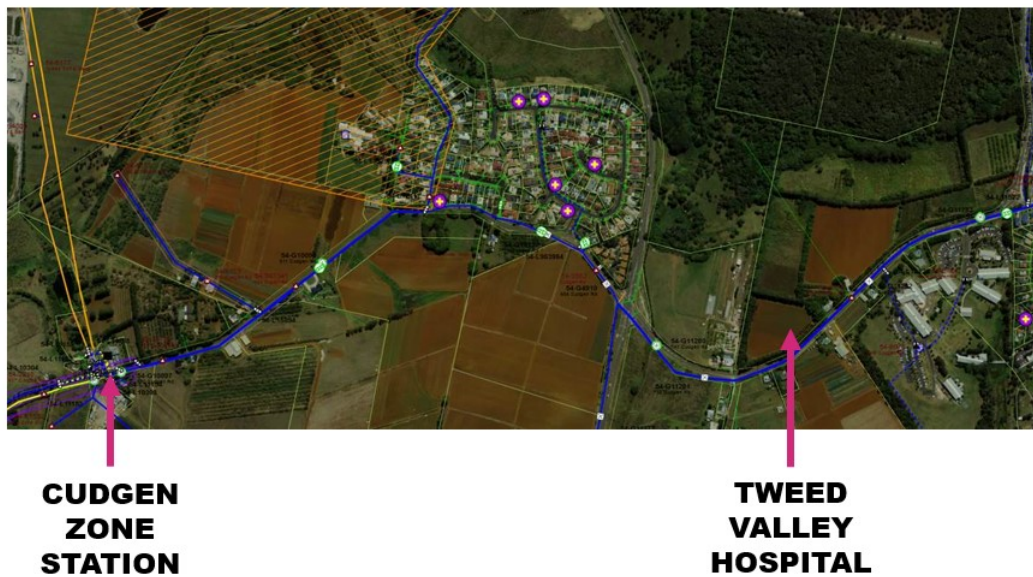


Figure 9: Map showing Cudgen Zone Station located 2.1km away from the Tweed Valley Hospital Project Site

Hospital *	2022	2026	2032	Future Level 6
Area (m ²)	57433	57433	64033	105836
Total Load (MVA)	4.3	4.3	4.8	7.8

Hospital Load Density (VA/m ²)	75			
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Contingency	25%
Spare capacity	25%

Hospital * including spare and contingency	2022	2026	2032	Future Level 6
Total Load (MVA)	6.45	6.45	7.20	11.70
Load Density (VA/m ²)	112			

Campus developments excluding the hospital	2022	2026	2032	Future Level 6
Area (m ²)	6600	10100	20800	54000
Total Load (MVA)	0.5	0.7	1.6	4.0

Campus Diversity	80%
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Diversified Campus loads (hospital * including spare	2022	2026	2032	Future Level 6
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and contingency + campus developments)				
Maximum Demand (MVA)	5.76	6.00	7.68	14.16
Load Density (VA/m ²)	89			

Table 1: Maximum demand forecast based upon areas from 180802 Design Growth Scenarios and 180522 Precinct Complementary Uses

* - Including day 1 external lighting and security loads for the campus

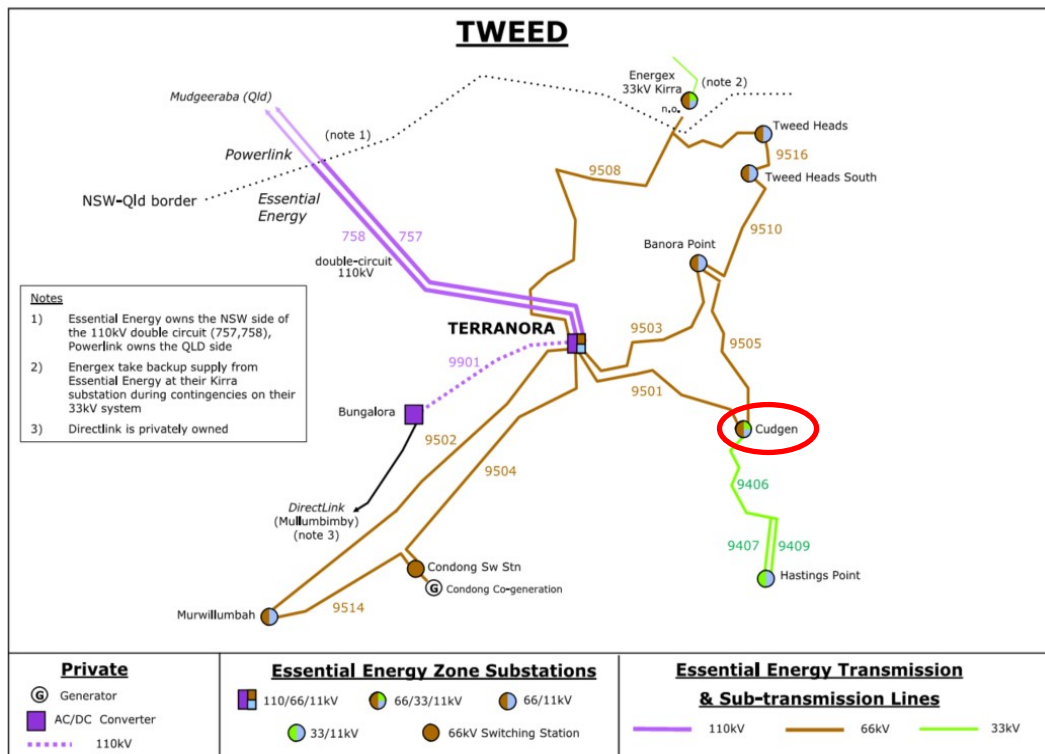


Figure 10: Essential Energy Network

Due to preliminary cost analysis carried out based on the maximum demand and load profiles, we have assumed that the hospital will be an HV customer. This will be verified through the design process in consultation with Health Infrastructure NSW. The HV intake for the future Project Site with a level 6 hospital facility shall be supplied from Essential Energy owned Cudgen Zone Station, where 2 no. 11kV circuit breakers and associated feeders shall be installed to supply the Project Site. The 2 no. feeders shall be buried underground to the hospital Project Site where they shall be terminated into ring main units at the edge of the Project Site, then into the customer owned HV switchboard within the HV switching station.

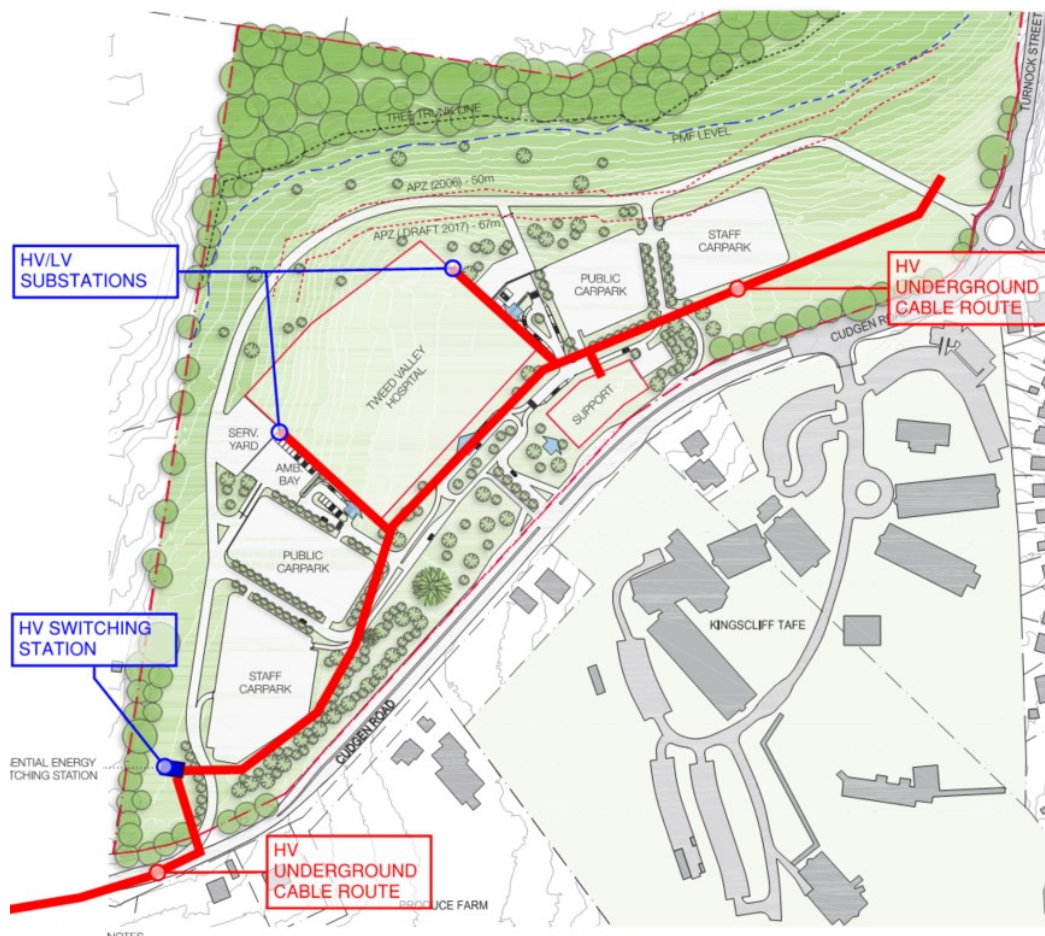


Figure 11: Proposed electrical cable routes, included in the Stage 1 works

External road, car park and pedestrian lighting will be provided within the Project Site boundary and to the Project Site entrances on public roads. Public road lighting will be supplied from Essential Energy assets and will form part of the level 3 ASP design. Lighting within the Project Site boundary will be fed from the temporary Project Site supply.

The hospital will have essential supplies that require a second supply from diesel generators on the Project Site. These generators will require underground petroleum storage systems as noted in item 23 of the SEARs Concept Proposal. The tanks will be compliant with AS 1692 and will be double walled with leak detection.

8 Temporary works electrical services

Stage 1 works include a temporary power supply for construction on the Project Site. In the Essential Energy Preliminary Response, attached in Appendix A, Essential Energy have confirmed that a 1000kVA supply can be provided from the existing 11kV aerial feeders running parallel to Cudgen Road. A pad mounted transformer will need to be installed to serve the Project Site with a temporary external switchboard to provide the Project Site with temporary lighting and power supplies. Additionally, during a meeting with Essential Energy on

16/06/2018 Essential Energy confirmed there is a 100kVA 3 phase supply at the pump site fed from a pole mounted transformer on Cudgen Road, this will be used for preliminary works until a larger supply is required for the Project Site.

External lighting and power distribution boards will be provided to supply road, car park and pedestrian lighting. Temporary supplies will be provided from the external temporary main switchboard. Permanent supplies will be provided once the permanent substations serving Tweed Valley Hospital have been commissioned.

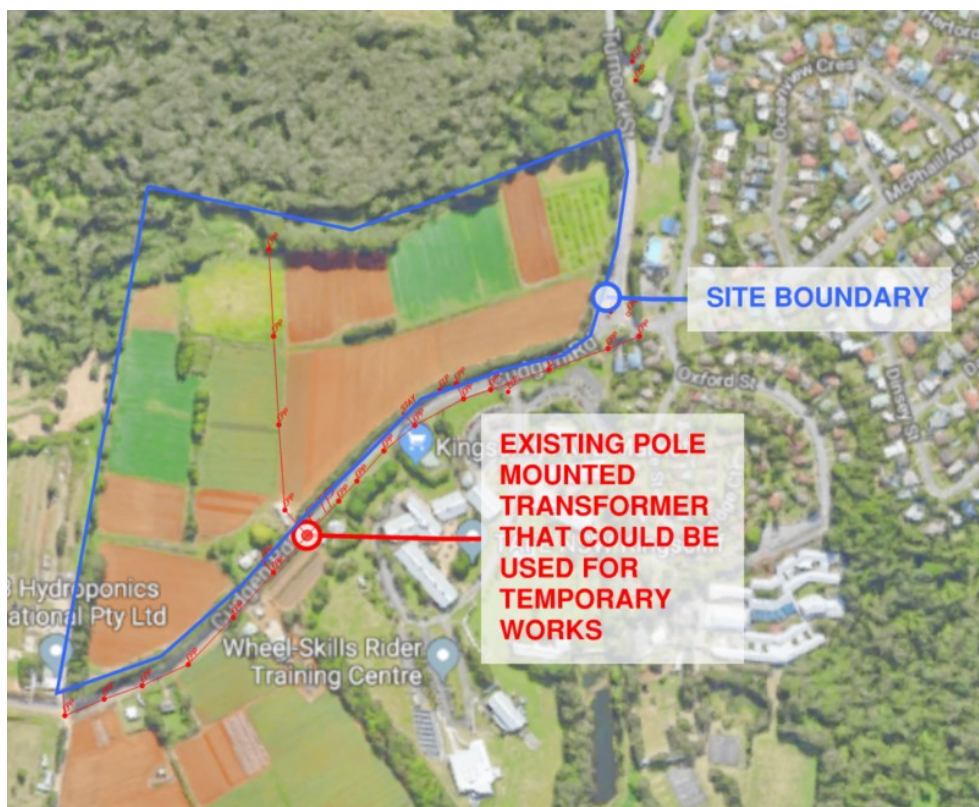


Figure 12: Existing pole mounted transformer which could be utilised for temporary works, included in the Stage 1 works

9 New communication services

New incoming telecoms will be required for Tweed Valley Hospital, pipes are to be installed in Stage 1 early and enabling works and fibre will be installed in Stage 2 in the main works package. Telstra services are available on the perimeter of the Project Site, the main telecommunications services routes run parallel with the Project Site along Cudgen Road.

An application has been submitted to Telstra they have informed us that there is spare capacity but that they cannot provide us with further information until 6 months before connection. This is a new policy due to the 2020 NBN rollout. The 2020 NBN rollout is a scheme brought out by the NSW government for the majority of NSW to have NBN owned fibre. Tweed Valley Hospital Project Site

is just outside of the NBN fixed cabling zone but by 2020 NBN may have procured the fibre in this area.



Figure 13: NBN coverage

Incoming telecommunications pits will be laid as part of the new development to a pit located on the boundary of the Project Site to allow the connection of the new telecoms services. These works shall be included within the Concept Proposal.



Figure 14: Proposed communication cable routes, included in Stage 1 works

10 Conclusion

All works described in this document are proposed in Stage 1 (early and enabling works) of the Project. Cudgen road is a main utility route that runs along the South side of the Project Site. All electrical and communication services need to be carefully considered when planning the South side of the Project Site including any Project Site entrances and associated road works.

The HV overground cabling on the South side of the Cudgen road is not likely to be affected by road widening, however some poles need to be relocated to accommodate bus stops. From the as built provided AARNet communications ducts supplying TAFE Kingscliff are also unlikely to be affected.

Significant changes are expected to affect existing Telstra, Optus and Essential Energy services on the North side of Cudgen road and within Project Site boundaries. Telstra and Essential Energy shall also be putting in new assets to serve the Project Site. For this reason, Arup has begun early engagement with both parties.

New electrical and communication infrastructure will be provided as required for the new development to allow connection to the local utility services. An HV intake will be provided within the new development to Australian Standards and Essential Energy standards to accommodate future electrical expansion.

Communications lead in infrastructure will be provided from a pit on the Project Site boundary to the main incoming telecoms room within the proposed development to allow incoming telecoms services to be connected into the building once required.

Appendix A – Essential Energy

From: Network Connections [mailto:networkconnections@essentialenergy.com.au]
Sent: Tuesday, 21 August 2018 7:18 AM
To: Charlotte Ware <Charlotte.Ware@arup.com>
Cc: Edward Caine <Edward.Caine@arup.com>
Subject: RE: [External] enq-01127 PCE Response 8MW Tweed Valley Hospital [Filed 22 Aug 2018 08:46]

Hi Charlotte,
Please see below response in red,

Regards,

Michael Logan

From: Charlotte Ware <Charlotte.Ware@arup.com>
Sent: Thursday, 16 August 2018 2:14 PM
To: Network Connections <networkconnections@essentialenergy.com.au>; Michael Logan <michael.logan@essentialenergy.com.au>
Cc: edward.caine@arup.com
Subject: RE: [External] enq-01127 PCE Response 8MW Tweed Valley Hospital

Hi Michael,

Thanks for the detailed response. I have a few questions regarding the proposal you sent:

1. Please can we have a copy of the single line diagram for Cudgen and Terranora zone stations to better understand the network resilience? I have requested a SLD for Cudgen and Terranora ZS's, I will provide these on internal receipt.
2. How long before the works start do we need to apply for the contestable works for a temporary LV supply? Contestable works to be submitted as soon as possible, A typical timeframe on return of Design Information pack is around 4-6weeks, the Design information Pack that would be issued is valid for 6 months.
3. Is there an opportunity for the feeders from Cudgen zone station to the site to be routed overhead rather than underground? An underground supply was nominated in the PCE response as requested by the local planner for Cudgen. Existing 11kV running along the front of the proposed site is a single pole / tri strung arrangement (2x 11kV feeders 1x LV distribution). The requirement of underground may have been (assume) due to existing easements / space for the additional network assets. The possibility of overhead construction in leu of underground can be negotiated through the design stage.
4. Are you able to provide an approximate price quotation for the extension of the Cudgen 11kV switchboard and installation of two circuit breakers, or would our contractor be expected to carry out these works? It is likely that any work inside of our zone substation would be considered fully non-

contestable. Within the detailed response, EE would provide a Rev_A Project definition which would identify any contestable / non-contestable works and provide a cost estimate for the non-contestable component. As works associated with each zone substation varies from site to site, I am unable to provide cost estimates at the preliminary stage of a project.

5. Are you able to tell us the maximum load we can apply for at 11kV from Cudgen zone station? Preliminary studies show 8MVA to be the upper limit of the 11kV network, detailed studies to confirm capacity.
6. Does the section on earthing only apply if the 66kV step down transformers are required or is it applicable to the entire hospital earthing design? A site earthing study would be required for any connection at High Voltage. EE have recently published a document on the Earth System design and Testing requirements. A copy is available on our website via the link/s below.

<https://www.essentialenergy.com.au/our-network/connecting-to-the-network/hv-connections-documents>

<https://www.essentialenergy.com.au/-/media/Project/EssentialEnergy/Website/Files/Our-Network/ExternalNetworkConnection.pdf?la=en&hash=0919E1D24928B522D0E524303CC1E3A6ACAF0766>

Thanks for your help.

Kind regards,

Charlotte Ware

Electrical Engineer | Buildings Engineering Sydney

Arup

Level 10, 201 Kent Street, Sydney NSW 2000

t +61 2 9320 9077

www.arup.com

From: noreply@salesforce.com [<mailto:noreply@salesforce.com>] **On Behalf Of** Network Connections

Sent: Wednesday, 8 August 2018 9:17 AM

To: Charlotte Ware <Charlotte.Ware@arup.com>

Subject: [External] enq-01127 PCE Response 8MW Tweed Valley Hospital

Hi Charlotte,

Please see below link to view and download the response to your 8MW Tweed Valley Hospital preliminary connection enquiry.

If you would like to further discuss your options, or have issues in viewing/ downloading the response, please feel free to contact Essential Energy's Major Network Connections Manager on 02 6589 8334 or reply to this email.

[PCE RESPONSE Tweed Valley Hospital](#)

Regards,

Michael Logan
Major Connections Case Manager
Essential Energy
T: 02 6589 8318
michael.logan@essentialenergy.com.au

Voice Conference – 16/06/18

Michael Logan - Major Connections Case Manager T: 02 6589 8318 | Email:
michael.logan@essentialenergy.com.au

Charlotte Ware - Arup
Andrew Davies - Arup

Meeting minutes:

1. Plenty of spare capacity at Cudgen zone station 66/33/11kV about 60MVA spare; zone station is about 2.1km away from the site
2. 2N redundant transformer arrangement is feasible from Cudgen zone station
3. They can't see a customer connected to the power line poles shown in the dial and dig - but there are a few options for relocating the service. They would look at relocation at the start of early works
4. We will hear a response in about 15 days to our connection application, following which we'll enter a connection investigations agreement
5. Change in tariffs over 1.5MVA over which becoming an HV customer is much cheaper
6. 33kV customer and we can allow reticulation for future capacity
7. 11kV customer we would need to duplicate reticulation in the future as the site expands past the agreed capacity
8. Typically the customer pays for the new infrastructure - if there is other works sharing the infrastructure it could be part funded - no other works known of right now
9. There is an existing 100kVA 3ph supply to the pump site - which could be utilised for temporary works. If more is needed this can be increased to 1000kVA @ 11kV with 1500kVA pole/ pad mounted substation depending on site requirements
10. Essentials HV intake to the site will just be an overground or underground intake to a customer owned HV switchboard - the intake would be at the first pole with in the customer boundary for which the 10m easement would apply
11. 11kV at 8MVA single feeder - maxing single LV - site substation for hospital
12. Relocation can come from the Tweed Coast Side (it can be diverted)
13. Load connection for detailed response, non - contestable works EE and L3 ASP contestable - Power Quality allocation provided.
14. We will be assigned a case manager to deal with the application. Power quality requirements will be sent upon assignment of a case manager
15. They could be an LV customer if they wanted to, but we will be recommending 11kV
16. 33 kV from Cudgen (Costs difference between Cudgen and 11 kV not a lot of difference)
17. Dual circuit arrangement currently along Cudgen Road
18. Customer funded for the 11 kV feeder, dependent upon upgrades may be dependent upon

19. 2N Redundant system is a possibility
20. Intake can be an overhead / underground arrangement, 10 m easement around the pole.
21. Upgrade will be required to the 11 Kv
22. 66 kV / 33 kV availability

Next steps:

1. Wait for response to our application - may advise 11/33kV
2. Michael to send example drawings for HV intake spacial allowances

Our Ref: enq-01127

8/08/2018

Attn: Charlotte Ware
Arup on behalf of Tweed Valley Hospital
201 Kent Street
Sydney, NSW 2000
Via email: Charlotte.Ware@arup.com

Dear Charlotte,

CONNECTION ENQUIRY PRELIMINARY RESPONSE – TWEED VALLEY HOSPITAL

This letter is in response to your preliminary connection enquiry received via email dated July 13, 2018 regarding the proposed connection by Arup acting on behalf of Tweed Valley Hospital.

This letter sets out the relevant matters and process required in progressing your preliminary enquiry to a connection application. This process is governed principally by Chapter 5 of the National Electricity Rules (NER). The NER documents are available via the following website link:

<http://www.aemc.gov.au/Energy-Rules/National-electricity-rules/Current-Rules>

References in this letter and accompanying documentation are in accordance with the version of the NER in force as of the date of this response.

1 NETWORK CAPABILITY

Tweed Valley Hospital is seeking information regarding the grid connection of a new facility with an indicated transfer capacity ranging from 1MVA – 20MVA.

The proposed location of the Tweed Valley Hospital is shown in Figure 1 below and marked “102//DP870722”. The plan also shows the location of the electricity network infrastructure in the vicinity of the proposed site,

- Essential Energy’s 66kV subtransmission circuit as yellow lines;
- Essential Energy’s 33kV distribution circuit as bright yellow lines.

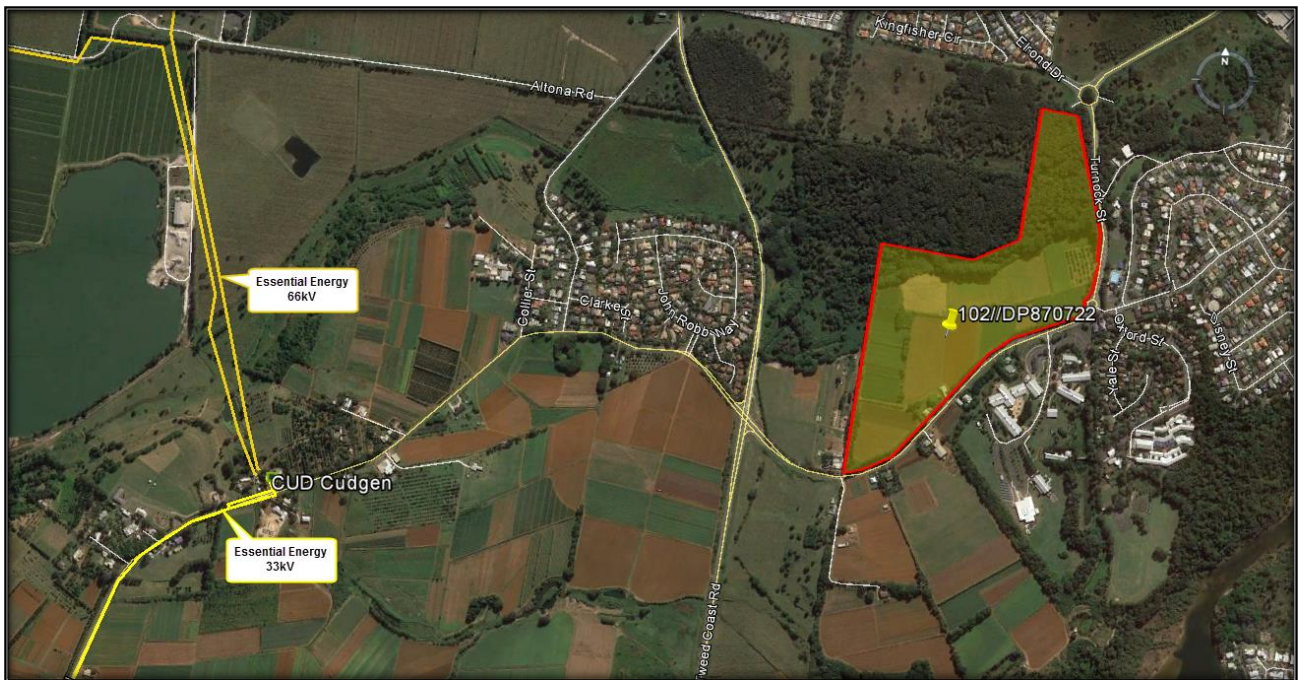


Figure 1. Location of proposed site with respect to the Cudgen zone substation.

Essential Energy's (EE) local distribution network infrastructure emanates from Terranora 110/66/11kV substation. This substation in turns supplies a number of Essential Energy zone substations including Cudgen zone substation via Essential Energy's 9501 and 9505 66kV feeders – refer Figure 2. Cudgen zone substation houses two 66/33/11kV 70/40/30MVA dual winding transformers operating in a duty / standby arrangement. Essential Energy has considered the proposed generation and offers the following information to assist you in progressing your connection enquiry towards connection.

Existing and Future Available Capacity for Connection:

The proposed Tweed Valley Hospital has been identified and assed as three stages.

- Stage 1 – Construction Supply 1000KVA
- Stage 2 – Operation 8MVA
- Stage 3 – Future expansion 20MVA

Stage 1.

An estimated ~1000kVA supply could be connected to the existing Kingscliff No.2 11kV feeder (CUD3B7) running along the southern boundary of the proposed site. Connection of the construction supply could be either at High Voltage (HV) or Low Voltage (LV) depending on preference of Tweed Valley Hospital. Additionally, an existing LV line runs through the proposed site which will require relocation.

For a LV metered connection Essential Energy will own, operate and maintain the proposed 11/0.415kV transformer and connection of the construction supply. A Contestable Works Project can be arranged through the Contestable Works online portal, link below.

<https://www.essentialenergy.com.au/our-network/connecting-to-the-network>

For A HV connection will see Tweed Valley Hospital own, operate and maintain the proposed 11/0.415V transformer. A Network Study, including associated Protection and Earthing reports will be required to be submitted by Tweed Valley Hospital for review and approval. A Connection Agreement and Operating Protocol will be required to be executed between Tweed Valley Hospital and Essential Energy for the construction supply and can remain in place until the permanent site (Stage 2) supply is established, new agreements will be implemented.

Stage 2.

A detailed Network Analysis Study Will be required be submitted by Arup for review and approval. This connection is likely to require customer funded network augmentation including, but not limited to: -

- Extension of the Cudgen 11kV switchboard, including installation of two dedicated Circuit Breakers, associated bays and protection systems;
- Installation of two dedicated underground 11kV feeders from Cudgen zone substation through to the proposed point of connection (300mmCU XLPE 13kA cable or equivalent) including associated easements;
- Installation of a customer owned, operated and maintained HV revenue metering system.

It is anticipated that a maximum of 8MVA can be supplied at 11kV from Cudgen zone substation.

A tie would be required between the two 11kV feeders at Tweed Valley Hospital, in addition to a tie into the existing CUD3B7 11kV feeder for contingency.

Stage 3.

Confirmation of site load / operation will be required over a stage period, in time to cater for the anticipated load increased from 8MVA through to 20MVA. It is expected that a load of 20MVA would require a connection at 66kV, with a 66/11kV substation constructed onsite and gifted to Essential Energy to own and operate. It is possible that this may be possible by augmenting the existing Terranora – Cudgen – Banora Point 66kV ring to include the Hospital site load. Additional 66kV augmentation (either upgrade to existing feeders, dual circuit construction or new feeder construction) may be required through to Terranora substation pending a detailed study considering final load requirements and associated timing.

Earthing

An earthing system design report detailing the necessary measures employed to achieve compliance with the relevant industry standard and guides shall be submitted to Essential Energy for approval. The applicable industry standards may include non-electrical infrastructures impacted by the power system during fault and steady state conditions. Reports shall contain a detailed hazard assessment presented in a professional document signed by the certified engineer. Hazard assessment detail shall include, but not be limited to:

- Physical earthing system design detail
- Auxiliary earthing configurations (OHEW's, cable sheath, counterpoise conductors, MEN etc.)
- Applicable safety criteria detailing assessment parameters
- Earth fault protection study for the all circuit voltages
- Earthing system performance evaluation including soil resistivity model, current distribution, EPR and expected voltage hazards
- Mitigation options considered / employed
- Earthing system commissioning test procedure

Protection

The applicable protection and control requirements for a connection to Cudgen zone substation are detailed in Essential Energy's Operational Procedures Section 5 CEOP8012. These also detail the required interlocking and synchronising arrangements.

The insulation co-ordination and lightning protection requirements are detailed in Essential Energy's Operational Procedures Section 5.5 CEOP8032 Transmission and Zone Substation Design Guidelines with reference to AS1824 and AS2067.

The Operational procedures referenced in this letter are available from Essential Energy's website.

<https://www.essentialenergy.com.au/our-network/connecting-to-the-network/hv-connections-documents>

Details of the Essential Energy network and associated ratings including forecasted loads/generation are available on our website:

<https://www.essentialenergy.com.au/our-network/network-pricing-and-regulatory-reporting/regulatory-reports-and-network-information>

Essential Energy will assist with in the provision of connection information consistent with the NER.

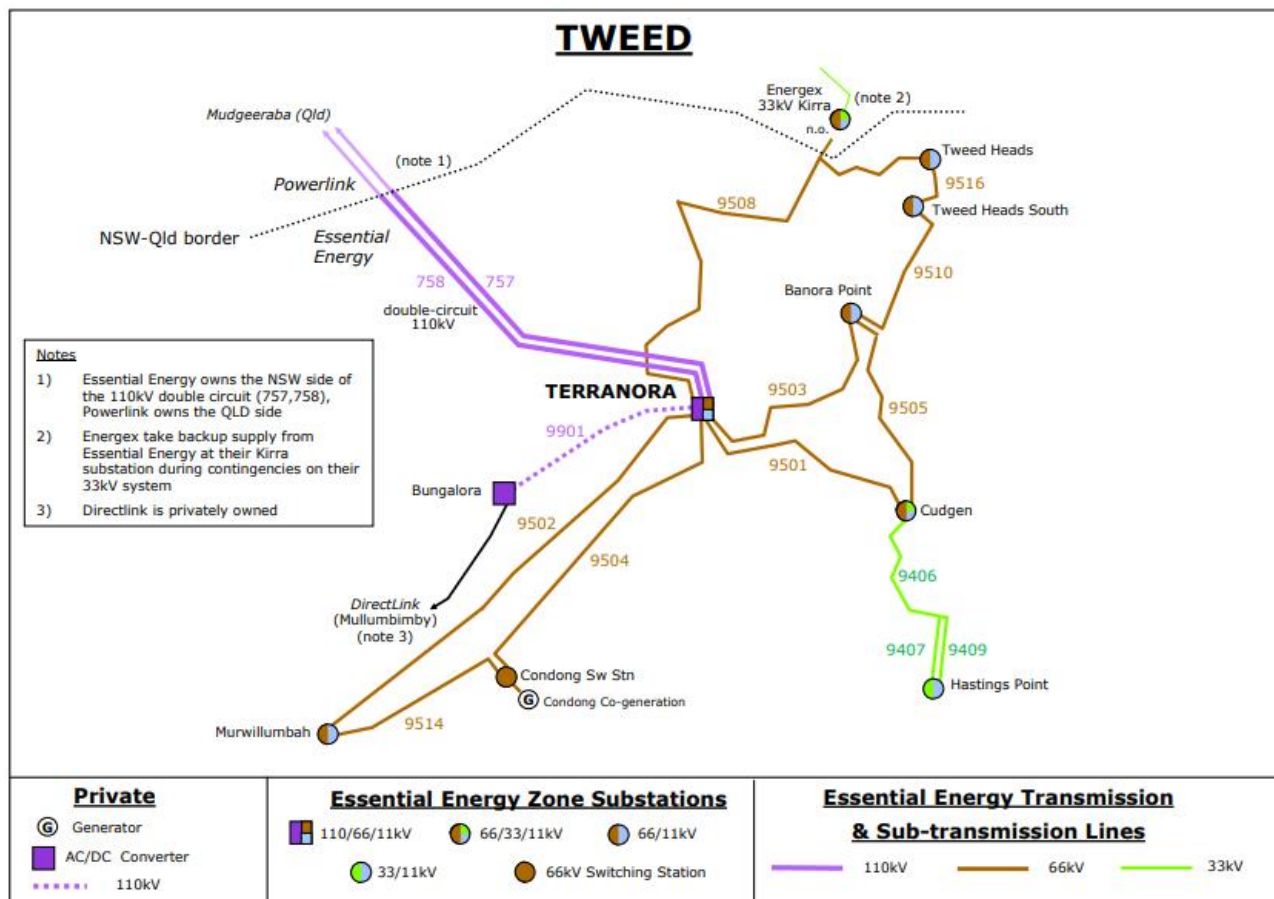


Figure 2. Essential Energy's Tweed Subtransmission Network.

2 CONTESTABILITY OF SERVICES

Essential Energy advises that in the NSW jurisdiction, the following services are contestable:

- (a) Design, planning and protection studies
- (b) Design of connection assets and connection arrangement configuration
- (c) procurement and construction of connection assets
- (d) meter provision
- (e) meter data agent

Contestable works can be undertaken by suitably accredited and experienced consultants and/or contractors. Tweed Valley Hospital will need to engage an appropriate service provider to undertake the network studies needed to evaluate the potential connection options and voltage regulation issues, identify and assess the connecting infrastructure needs and provide cost estimates to confirm or amend the project proposal indicated in the connection enquiry.

Information about the scheme, levels of accreditation and currently Accredited Service Providers (ASP) is available from the Resources and Energy NSW website:

<http://www.resourcesandenergy.nsw.gov.au/energy-supply-industry/pipelines-electricity-gas-networks/network-connections/contestable-works>

3 OTHER PARTIES

Essential Energy may need to advise TransGrid <https://www.transgrid.com.au/> and/or AEMO <http://www.aemo.com.au/> and/or Powerlink <https://www.powerlink.com.au/> of the connection proposal and include projected forecasts. Please note the NER allow both AEMO and TransGrid to levy fees for any work

they are required to perform in the assessment of any connection application. Tweed Valley Hospital will be required to pay these fees on a cost pass through basis, in addition to a connection application fee.

4 STEPS TO ACHIEVING CONNECTION

Information about the Connection Process CEOP 8079 is available on the Essential Energy website. Refer to link below.

<http://documents.essentialenergy.com.au/CEOP8079.pdf>

Arup should be familiar with this document as it reflects the NER and will govern many aspects of the connection process.

5 CONNECTION INVESTIGATION SERVICES AGREEMENT

To progress this Connection Enquiry towards a compliant Connection Application, Essential Energy will require Tweed Valley Hospital to enter into a Connection Investigation Services Agreement (CISA). Refer to link below for template.

<https://www.essentialenergy.com.au/-/media/Project/EssentialEnergy/Website/Files/Our-Network/CISA-Sample.pdf>

Should Tweed Valley Hospital wish to progress to CISA, Tweed Valley Hospital will need to notify Essential Energy by emailing: networkconnections@essentialenergy.com.au. A formal CISA document will be returned to Tweed Valley Hospital for signing and subsequent execution by Essential Energy.

The CISA signature, execution and payment of the Upfront Amount is required in advance of the provision of network data and/or planning requirements including the review/approval of network studies. This agreement will govern Essential Energy's and Tweed Valley Hospital's mutual obligations and responsibilities in respect of the provision of investigation services, payments and reasonable costs anticipated to be incurred by Essential Energy including AEMO and/or TransGrid and/or Powerlink costs.

6 LAND ACCESS INVESTIGATION AGREEMENT

Where gifted assets are to be constructed or installed, Essential Energy will seek to enter into a Land Access Investigation Agreement (LAIA) with Tweed Valley Hospital. This may be done at any time during the connection application process. Refer to link below for template.

<https://www.essentialenergy.com.au/-/media/Project/EssentialEnergy/Website/Files/Our-Network/LAIA-Sample.pdf>

7 CONNECTION APPLICATION

Should Tweed Valley Hospital wish to proceed with a connection to the Essential Energy network, then Arup should make a formal Connection Application. The application will need to address the requirements set out in section 10 of the Connection Process CEOP8079.

In general, confirmation of the location, proposed capacities, type of loads and connection arrangements need to be provided by Arup for consideration against a specific project application before an offer to connect can be made. Arup will also be required to complete and submit full studies of the network performance regarding voltage regulation, fault level and sensitivity, stability and harmonics, protection and operating parameters for the proposed connection as part of the assessment and approval process. Essential Energy will assist with the provision of network information relating to these connection assessments consistent with the NER.

You should also note that in addition to the planning and design approvals above, Tweed Valley Hospital will be fully responsible for all works and costs associated with providing the required connection assets including the acquisition of line easements and substation/switching station sites, environmental and planning approvals, materials procurement, construction and commissioning

8 ACCESS STANDARDS

In accordance with Rule 5.3.3, Essential Energy advises that the automatic access standards, minimum access standards and applicable plant standards are those set out in Schedule 5.3 of the Rules with respect to the following load technical parameters:

- 1 Design standards

-
- | | |
|----|---|
| 2 | Protection systems and settings |
| 3 | Control systems and settings |
| 4 | Power factor requirements |
| 5 | Balancing of load currents |
| 6 | Quality of electricity generated and continuous uninterrupted operation |
| 7 | Voltage fluctuations |
| 8 | Harmonics and voltage notching |
| 9 | Design requirements – substations |
| 10 | Load Shedding facilities |

It will be a requirement of any Connection Application arising from this connection enquiry response that evidence of the Access Standards the project is capable of meeting be submitted with the application.

9 OWNERSHIP OF CONNECTION ASSETS

Tweed Valley Hospital may either retain ownership of completed assets, or negotiate to gift them either in full or in part, to Essential Energy to own and operate.

Generally, the conditions on which Essential Energy will accept ownership of the connection assets are:

- The connection assets are designed and constructed in accordance with all environmental laws, approvals and Essential Energy's standards and guidelines. Essential Energy may require that certain types of equipment be supplied by certain suppliers before it will take ownership. This will permit Essential Energy to maintain common spare parts and standardise product training for its employees so that the duration of outages caused by any failure of the electricity works can be minimised; and
- Essential Energy will charge the Connection Applicant to recover the costs of maintenance and operation of the electricity works and any system augmentation works caused by the connection.

Once Essential Energy assumes ownership of any electricity works, they become part of Essential Energy's distribution system and are available for access by other parties in accordance with the National Electricity Law. These other parties may be required to contribute a fair and reasonable proportion of the capital cost of establishing, operating and maintaining the system.

Details of Essential Energy's requirements over ownership of connection assets can be found in Parts 11, 12 and 13 of the Connection Process CEOP8079.

10 VALIDITY OF CONNECTION ENQUIRY RESPONSE

This Connection Enquiry Response is valid for the network configuration which exists at the date of this response. This Connection Enquiry Response is valid for a period of 3 months.

Should you require any further information relating to this Connection Enquiry Response please feel free to contact me on (02) 6589 8447.

Yours sincerely



Darren Elliott
Major Connections Manager
Network Connections
Essential Energy

Appendix B – Telstra

Mon 23/07/2018 11:47 AM

Telstra Development Liaison <Dev4National@team.telstra.com>

[External] NSW AFR: 17433902, Tweed Valley Hospital, 792 Cudgen Road,
Tweed Valley 2487

Dear Charlotte Ware,

Thank you for your recent application (AFR: 17433902) requesting Telstra to provide Telecommunications infrastructure to and/or within your proposed development.

The Federal Government has recently released its new policy for telecommunications infrastructure in new developments. This policy contains a maximum notice period of 6 months for new developments. This is intended to allow time for NBN Co to make announcements and build network, which may have an impact on infrastructure responsibility.

In addition, Telstra's agreements with NBN Co include a requirement to transfer ownership of certain network elements as NBN Co's areas become Ready for Service.

We would like to minimise the risk of transfer of Telstra's network being required prior to, or part way through Telstra's provision of infrastructure for your development, and accordingly, Telstra is unable to confirm at this point in time that it will be able to install telecommunications infrastructure to service your development.

Telstra is not rejecting any responsibility that it may have as Infrastructure Provider of Last Resort for your development, rather, it is simply deferring consideration until there is reasonable certainty Telstra will be able to complete the necessary infrastructure build for the development.

Telstra will contact you via email approximately 6 months prior to your project completion date (as advised in your AFR), to seek an update on your project status, timing, and if you still wish Telstra to consider your application. If you choose to engage another telecommunications infrastructure provider and wish to cancel this application, we would appreciate notification of such in order to update our records.

Please note that unless you engage another infrastructure provider, the communications design for your development should allow for NBN Co to become the telecommunications infrastructure provider if Telstra needs to decline your application at a future date.

Regards,

Telstra Development Liaison
Dev4National@team.telstra.com

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Charlotte,

As discussed, due to the constant changes in the NBN rollout areas we are unable to determine the service provider at this early stage. A Telstra representative will contact you for an update 6 months before the expected construction finish date to confirm these dates are still on track.

The corporate directory shows the Account Executive for Health Infrastructure as Stefan Marinovich Stefan.Marinovich@team.telstra.com . It might be an idea to touch base with him when you have the wideband requirements for the project.

With regard to relocating existing assets as part of road widening you can ring the number on the Dial Before You Dig pack, or failing that, you can lodge your request for plant relocation online via the following hyperlink [Network Integrity New Request](#)

or

Fill out the information below and return to email F1102490@team.telstra.com

Requesting Company/Party Name: (if applicable)

Customer Contact Full Name:

Postal Address of above Requestor:

ABN: (if applicable)

Landline Phone Number:

Mobile Contact Number:

Email address: (for quote to be issued)

Project Name / Site Name:

Site Contact Name:

Site Contact Number:

Location of works required:

(please include the Street Number and/or closest cross streets, Street Number, Suburb and the State)

Other information:

(please include anything else relevant to your request eg. Telstra Order Numbers, co-ordinates of site etc)

Actual works required:

(please provide as much detail as possible)

Please provide estimated Construction Required Timeframe: (if applicable)

*Should you have any further information, such as order numbers and/or plans, please don't hesitate to include these, so they can be attached to the project.

Important Note: *

All Network Integrity works are quotable and chargeable to the requestor/customer.

Our Telstra Industry Specialist Contractors may charge you a Consultation Fee upfront for Scope and Quotation of your request. If they do, they will advise you

in the first instance. If you choose to accept the Contractor's Quotation, they will deduct this Consultation fee from the total cost.

If you have any further questions or concerns, please contact us on 1800 810 443 or email f1102490@team.telstra.com



Mark Melville

Land Development Liaison Specialist
New Developments and Forecasting
Networks, Telstra Operations

P 02 4918 8567

E Mark.Melville@team.telstra.com

W www.telstra.com

This email may contain confidential information.
If I've sent it to you by accident, please delete it immediately

Appendix C – NBN

Sent: Monday, 9 July 2018 12:03 PM

To: Charlotte Ware <Charlotte.Ware@arup.com>

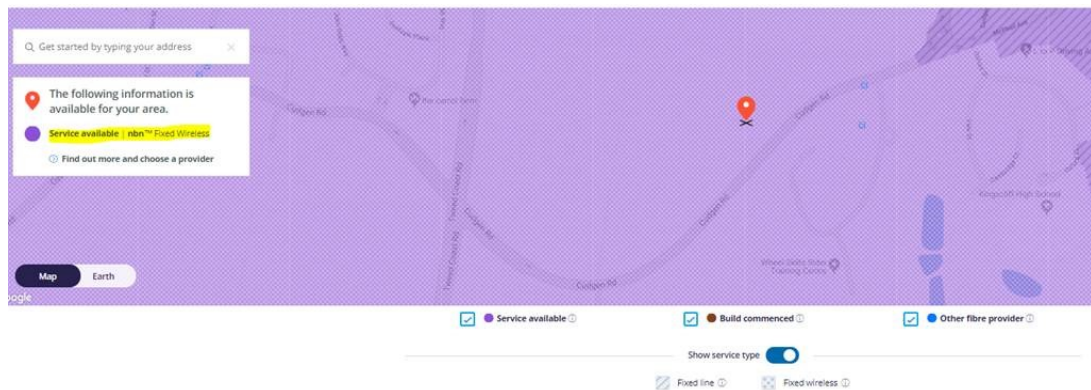
Subject: [External] RE: Development Reference: AYCA-5FK5XC for 792 Cudgen Road, Cudgen [nbn-Confidential:Commercial]

nbn-Confidential: Commercial

Hi Charlotte,

Thanks for the confirmation.

Unfortunately, we are unable to accept this application as the development has less than 100 premises and is located within the **nbn™** fixed wireless network – please refer to the below screenshot:



In this instance, the development is eligible to receive **nbn™** fixed wireless technology (an application is not required when ordering this service).

For standard telephone services covered under the Universal Service Obligation, you will still need to contact Telstra who will advise the best solution available for this development.

Regards

Kristine Lam

Account Associate NSW/ACT

nbn Build Partnerships | Demand Development

P +61 2 8918 8547 | **M** +61 409 208 875 | **E** kristinelam@nbnc.com.au



Appendix D – Optus

Tue 5/06/2018 9:55 AM

Andrew Porm Andrew.Porm@optus.com.au

FW: Optus connection

Hi Charlotte

Please see the infrastructure results below.

As discussed we can provide a Telstra link into the site but need to do a feasibility study.

I will request this but it usually takes about a month to come back.

Did you want me to move forward with this?

Thanks

Andrew Porm

Enterprise Business Manager – Optus

0450 283 251

1 Lyonpark Road, Macquarie Park, NSW 2113 Australia

andrew.porm@optus.com.au



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If you wish to opt out of these communications, please click [here](#)

From: Troy Smith

Sent: Friday, 1 June 2018 11:54 AM

To: Andrew Porm <Andrew.Porm@optus.com.au>

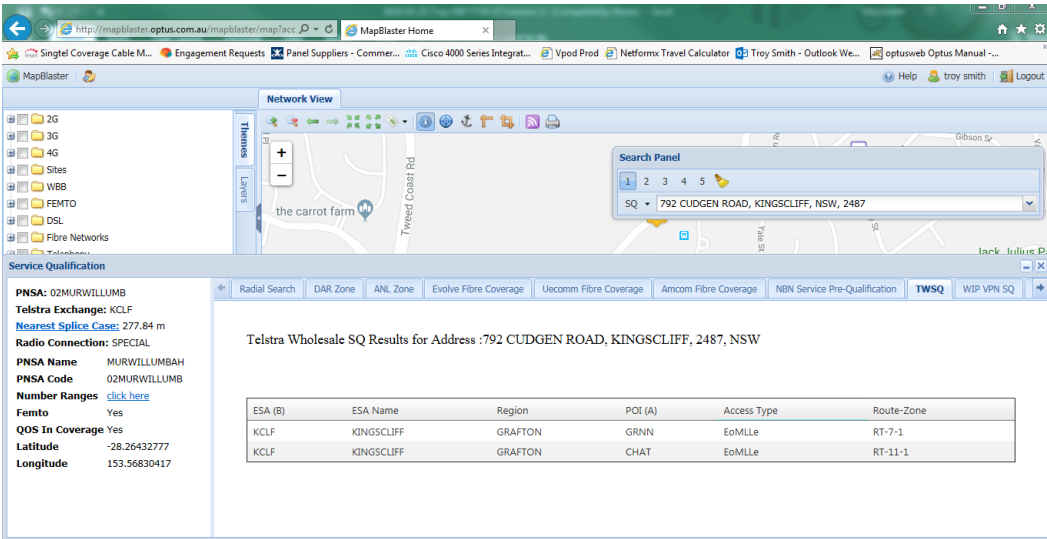
Subject: RE: Optus connection

The address resolved as: 792 CUDGEN ROAD, KINGSCLIFF, NSW, 2487

No Optus fibre at this site.

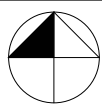
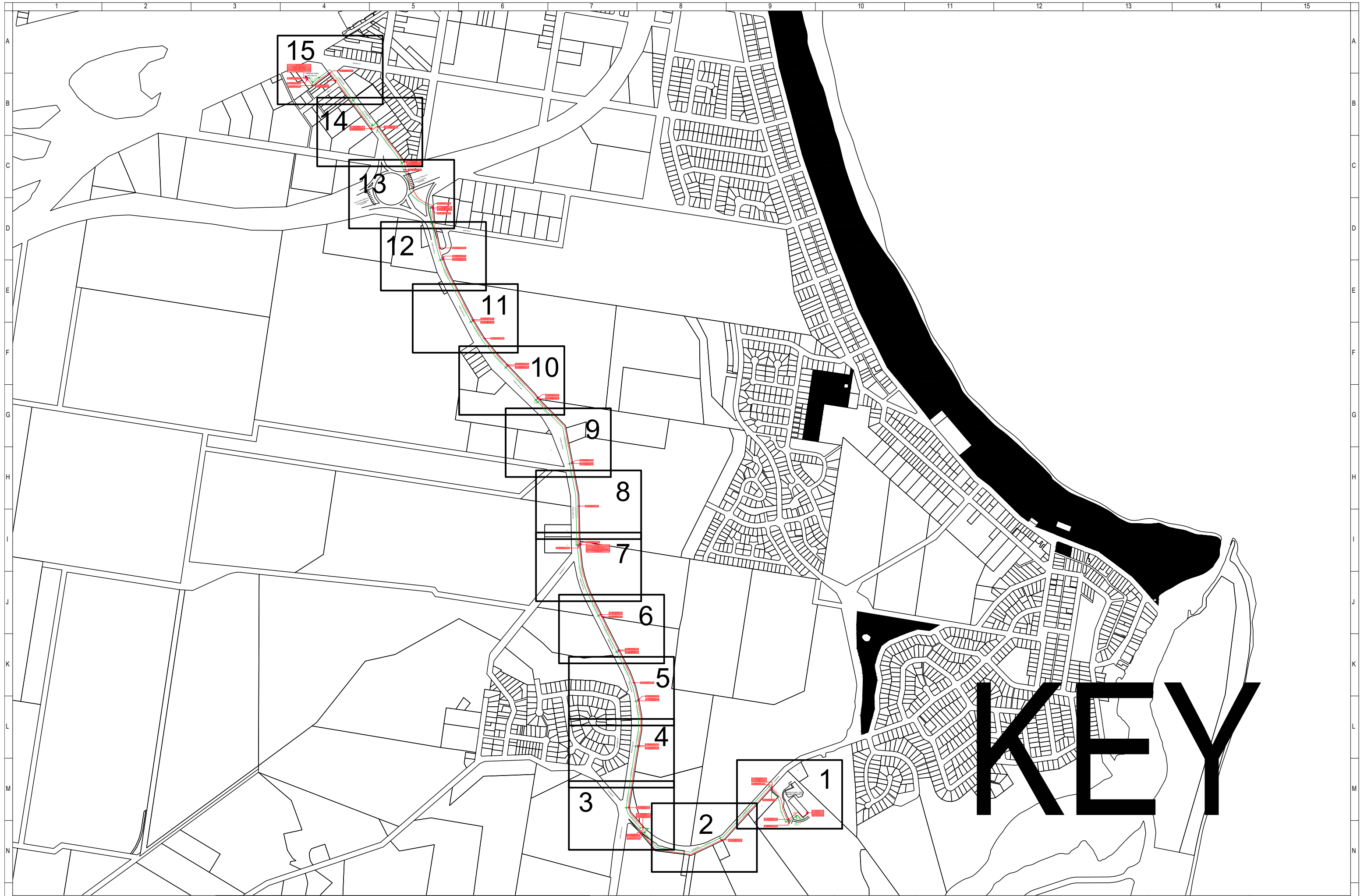
Telstra fibre is available but a feasibility check is required.

NBN is via wireless so not sure we can use this access option.



Troy
M: 0412 301 327

Appendix E - AARNet



- | | |
|----------------------------|----------------------|
| Third Party Manhole | Existing AARNET Duct |
| Third Party Pit | New AARNET Pit |
| Third Party Duct or Tunnel | New AARNET Duct |
| Marker Post | Breakout |
| Existing AARNET Pit | |

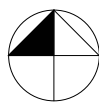
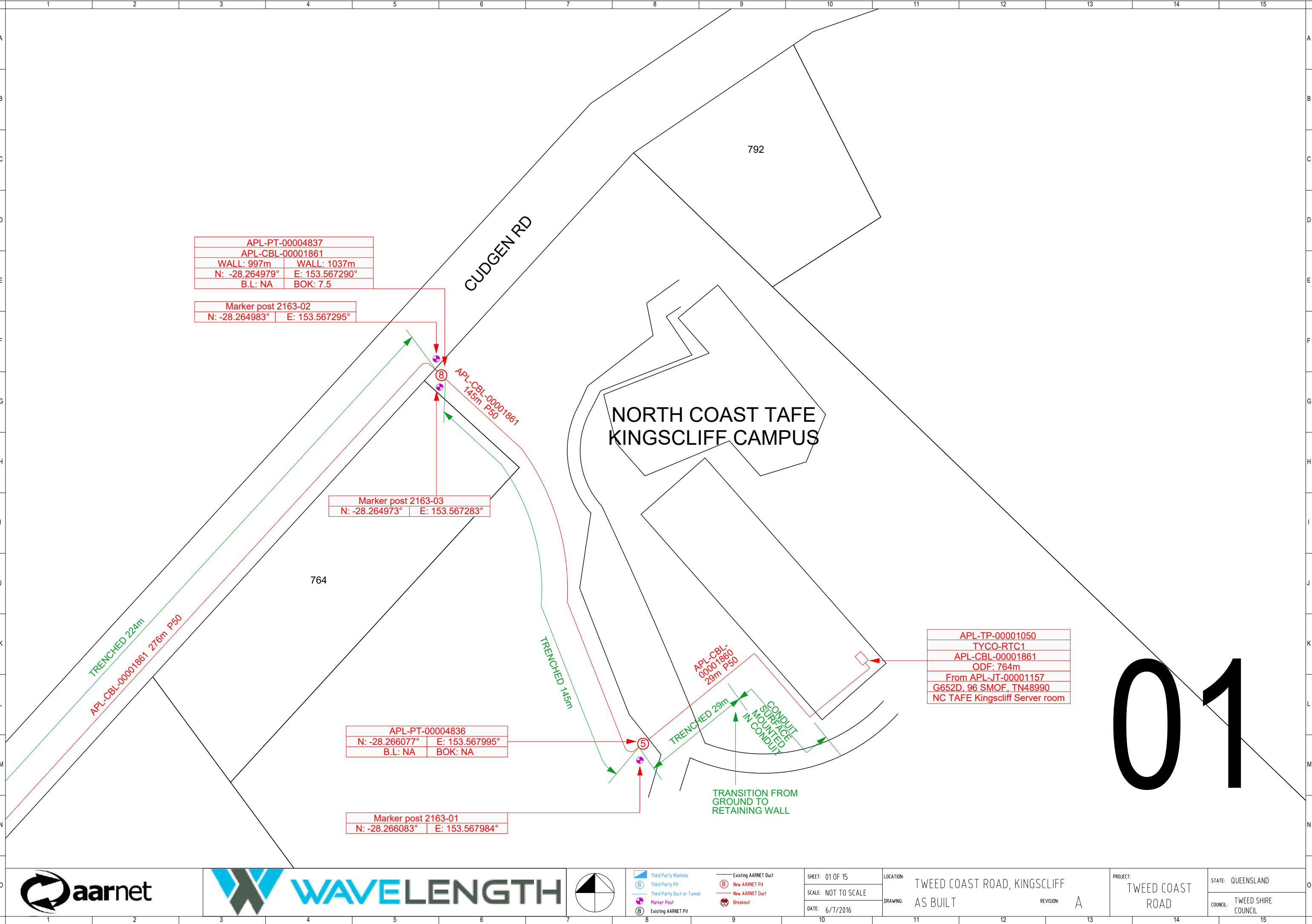
SHEET: KEY OF 15
SCALE: NOT TO SCALE
DATE: 6/7/2016

LOCATION: TWEED COAST ROAD, KINGSCLIFF
DRAWING: AS BUILT

REVISION: A

PROJECT: TWEED COAST ROAD

STATE: QUEENSLAND
COUNCIL: TWEED SHIRE COUNCIL



- Third Party Manhole
- Third Party Pit
- Third Party Duct or Tunnel
- Marker Post
- Existing AARNET Pit

- Existing AARNET Duct
- New AARNET Pit
- New AARNET Duct
- Breakout

SHEET: 01 OF 15
SCALE: NOT TO SCALE
DATE: 6/7/2016

LOCATION: TWEED COAST ROAD, KINGSCLIFF
DRAWING: AS BUILT

REVISION: A

PROJECT: TWEED COAST ROAD

STATE: QUEENSLAND
COUNCIL: TWEED SHIRE COUNCIL

