If a building becomes architecture, then it is art. Clearly, if a building is not functionally and technically in order, then it isn't architecture either – it's just a building.
Arne Jacobsen

Mechanical Engineering
Lighting Design
Sustainable Design
Electrical Engineering

Copenhagen
London
Sydney
Canberra
Hong Kong
New York

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BUILDING SERVICES

STEENSEN VARMING

Liverpool New Primary School Infrastructure Management Plan

Level 8, 9 Castlereagh Street
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STEENSEN VARMING

Document Revision and Status

Date	Rev	Issue	Notes	Checked	Approved
08-03-2021	1	Draft	For Comment	IM	BJ
29-03-2021	2	Final	Final	IM	BJ
29-04-2021	3	Final	Final	IM	BJ

Sydney April 29th, 2021
Ref. No. 207148

Ivan Mira
Associate

ivan.mira@steensenvarming.com
9967 2200

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1.0 Introduction

The new Liverpool Primary School (NLPS) is located within the grounds of the existing Liverpool Boys and Girls High School in the Liverpool Central Business District (CBD), at 18 Forbes Street, Liverpool. The proposed new Liverpool Primary School is located in the eastern portion of the existing school grounds (refer to figure 1.)

The site is legally described as Lot 1 in DP 1137425. The application seeks consent for the construction and operation of a new Liverpool Primary School. This will include construction of a new school building for core school facilities, teaching spaces, support units, preschools as well as associated landscaping and open space improvements. A detailed description of development is provided by Ethos Urban within the EIS.

Figure 1. NLPS Site Plan

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The purpose of this report is to identify the electrical, telecommunications, water, gas and sewer infrastructure and connection points in the area to satisfy the requirements of the SSDA submission as identified in the figure below.

SEARs Requirements	Relevant Section of the Report
14. Utilities	
Prepare an Infrastructure Management Plan in consultation with relevant agencies, detailing information on the existing capacity and any augmentation and easement requirements of the development for the provision of utilities including stage of infrastructure.	Sections 2, 3, 4.1, 4.2, 4.4.1 & 4.4.2
Prepare an Integrated Water Management Plan detailing any proposed alternative water supplies, proposed end uses of potable and non-potable water, and water sensitive urban design	Sections 4.3, 4.4.3

Figure 2. Infrastructure Management Plan SEARs Requirements

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2.0 Electricity

The New Liverpool Primary School is to be constructed on the same site as the existing Liverpool Boys High School and Liverpool Girls High School. The lot is to remain as a single lot.

Steensen Varming has consulted with Endeavour Energy on the proposed power supply arrangement and it has been accepted to consider the New Liverpool Primary School as a seperate construction in relation to the incoming electrical supply. Therefore no works are required to the power supplies associated with the existing Boys and Girls High Schools.

On this basis the New Liverpool Primary School is to be provided with a new dedicated 1000kVA kiosk to satisfy the anticipated maximum demand which is expected to be in the order of 800-900kVA. Endeavour Energy has confirmed that at this point in time, there is sufficient capacity in the area to accomodate this load however it will not be allocated/reserved until a formal application for the supply is submitted.

Approved under the SSD is not sought for the kiosk transformer, the kiosk transformer will form part of a seperate REF planning approval.

Refer to the correspondence between Steensen Varming and Endeavour Energy in Appendix A of this report.

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3.0 Telecommunications

As a greenfield site there is no existing telecommunications services to the site of the New Liverpool Primary School. The existing Boys and Girls High school's have their own incoming telecommunications service.

The proposal for the New Liverpool Primary School is to establish a new main commuications room on ground floor which will service the new school and that a new incoming telecommunications services will be established to this room and distributed to the rest of the school.

The submission of the formal application for telecommunication services is completed by the Department of Education's Information Technology Directorate (ITD). Based on the NBNCo website, the area is serviced by the NBN network and a new connection to the school can be established. The purple area in the snapshot below desigates the areas currently serviced by the NBN network.

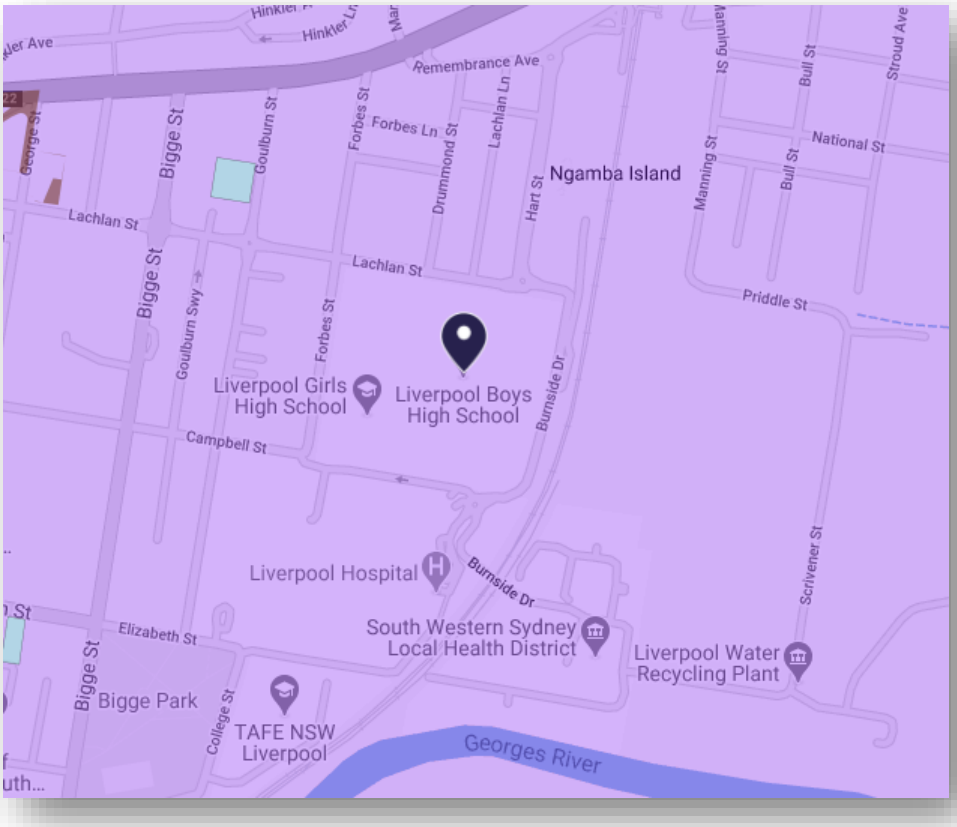

Figure 3. NBN Coverage Map

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4.0 Fire and Hydraulics

4.1 Demand Calculations

4.1.1 Water Demand Calculations

The average daily water demand has been calculated utilising an estimated usage per student based on the Sydney Water water usage guide by property type, as seen in table 1:

Table 1: Average Water Demand Per Student		
Classification	**Metric Unit**	**Average Demand (L/Metric Unit/Day)**
School	Student	20

Table 2 below shows the average daily water demand calculation.

Table 2: Average Daily Water Demand		
Total Students	**Average Demand (L/Metric Unit/Day)**	**Total Average Daily Water Demand (kL)**
1200	20	24,000

The Probable Simultaneous Flow for the school has not been determined at this stage due to insufficient architectural information.

The fire demand has been approximated as follows:

- Fire flow for hydrants – 20 L/s
- Fire flow for sprinklers – 18 L/s

Mechanical cooling demands are unknown at this stage.

4.1.2 Sewer Demand Calculations

As with water, the daily total sewer discharge is the product of the number of students and the average daily discharge per students. Sydney Water estimates that for non-residential developments roughly 78% of water consumed is discharged to sewer.

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Table 3: Daily Sewer discharge		
Total Students	**Average Sewer Discharge 78% of L/metric unit/day**	**Total Average Daily Sewer Discharge (kL)**
1200	15.6	18,720

As can be seen in table 3, the daily sewer discharge is 18.7kL/day.

4.1.3 Gas Demand Calculations

Gas is not required for the NLPS. Approval is not sought under the SSDA.

4.2 Connections

The NLPS and the existing Liverpool Boys and Girls High schools are within the same lot. The figure below shows the Sydney Water sewer and water mains that from the lot.

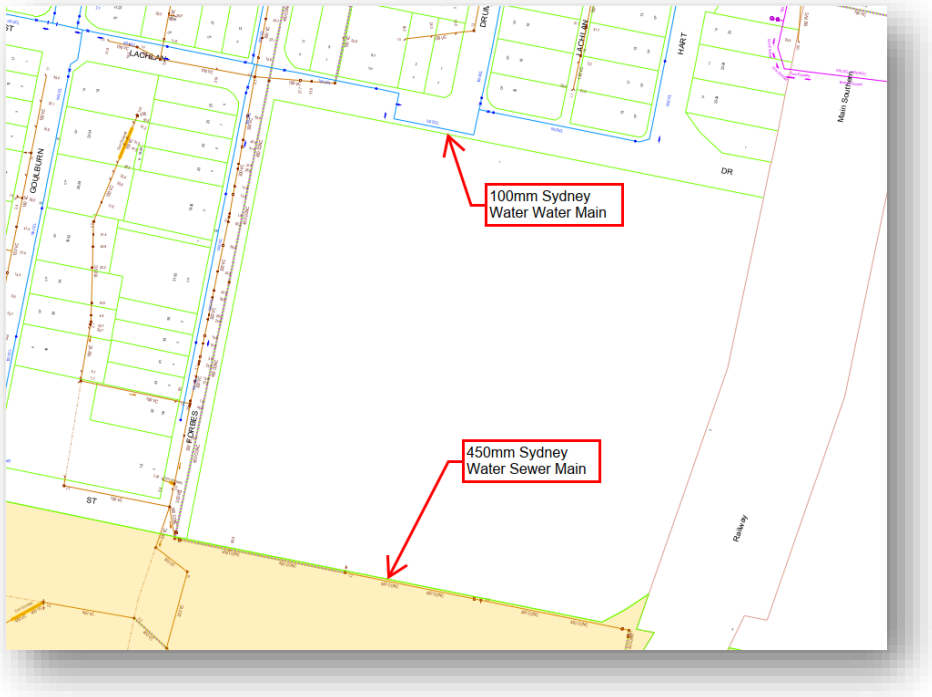

Figure 4: Sydney Water Sewer and Water Mains in proximity to site.

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4.2.1 Water

The potable cold water service is proposed to connect to the existing water meter serving the existing Liverpool Boys and Girls High School, located on Lachlan Street. The existing school connection is 50mm. Subject to the new load, an amplification of the existing main connection may be required.

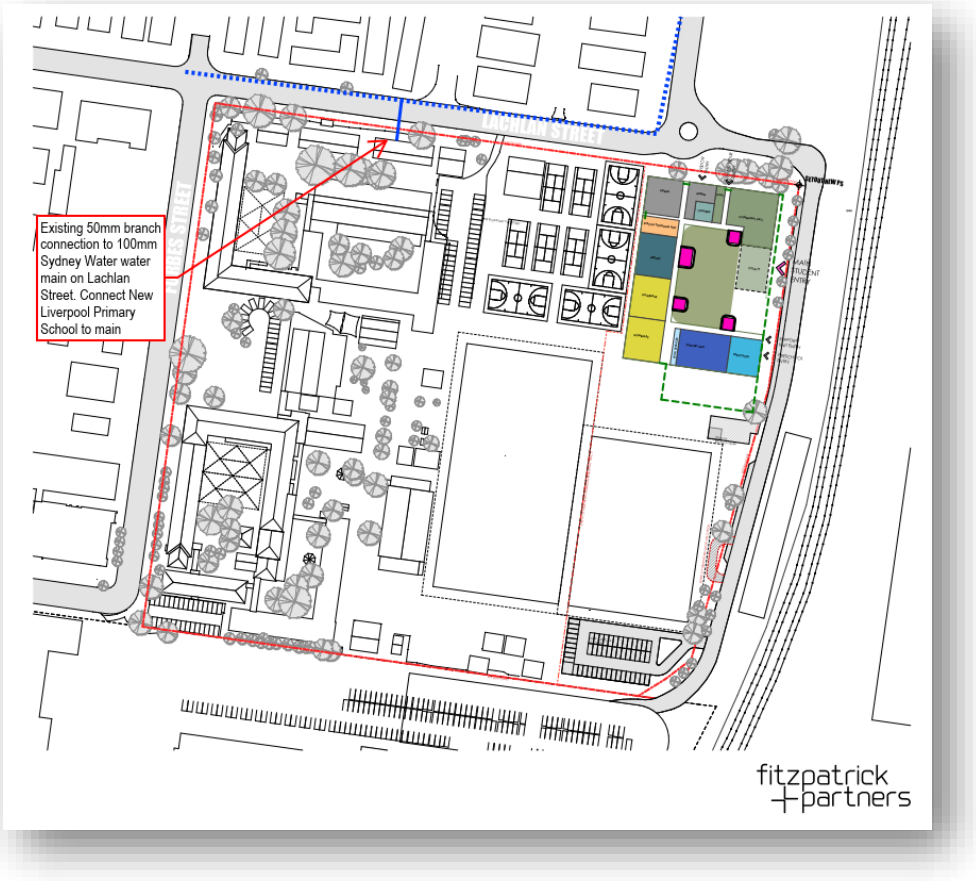

Figure 5: Water connection to NLPS from existing connection to Sydney Water Main.

4.2.2 Sewer

There is a 450mm Sydney Water sewer main reticulating across the southern boundary of the lot. The NLPS sewer will drain southwards into a pumpout pit due to the lack of fall to the Sydney Water sewer main. The pumpout pit will be pumped to the sewer main south of the lot.

The existing Liverpool Boy and Girls High school also drain via a pumpout pit to the sewer main south of lot, making a branch connection to the sewer main which extends into the lot. The pumpout line from the new pumpout pit will connect to the

same branch connection. Subject to the new added load, the branch connection may require an amplification. The above is described in Figure .

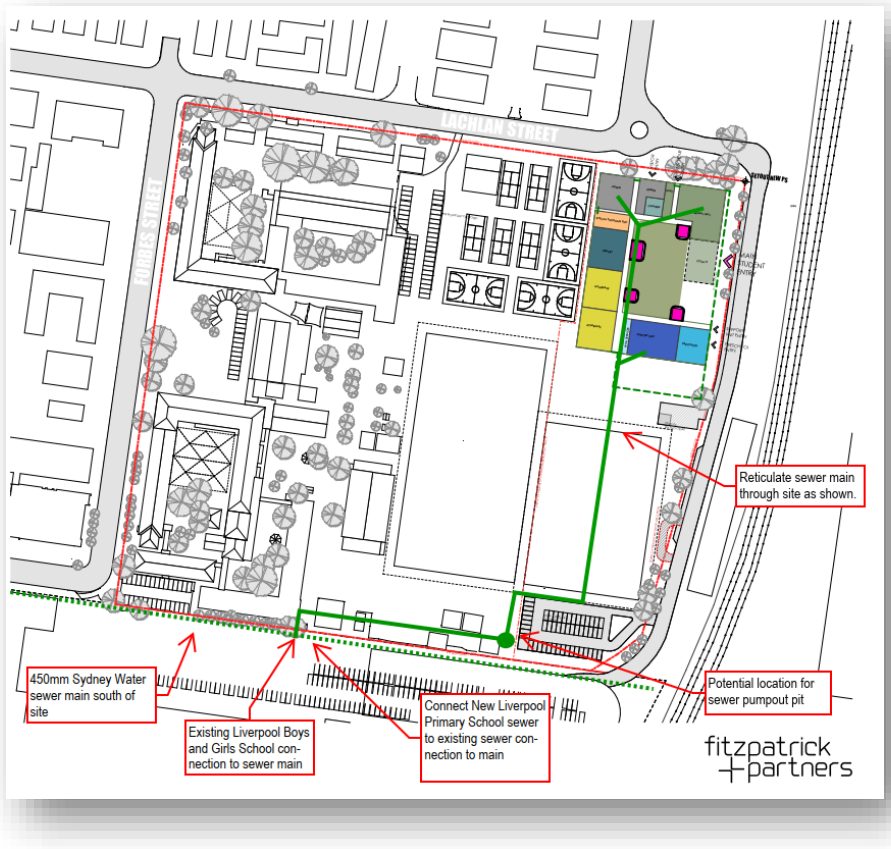

Figure 6: Connection to Sydney Water Sewer Main

4.2.3 Gas

Gas is not required for the NLPS. Approval is not sought under the SSDA.

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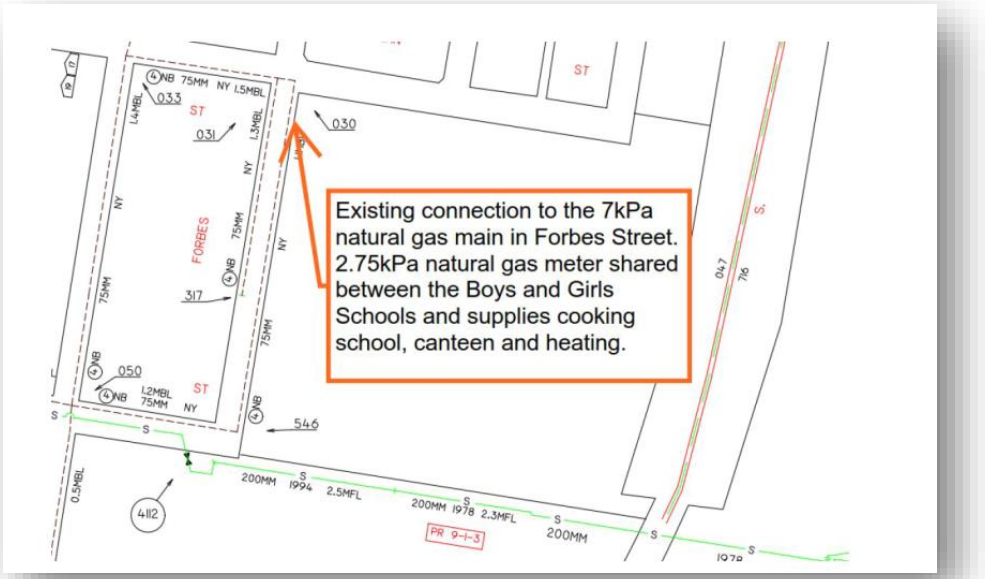

Figure 7: Jemena Gas Main and Existing Private Gas Meter Location

4.3 Private System

4.3.1 Potable Cold Water Services

It is proposed that the potable water services extend from the infrastructure as described in the latest WS+P Schematic Design report to all wet area fixtures and fittings as required, including basins, WC's, showers and the like.

Potable water services will also extend to any mechanical services as required.

4.3.2 Non-Potable Cold Water Services

It is proposed that non-potable cold water services are not utilised for supply to any internal sanitary fixtures or fittings such as WC flushing. This is to minimise any risk to public health.

The non-potable cold water service extending from the rainwater reuse system will be used for irrigation purposes only. A potable cold water service with a reduced pressure zone device preceding the first take off where zone protection is required in accordance with AS 3500.1 will be utilised as a rainwater top-up supply. The top up supply is to be provided with an air gap (above) the rainwater tank overflow outlet.

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4.4 Water Usage Reduction

4.4.1 Low Flow Taps

Where possible, potable water usage will be reduced by the use of low flow taps and sanitary. Fixtures to achieve at least average WELS star rating. This is mandated by DG 02 of School Infrastructure's Educational Facilities Standards and Guidelines. Low flow taps are to be provided by the architect.

4.4.2 Water Meters

The development will be metered with both utility owned water meters at the property boundary, and client owned and read water meters. These water meters will have the capability for connection a BMCS via pulse read-out and therefore be water demand and leak monitored.

4.4.3 Rainwater Reuse

Rainwater harvesting is designed to provide an alternative source for non-potable water uses for the school. Implementing a rainwater re-use system will result in the conservation of potable cold water sources and a reduction in the daily water demand.

Where practical, rain from sloped roof (metal deck) areas will be collected using gutters and downpipes before reticulating to the rainwater tank for re-use (irrigation purposes only).

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"AVERAGE DAILY WATER USE BY PROPERTY TYPE"

Development Type	Development Sub-Type	Key Metric	Metric Unit	Average Demand (L/Metric Unit / Day)
Residential	Single Lot Torrens	Dwelling	Each dwelling	623.00
	Flats Torrens	Net Floor Area	Square Meter	2.36
	High Rise Units	Net Floor Area	Square Meter	3.34
	Single Lot Community	Dwelling	Each dwelling	623.00
Mixed	Residential / Commercial	Combined Floor Area	Each dwelling / Square Meter	Use separate rates for each component
	Commercial / Industrial	Combined Floor Area	Square Meter	Use separate rates for each component
Commercial	Aged Accom - Self Care	Net Floor Area	Square Meter	2.50
	Aged Accom - Hostel	Bed	Each bed	271.00
	Aged Accom - Full Care	Bed	Each bed	271.00
	Childcare	Net Floor Area	Square Meter	3.60
	Hotel / motel / serviced apartments	Room	Each room	359.94
	Office	Net Floor Area	Square Meter	2.27
	Shopping Centre	Net Floor Area	Square Meter	3.00
	Laundry / Dry Cleaner	Net Floor Area	Square Meter	10.50
	Café / Fast Food / Butcher / Deli	Net Floor Area	Square Meter	2.48
	Retail Units	Net Floor Area	Square Meter	2.48
	Medical / Veterinary	Net Floor Area	Square Meter	2.48
	Mechanical Repair	Net Floor Area	Square Meter	2.48
	Car / Boat Sales	Net Floor Area	Square Meter	2.48
	Car Wash	Net Floor Area	Square Meter	9.40
	Club	Net Floor Area	Square Meter	3.77
Industrial	Heavy Process		As required	
	Chemical Manufacturing		As required	
	Printing Manufacturing		As required	
	Beverage Manufacturing		As required	
	Light Factory Unit	Developed floor area	Square Meter	2.82
	Warehousing	Developed floor area	Square Meter	2.82
	Transport / Bus Depot	Site area	Square Meter	0.91
Special Uses	University	Student	Each student	20.00
	School	Student	Each student	20.00
	Hospital	Bed	Each bed	271.00
	Religious assembles	Developed floor area	Square Meter	1.30
	Government Depot	Site area	Square Meter	0.91
	Community Centre / Library	Floor area	Square Meter	1.84
	Sport Fields with Amenities		As required	
	Park & Reserves		As required	
	Services - Police / Ambulance etc.	Floor area	Square Meter	1.40

Figure 8. Average Daily Water Use by Property Type

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5.0 Appendix A – Correspondence with Endeavour Energy

Ivan Mira

From: David Ho <David.Ho@endeavourenergy.com.au>
Sent: Friday, 26 February 2021 3:15 PM
To: Ivan Mira
Subject: RE: 207148 - Liverpool West Public School and New Liverpool Primary School Supply Query
Attachments: LWPS - Location Plan.pdf; LWPS - Preliminary Arch Layout.pdf; NLPS - Location Plan.pdf; NLPS - Preliminary Arch Layout.pdf

Categories: 207148

Hi Ivan,

Please see my comment in blue.

Regards,
David

From: Ivan Mira <ivan.mira@steensenvarming.com>
Sent: Wednesday, 24 February 2021 3:50 PM
To: David Ho <David.Ho@endeavourenergy.com.au>
Subject: RE: 207148 - Liverpool West Public School and New Liverpool Primary School Supply Query

Hi David,

Thanks again for getting back to us on the queries below for this project.

Our client is asking if we can confirm that the authority network can accommodate the increase in load as a result of the two school projects. This is required for the SSDA submission. Below is a summary of each project and some attachments to give you an idea of the scope. Once options are more locked we will submit a formal application. In the meantime I am hoping you could assist with provide some advice on the following.

Liverpool West Public School (LWPS)

The scope of work for this school is a new two story building and some minor work within existing buildings. Attached is a location plan and the current proposed architectural design. The new build area equates to 2542m2. Using a figure of 80VA/m2 we get a increase in the demand of 203kVA. Peter Henderson has done some research for us on the existing kiosk no.27137 which we understand to be a 500kVA kiosk and at capacity. Based on the additional load we are adding it appears we will need to upgrade this kiosk to a 1000kVA kiosk as I don't believe you do a 750kVA unit.

Based on the above can you comment on my assumption on the kiosk and confirm that the network in the area has the capacity to service our increase in load.

Our record shows that the 500kVA Pad Sub 27137 had been overload for last 3 years, therefore this sub has to upgrade to 1000kVA to cater the additional load.

New Liverpool Primary School (NLPS)

The location of this school is as per our email trail below. There are currently two proposals for this development, a proposed one and an endorsed one. The endorsed one is large so we will use that as its worst case. This school will need a whole new kiosk as you know and the current plan is to put it on the Lachlan Street boundary.

The new building is approximately 12,800m2. Using a demand density of 80VA/m2 we get an approximate maximum demand of 1026kVA. In reality we don't expect to see this demand once constructed and not all areas will use

80VA/m2 at the same time. This will get refined as we complete the design. So on the basis we need to provide a 1000kVA kiosk for this school, could you please confirm that the authority network in the area can accommodate this additional load please.

At present there is available capacity in 11kV network to cater your required load 1000kVA, however we will not reserve any network capacity until receiving COL application and approval is granted.

Regards,

Ivan Mira
Associate

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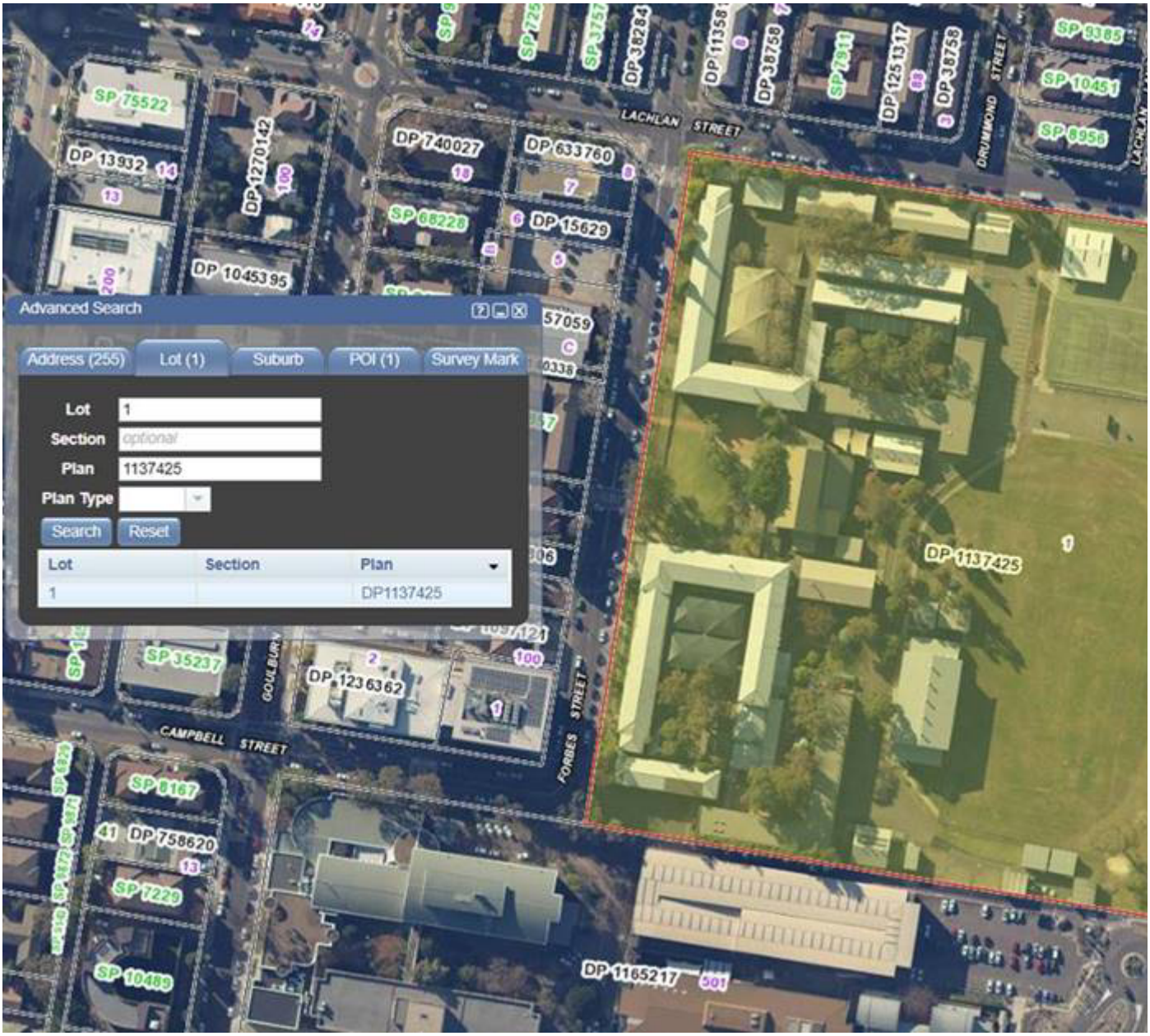
From: David Ho <David.Ho@endeavourenergy.com.au>
Sent: Wednesday, 10 February 2021 5:11 PM
To: Ivan Mira <ivan.mira@steensenvarming.com>
Subject: RE: 207148 - Liverpool West Public School and New Liverpool Primary School Supply Query

Hi Ivan,

Presently power supply of Liverpool West Public School on the property, Lot 1 DP 1137425, is supplying from a 1000kVA shared Pad Sub 1366 locates at the Lachlan Street property frontage.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CAMPBELL STREET
GOULBURN
FORBES STREET
DRUMMOND STREET
DP 1137425
DP 1236362
DP 1165217
SP 75522
DP 13932
DP 1270142
DP 740027
DP 633760
SP 68228
DP 15629
DP 1045395
SP 35237
SP 8167
DP 758620
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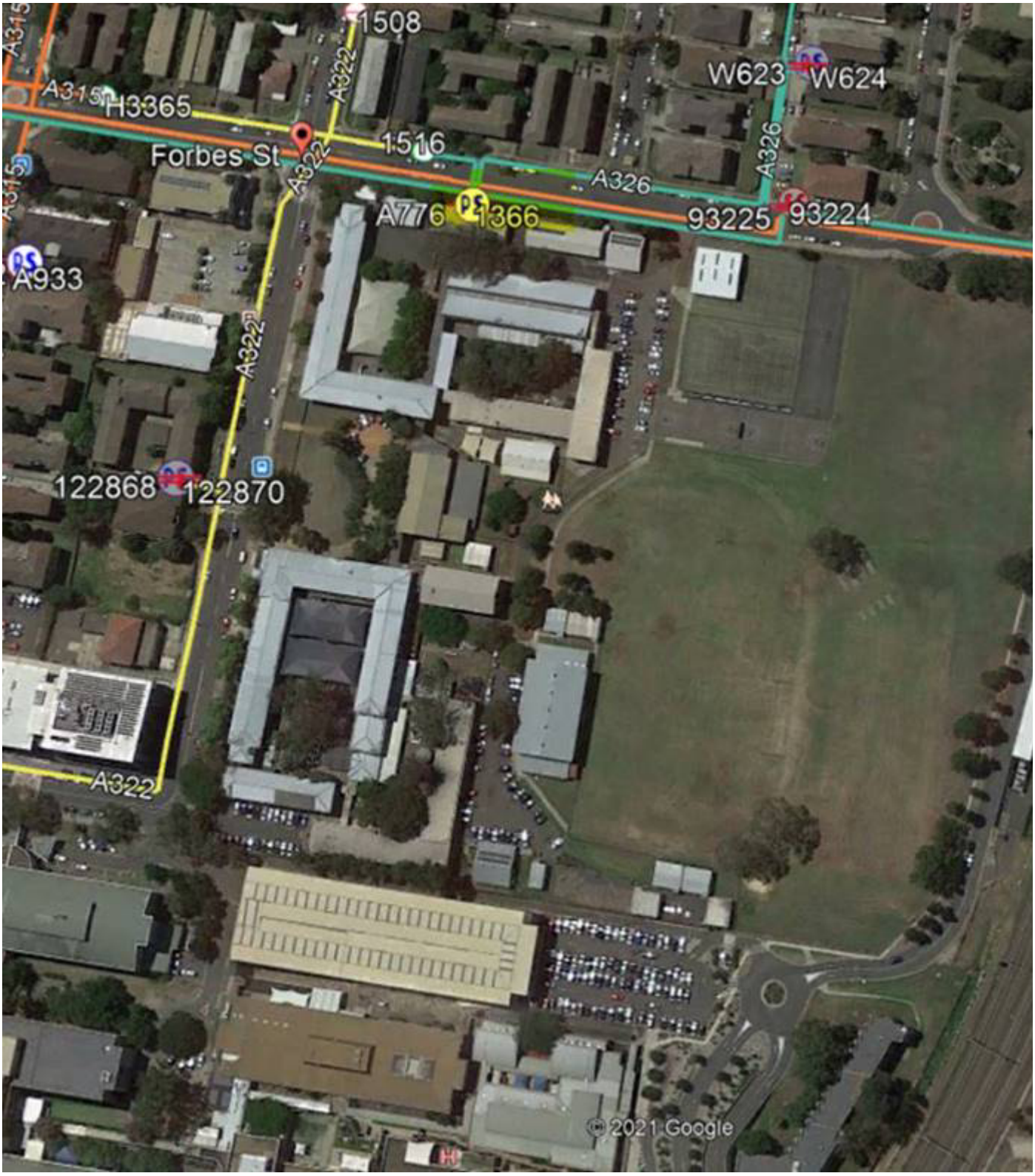
SP 7911
SP 3757
SP 7257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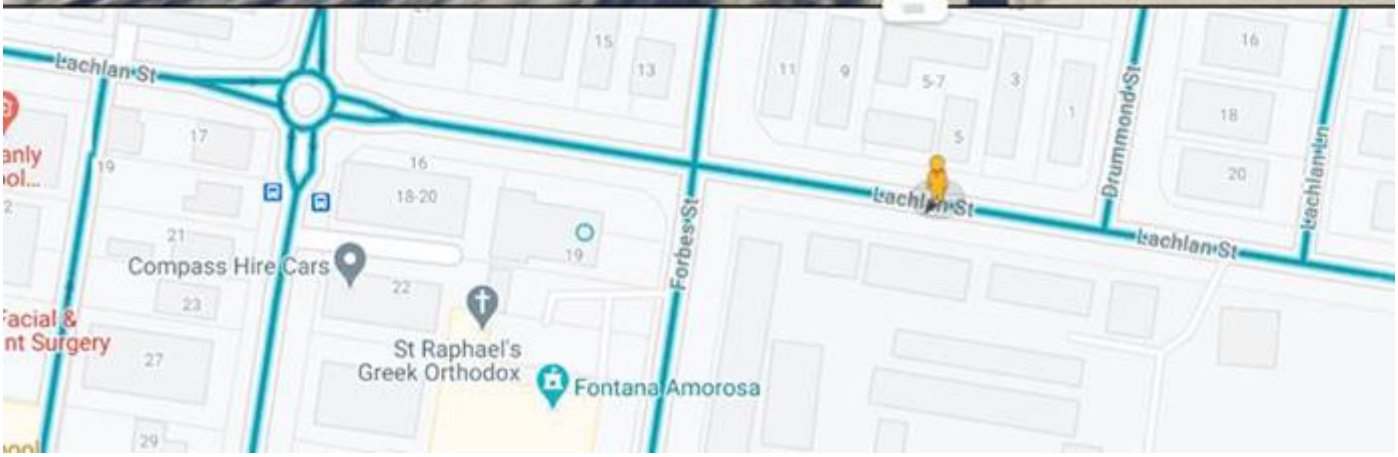

It is more practical and acceptable to install a new Pad Sub to supply the new school development.

Regards,
David

From: Ivan Mira <ivan.mira@steensenvarming.com>
Sent: Wednesday, 10 February 2021 12:48 PM
To: David Ho <David.Ho@endeavourenergy.com.au>
Subject: 207148 - Liverpool West Public School and New Liverpool Primary School Supply Query

Hi David,

Hope this email finds you well, its been some time since we have spoken!

I am looking after a project in Liverpool which falls under Endeavour. The project is for two schools, one is a new school and the other is an existing one.

The new school, the Liverpool primary schools is proposed to be building on the same site as the existing Liverpool boys and girls high school as per the image below. The existing schools are one the left, the new on the right (coloured section). My understanding is this site is one large lot and there are currently no plans to sub-divide the lot. The existing high schools are supplied off any existing 1000kVA kiosk (sub no. 1366) and is at capacity as far is as I aware. The new school will be a completely separate electrical installation as so my query is, even though this site is one single lot, will Endeavour Energy permit us to have anew kiosk dedicated to the new school. Note we are doing no work at the existing high schools on this site as part of this project.


LACHLAN STREET
FORBES STREET
40.000
STAFF PARKING
SENIOR SOCCER FIELD
LBHS
WORKSHOP
LGHS
DEMOUNTABLE CLASS ROOM
LGHS
DEMOUNTABLE CLASS ROOM

The second school is at the existing Liverpool West Primary School where we will be building a new building and refurbishing some existing buildings. Once we have a better understanding of the new maximum demand we will issue an application for connection with the updated load to get that ball rolling as well. This school is currently supplied by sub 27137 which is 500kVA which we also understand to be at capacity. ???

Regards,

Ivan Mira
Associate

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