

# Infrastructure Master Plan

## Tweed Valley Hospital

### Lendlease

Revision SSD2

12/09/2019

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## Revision Information

<b>Project</b>	Tweed Valley Hospital
<b>Title</b>	Infrastructure Master Plan
<b>Client</b>	Lendlease
<b>Revision</b>	SSD2
<b>Revision Date</b>	12 September 2019
<b>Prepared By</b>	LCI Consultants Sydney Office Level 4 73 Walker Street North Sydney 2060
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## Revision Schedule

Revision	Date	Issue Name	Author	Authorised
P1	13/05/2019	PRELIMINARY	JLK	SS
P2	13/06/2019	SSD2	JLK	SS
P3	08/08/2019	SSD2	JLK	SS
P4	15/08/2019	SSD2	JLK	SS
P5	12/09/2019	SSD2	JLK	SS

# 1 Executive summary

This report addresses the key master planning considerations and Utility consultations to date for the new Tweed Valley Hospital. It has been updated to reflect the Stage 1 SSD Consent – Stage 2 Requirements, the Stage 2 SSD (State Significant Development) application and to address the electrical and communications requirements of the Secretary's Environmental Assessment Requirements (SEARs).

**Stage 1 SSD Consent – Stage 2 Requirement: Part B Schedule 2 B30(a):** *Address the existing capacity and any augmentation requirements of the development for the provision of utilities including staging of infrastructure through the preparation of an Infrastructure Management Plan and Water Reuse Management Strategy Plan in consultation with relevant agencies and service providers. This plan must be based on the conclusions of the Integrated Water Management Report and the information provided within the Infrastructure Management Report prepared by ACOR dated 17 October, 2018.*

**SEARs: 14. Utilities:** *Prepare an Infrastructure Management Plan in consultation with the relevant agencies, detailing information on the existing capacity and any augmentation and easement requirements of the development for the provision of utilities including staging of infrastructure.*

Refer to Section 5 for project infrastructure requirements, in summary:

- there is capacity in the Electrical and Telecommunications Utility networks to support the development
- new high-voltage feeder cables will be sourced from the Cudgen Zone Substation and reticulated along Cudgen Rd to serve the hospital campus – this work will be completed under the NSW Accredited Service Provider (ASP) Scheme (Level 1 and Level 3), including environmental assessment and stakeholder engagement as per Section 5.3
- the hospital campus will be a high-voltage customer
- temporary/construction supply is available from the existing overhead lines running along Cudgen Rd – this may require augmentation from on-site generation during construction
- an electrical easement will be required on the hospital site between Cudgen Rd and the hospital incoming switching station (ISS)
- consultation history is included in Section 6

**Stage 1 SSD Consent – Stage 2 Requirement: Part B Schedule 2 B30(b):** *Provide details of any fuel storage for back-up emergency generator and all associated pipes, fittings and equipment.*

Refer to Section 5.2 – Campus requirements – Standby electrical supply for details, in summary:

- onsite diesel fuel storage will be provided for standby generators
- fuel storage, pipework, fittings and equipment will be designed and installed in accordance with relevant Australian Standards
- schematic design for underground fuel storage option is included in Appendix B3 of this report

## 2 Introduction

### 2.1 Overview

On the 11<sup>th</sup> June, 2019 the Minister for Planning and Public Spaces granted approval for the Concept Proposal and Stage 1 Early and Enabling Works for the new Tweed Valley Hospital (SSD 9575) located at 771 Cudgen Road, Cudgen (Lot 11, DP1246853). All documents relating to this consent can be found on the major project website of DPIE at

<https://www.planningportal.nsw.gov.au/major-projects/project/10756>

The Environmental Impact Statement (EIS) has been prepared to assist in the State Significant Development (SSD) Stage 2 Application for the Tweed Valley Hospital which will be assessed under Part 4 Division 4.7 of the *Environmental Planning and Assessment Act 1979* (EP&A Act). This, along with supporting documentation, provides a clear outline of the Stage 2 Application.

The Tweed Valley Hospital Project broadly consists of:

- Construction of a new Level 5 major regional referral hospital to provide the health services required to meet the needs of the growing population of the Tweed-Byron region (in conjunction with the other hospitals and community health facilities across the region);
- Delivery of the supporting infrastructure required for the Tweed Valley Hospital, including green space and other amenities, roads and car parking, external road upgrades and connections, utilities connections and other supporting infrastructure.

#### 2.1.1 Stage 2 Hospital Main Works and Operation

The Stage 2 SSD component seeks consent for the Main Works and Operation of the Tweed Valley Hospital, including:

- **Construction of the Main Hospital Building**
  - Main entry and retail area
  - Administration
  - Community health
  - In-patient units
  - Outpatient clinics and day only units
  - Child and Adolescent Services
  - Intensive Care Unit
  - Mental Health Unit
  - Maternity Unit and Birthing Suites
  - Renal Dialysis
  - Pathology
  - Pharmacy
  - Radiation Oncology as part of integrated Cancer Care
  - Emergency Department
  - Perioperative Services
  - Interventional Cardiology
  - Back of House services
  - Rooftop Helipad
  - Medical Imaging
  - Mortuary
  - Education, Training and Research
- **Construction of Support Building, referred to as the 'Health Hub', containing:**
  - Oral Health
  - Community Health
  - Aboriginal Health
  - Administration
  - Education, Training and Research
- **Internal Roads and carparking, including multi-deck parking for staff, patients and visitors;**

- **Construction of a temporary building for the 'Tweed Valley Skills Centre'**
- **External road infrastructure upgrades and main site access**
- **Environmental and wetland rehabilitation, including rehabilitation of existing farm dam as outlined in**
- **the Biodiversity Development Assessment Report (BDAR) prepared for the Concept Proposal and Stage 1 works**
- **Site landscaping**
- **Signage**
- **Utility and service works**

The works outlined above comprise five key components, which are subject to various funding allocations and may be delivered independently to each other. Stage 2 has therefore been defined in the following sub-stages<sup>1</sup>:

- Stage 2A – Main Hospital Building complete with supporting roads, services infrastructure and landscaping
- Stage 2B – Main Hospital Building incremental expansion areas
- Stage 2C – Health Hub
- Stage 2D – Tweed Valley Skills Centre
- Stage 2E – Multi-deck carpark

Development consent is sought for all five components of Stage 2 under this SSDA.

Plans for Stage 2 Main Works and Operation are attached in Appendix B of the EIS. Approval of Stage 2 will enable the new Tweed Valley Hospital to be built which will provide a much-needed contemporary health service facilities for the surrounding region.

### **2.1.2 Potential Future Expansions**

Any subsequent stages or modifications to the proposal would be subject to separate applications as required including the potential future expansion of the facility.

## **2.2 Infrastructure Master Plan**

LCI has been engaged by Lendlease to develop the electrical and communications components of the infrastructure master plan for the new Tweed Valley Hospital.

This report addresses the key master planning considerations and Utility consultations to date and supersedes the document Tweed Valley Hospital – Infrastructure Management Plan – Revision 3, 17 October 2018.

It has been updated to reflect the Stage 2 SSD (State Significant Development) application and to address the electrical and communications requirements of the Secretary's Environmental Assessment Requirements (SEARs). These requirements are captured in the Executive summary.

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<sup>1</sup> Stages are not listed in chronological order and may be delivered independently to each other

### 3 Background

The site of the new hospital development is 771 Cudgen Rd, Cudgen (Lot 11, DP 1246853).



Figure 1 - Area map

The development will consist of a main hospital building, a health hub, multi-deck carpark and on-grade carparking.

Construction will occur over two primary project phases:

- Phase 1 – site early works, including temporary supply, underground pit and conduit systems, incoming feeders, switching station and substations
- Phase 2 – construction, low-voltage electrical installation, communications

As this project establishes a new major health facility, future development of the site is likely. Provisioning of services for future development includes planning for a future sub-acute building and private hospital as-per the 2031 master-planning.



## 4 Existing services

The development will predominantly occur on a greenfield site, with minimal impact on existing services. The primary impact will be on utility assets in Cudgen Rd and is associated with the road works at the campus entrances.

A Dial Before You Dig (DBYD) enquiry lodged 9/5/2019 and covering the area adjacent the lot has identified the following electrical and communications assets around the development site:

Utility	Asset
AARNet	Fibre optic assets along the south verge of Cudgen Rd
Essential Energy	Poles and underground earth wires along the northern and southern verge of Cudgen Rd
Essential Energy*	Poles within the lot boundary
NBN Co	Underground conduits along the north verge of Cudgen Rd and possibly within the site boundary
Optus	Major fibre optic network along the north verge of Cudgen Rd and possibly within the lot boundary, entering the Kingscliff TAFE Campus
Optus	Underground services along the northern and southern verge of Cudgen Rd
Telstra†	Assets within the works area
<b>Notes:</b>	
(*) Site investigations indicate these poles appear to be incorrectly shown on the Utility drawing and are four pole crossing the site south/north from the existing house to a pumping station. LCI has been advised by Lendlease these assets have been decommissioned and demolished.	
(†) The extent of Telstra assets has been confirmed through correspondence as a major fibre running adjacent the site and the route is captured on the site survey.	

There will be an impact on existing services along Cudgen Rd, associated with the provision of new high-voltage cables from Cudgen Zone Substation to provide electrical supply to the campus. The impact on these services will be developed and managed through the Accredited Service Provider (ASP) Level 3 design process for the incoming supply.

A Dial Before You Dig (DBYD) enquiry lodged 9/5/2019 and covering the area along Cudgen Rd from the site to the Cudgen Zone Substation has identified the following electrical and communications assets:

Utility	Asset
AARNet	Fibre optic assets along Cudgen Rd, turning north along Tweed Coast Rd
Essential Energy	High-voltage underground cable in the vicinity of the Cudgen Zone Substation
Essential Energy	Poles and underground earth wires along the northern and southern verge of Cudgen Rd
Essential Energy	Short section of low-voltage underground cable in front of 604 Cudgen Rd
Essential Energy	Short section of high and low-voltage underground cable at the intersection of Cudgen Rd and John Robb Way

Utility	Asset
NBNCo	Underground conduits along the north and south verge along Cudgen Rd
Optus	Major fibre optic network along the north verge of Cudgen Rd and possibly within the lot boundary, entering the Kingscliff TAFE Campus and turning north along Tweed Coast Rd
Optus	Underground services along the northern and southern verge of Cudgen Rd, turning north along Tweed Coast Rd
Roads and Maritime Service	Traffic signalling at the intersection of Cudgen Rd and Tweed Coast Rd
Telstra*	Assets within the works area
<b>Notes:</b>	
(*) The extent of Telstra assets will be confirmed during the incoming supply feeder detailed design.	

The information from the DBYD inquiries has been reviewed against the previous masterplan documentation and we note the following developments:

- NBN Co assets have been installed along Cudgen Rd
- NBN Co network coverage has expanded in this area and NBN Co will be the primary communications provider (not Telstra as per the previous master plan)



## 5 Project infrastructure requirements

### 5.1 Campus site plan

The electrical and communications site plans for SSD Stage 1 and SSD Stage 2 are included as Appendix A.1 and Appendix B.1.

### 5.2 Campus requirements

#### **Electrical supply**

The estimated maximum electrical load for the campus, including anticipated future developments, is approximately 8MVA. A copy of the demand allowances is provided in Appendix B.2.

The electrical supply will run from Cudgen Zone Substation, along Cudgen Rd and into an incoming switching station (ISS) within the site. From this point, the hospital will operate as a private high-voltage network, including reticulation to private substations and high-voltage generators.

The incoming switching stations will be located in a services compound adjacent the incoming maintenance road in the south-west corner of the campus.

An electrical easement will be required on the site between Cudgen Rd and the ISS and around the ISS switchgear, with requirements captured in the Level 3 design. Indicative sizes are:

- 2m wide easement over electrical cables
- 7 x 4.2m easement over the ISS

Essential Energy is the Distribution Network Service Provider (Utility). They have advised that:

- electrical capacity is available at Cudgen Zone Substation to service the site
- that existing overhead lines along Cudgen Rd have insufficient capacity for the development, but may be used to provide temporary/construction power
- temporary/construction power supply is limited to 1000kVA
- that up to two new, dedicated, in-ground high-voltage feeder cables can be used to supply the site, optionally from separate transformers/bus sections within Cudgen ZS

A Design Information Package (DIP) was received on the 31 July, 2019 confirming that:

- supply to the site will be at high-voltage (11,000 Volts 3 Phase)
- two new cables will be required from Cudgen Zone Substation to switching stations located on the site
- works within Cudgen Zone Substation are non-contestable and will be completed by Essential Energy Major Projects
- spare conduit provision requirements
- easements will be required over the cables and switching stations on the hospital site.

#### **Standby electrical supply**

The high voltage network will be backed by standby diesel high-voltage generators, located in a services compound adjacent the incoming maintenance road in the south-west corner of the campus. These generators will operate in the event of a utility supply outage to provide electricity to critical patient care areas.

Diesel fuel will be stored on site in an AS 1692 compliant, double-walled tank with leak detection. Design development will determine if the tanks are installed above or under-ground, with indicative plans for an underground storage solution beneath the services lay-by provided in Appendix B.3.

An underground fuel storage installation will be in accordance with the AS 4897 – The design, installation and operation of underground petroleum storage systems and Guidelines for implementing the protection of the environment operations (underground petroleum storage systems) regulation.

An above-ground fuel storage installation will be in accordance with AS 1940 – The storage and handling of flammable and combustible liquids.

Sufficient fuel will be stored for 24hrs of generator operation at full load as per the requirements in the Health Infrastructure Engineering Services Guidelines.

To ensure availability, generators require regular testing and maintenance. The details of the maintenance regime are unknown at this stage, however we anticipate the generators will operate for short periods (up to 8hrs per month) for testing purposes.

In the event of a power network failure, the generators will operate until the Utility network supply can be restored.

### **Services compound**

A services compound will be provided adjacent the incoming maintenance road in the south-west corner of the site. The compound will house the incoming switching stations, high-voltage generator switchgear, containerised generator sets, diesel pump house and refuelling point. Equipment within the compound will generally be installed in weatherproof enclosures.

There is sufficient space internally for maintenance vehicles and flatbed truck access. Refuelling vehicles will park adjacent the compound in a services lay-by.

### **Lighting**

Lighting will be provided around the campus and along Cudgen Rd – refer to the External Lighting Strategy Report for further details.

### **Communications**

In accordance with Health Infrastructure requirements, dual campus distributors will be located within the main health building. A separate pathway for incoming communications cabling will be provided into each campus distributor, following diverse routes to connect with utility infrastructure on either side of the main entrance.

Cable routes within the campus will be provided to minimise the need for future relocations and so as to not reduce the flexibility of the site.

## **5.3 Incoming electrical supply**

To meet Essential Energy and regulatory requirements, detailed design of the incoming supply will be by an Accredited Service Provider (ASP) Level 3 designer.

The Level 3 design process includes environmental assessment and stakeholder engagement for this component of the works.

To minimise disruption to traffic, it is anticipated that the cable will be installed by trenching and/or directional underbore along the verge of Cudgen Rd.

## **5.4 Cudgen Road Works**

The primary civil works in Cudgen Rd involve road widening, provision of campus entrance slip lanes and bus shelter relocations. Services will be located within the works areas by an accredited services locator.

Tweed Shire Council will be contacted as part of the Level 3 design to identify lighting design category requirements.

Relocation of existing utility assets may be required and will be further developed during the detailed design. Any relocation of Essential Energy assets will be captured as part of the Level 3 design.

A number of telecommunications providers have assets along Cudgen Rd that will be affected by the road widening works. Telstra, Optus, AARNet and NBN will be further consulted to determine the preferred mitigation and relocations, if required.

## 5.5 Temporary works

In consultation with Lendlease, electrical demand during construction has been estimated at between 1.5MVA and 2MVA. Electrical supply will be provided at high-voltage to a temporary kiosk substation and from there reticulated around the site to serve the site office, subcontractor offices, tower cranes, lifts, lighting and construction loads.

Temporary lighting will be provided around the site to ensure a safe and accessible work area.

An application for temporary supply was submitted to Essential Energy on 28<sup>th</sup> May, 2019 and a Design Information Package provided on the 4<sup>th</sup> July, 2019.

Essential Energy has advised that their network cannot support the anticipated full load of the construction site. Options for sourcing additional power are currently under investigation and may include the use of diesel generators.

## 6 Consultation history

The following is a summary of the consultation with Utilities to date.

### **Essential Energy**

Preliminary conversations with Essential Energy began in February 2019 following receipt of the 100% Concept Design reports. Clarification was sought in regards to the existing capacity of Essential Energy's assets, the optimum supply arrangement and approximate scope of works. Verbal advice was provided, however no formal investigations, studies etc could be instigated until the Connection Investigation Services Agreement (CISA) was signed in early March 2019.

As of 20<sup>th</sup> May 2019, network harmonic studies have been completed by Essential Energy, who are now compiling the Design Information Package (DIP) to allow the ASP Level 3 designer to complete the incoming electrical supply design.

A kickoff meeting was held with Essential Energy on 11<sup>th</sup> June, 2019.

Advice on the capacity of the network to support temporary/construction power was received on 27<sup>th</sup> July, 2019.

A Design Information Package for the site temporary supplies was received 4<sup>th</sup> July, 2019.

A Design Information Package for the main hospital supplies was received 31<sup>st</sup> July, 2019.

### **NBNCo**

A connection application was lodged with NBNCo in late February 2019 advising them of the new hospital development. NBNCo subsequently granted approval of the new connection application in April 2019 to which pit and pipe infrastructure routes are currently being designed. Upon completion, these will be submitted to NBNCo for approval prior to commencement of installation works.

We note that previous advice that main incoming fibre would be provided by Telstra has been superseded by the rollout of the NBN.

### **Telstra, Optus, Vodafone**

The major mobile carriers will be consulted during design development to determine the lead DAS provider and confirm requirements for the facility.

### **NSW Telecommunications Authority**

NSW Telecommunications authority was contacted in May 2019 and advised of the hospital development with location and initial site plans. The NSW Telecommunications Authority will assess the site for current and future Government Radio Network (GRN) coverage and has advised (July 2019) they will be able to make preliminary comments for this site. They have requested space be allocated to located equipment on site as part of the planning process. This has been included in the layout for the main Distributed Antenna System (DAS) room.

### **AARNet**

The Local Health District (LHD) has advised of a strong preference to own this relationship and it is therefore excluded from this report. The LHD is to approach AARNet via EHealth contact to advise working group of preference in approach to AARNet application.

### **Council**

Tweed Shire Council will be contacted during design development to confirm requirements for:

- sharing/colocation of site security assets
- street lighting design categories for Level 3 electrical works
- mandatory notifications for Level 3 electrical works

### **Local stakeholders**

Local residents and business owners will be consulted during the Level 3 design phase and Level 1 construction phase, according to the Utility requirements for mandatory notifications of electrical works.

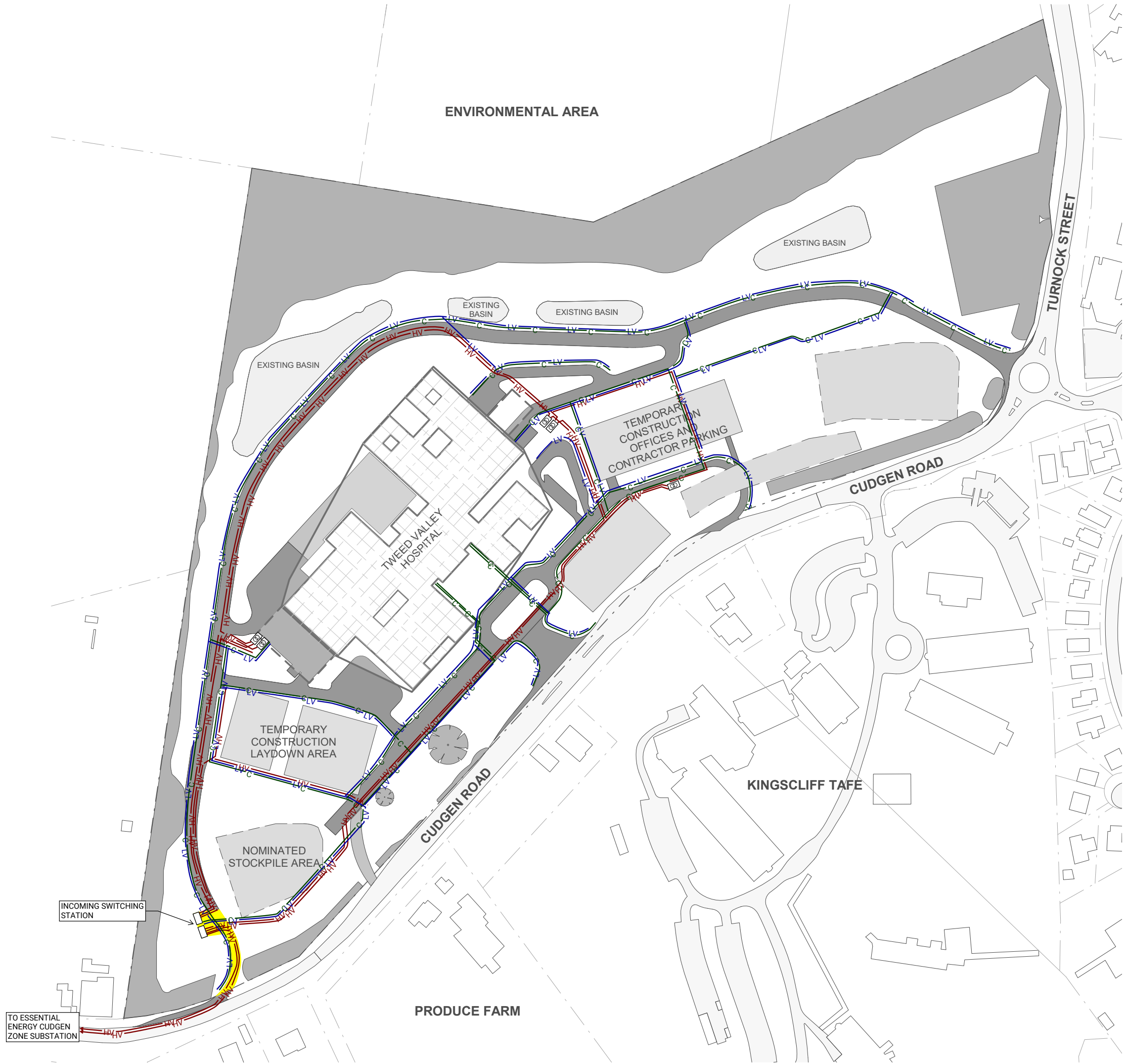
### **Ambulance, Police and Fire services**

Emergency services will be consulted during the user group consultation process to ensure communications requirements are addressed.

## Appendix A SSD Stage 1 DA

### A.1 Electrical and communications plan





LEGEND

- HV HIGH VOLTAGE UNDERGROUND CABLE ROUTE
- LV LOW VOLTAGE UNDERGROUND CABLE ROUTE
- C COMMUNICATIONS/SECURITY UNDERGROUND CABLE ROUTE
- PRIVATE KIOSK SUBSTATION
- ESSENTIAL ENERGY EASEMENT

No.	Description	Date	By	Chk
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Services Consultant



**LCI**

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Project  
TWEED VALLEY HOSPITAL

Drawing Title  
SSD STAGE 1 DA  
ELECTRICAL AND COMMUNICATIONS

Status  
PRELIMINARY (2019-05-06)

Scale @  
1:2500@A3

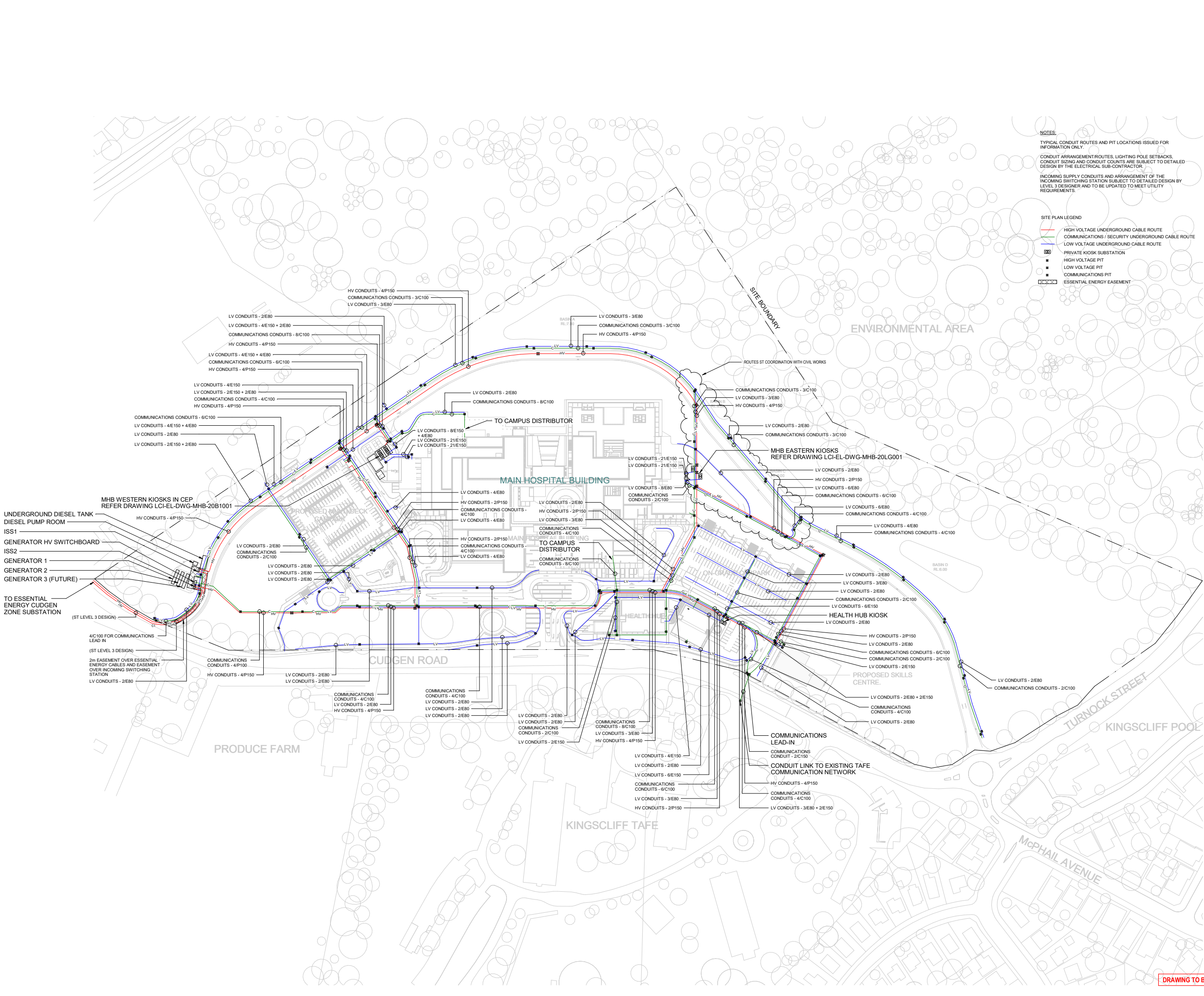
Project No.  
18202

Drawing No.  
LCI-EL-DWG-SSI-1000001

Rev  
P8

## Appendix B SSD Stage 2 DA

### B.1 Electrical and communications site plan



- NOTES:**
- TYPICAL CONDUIT ROUTES AND PIT LOCATIONS ISSUED FOR INFORMATION ONLY.
- CONDUIT ARRANGEMENT ROUTES, LIGHTING POLE SETBACKS, CONDUIT SIZING AND CONDUIT COUNTS ARE SUBJECT TO DETAILED DESIGN BY THE ELECTRICAL SUB-CONTRACTOR.
- INCOMING SUPPLY CONDUITS AND ARRANGEMENT OF THE INCOMING SWITCHING STATION SUBJECT TO DETAILED DESIGN BY LEVEL 3 DESIGNER AND TO BE UPDATED TO MEET UTILITY REQUIREMENTS.
- SITE PLAN LEGEND**
- HIGH VOLTAGE UNDERGROUND CABLE ROUTE
  - COMMUNICATIONS / SECURITY UNDERGROUND CABLE ROUTE
  - LOW VOLTAGE UNDERGROUND CABLE ROUTE
  - PRIVATE KIOSK SUBSTATION
  - HIGH VOLTAGE PIT
  - LOW VOLTAGE PIT
  - COMMUNICATIONS PIT
  - ESSENTIAL ENERGY EASEMENT

KEY PLAN

REV	DESCRIPTION	DATE
01	PRELIMINARY DRAWING	10.07.19
02	100% SCHEMATIC DEVELOPMENT	10.07.19
03	SS1	10.07.19
04	SS2	10.07.19

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USE FIGURED DIMENSIONS. DO NOT SCALE. CONTRACTORS MUST VERIFY ALL DIMENSIONS ON THE SITE BEFORE COMMENCING ANY WORK OR MAKING ANY SHOP DRAWING WHICH MUST BE SUBMITTED AND REVIEWED BEFORE MANUFACTURE.

**100% SCHEMATIC DEVELOPMENT**

MAIN CONTRACTOR

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PROJECT MANAGER

CLIENT

Health Northern NSW Infrastructure Local Health District

PROJECT

**TWEED VALLEY HOSPITAL**

DRAWING TITLE

**ELECTRICAL / COMMUNICATIONS RETICULATION LAYOUT CIVIL WORKS**

SCALE: 1:1000@A0 DATE: 10.07.19 DRAWN BY: BH CHECKED: MM

PROJECT NO: 18202 DRAWING NO: LCI-EL-DWG-SSI-1000003 REVISION: 04

DRAWING TO BE PRINTED IN COLOUR

## B.2 Site maximum demand

**Tweed Valley Hospital**  
**Site Maximum Demand - SSD 2**

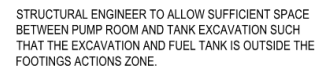
6/08/2019

Building/Area	Load (kVA)	Load (A,LV)
<b>Sub-01-A/B</b>		
Main Health Building - West	4789	6913
Multi-deck carpark	900	1299
Future Expansion (Consulting Suites)	104	150
<b>Sub-02-A/B</b>		
Main Health Building - East	2530	3651
<b>Sub-03</b>		
HUB	188	271
On-grade carpark	69	99
Future Expansion (Sub-acute)	544	785
Skills Centre	58	83
<b>Sub-04</b>		
Future Expansion (Private Hospital)	1040	1501
<b>Misc</b>		
Roads	4	6
Footpaths/Cyclepaths	0	1
Site Hydraulics (SPS)	38	54

<b>INCOMING SUPPLY</b>	
<b>SUBTOTAL (kVA)</b>	<b>10263</b>
OVERALL SITE DIVERSITY	0.7
<b>SUBTOTAL (kVA)</b>	<b>7184</b>
SPARE	10%
SPARE (kVA)	718
<b>TOTAL (kVA)</b>	<b>7903</b>

## B.3 Underground fuel storage





**DRAWING TO BE PRINTED IN COLOUR**