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# West Lakes Residential & Mixed Use Code Amendment

## Retail & commercial land use investigations

Prepared for Potentia West Lakes Pty Ltd  
27 July 2022





**Deep End Services**

Deep End Services is an economic research and property consulting firm based in Melbourne. It provides a range of services to local and international retailers, property owners and developers including due diligence and market scoping studies, store benchmarking and network planning, site analysis and sales forecasting, market assessments for a variety of land uses, and highest and best use studies.

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This report should be read in its entirety, as reference to part only may be misleading.

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# 1

## Background

A Code Amendment Process has been initiated for approximately 19.8 hectares of land located at Lot 100 and Lot 101 Frederick Road, West Lakes (the Affected Area).

The Affected Area (refer Figure 1) is zoned Infrastructure. It had been used as the 'Port Adelaide Wastewater Treatment Plant' from the mid 1930's until it was decommissioned in 2004. The decommissioned infrastructure on Lot 100 is now surplus to SA Water's requirements. SA Water operate a re-lift pumping station on Lot 101 (north west corner of Frederick Road and Lochside Road), adjacent to the southern boundary of Lot 100. This existing pumping station will be retained but forms part of the Affected Area.

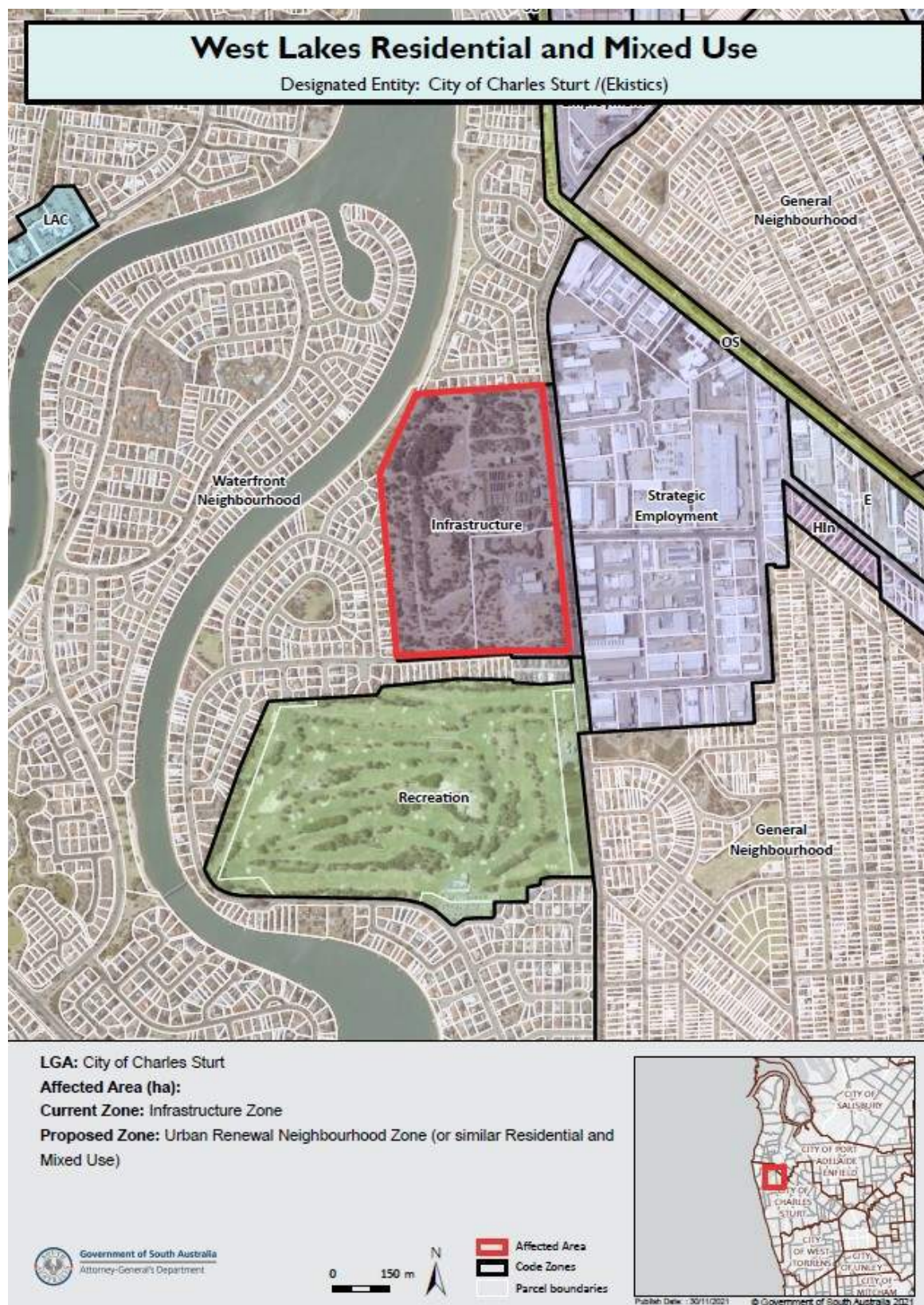
Part of Lot 101, a buffer area extending approximately 50 metres within the boundary of the allotment, is not used for Infrastructure purposes. This buffer will be incorporated into the Concept Plan for the Affected Area to provide a vegetated buffer to potential residential land use on Lot 100. The balance of Lot 101 will remain within the Infrastructure Zone.

The Code Amendment has been initiated by Charles Sturt Council and will be funded by Potentia West Lakes Pty Ltd (Potentia). The process will investigate a rezoning of the Affected Area from its current Infrastructure Zone to the 'Urban Renewal Neighbourhood Zone' (or similar neighbourhood-type zone(s)) to facilitate mixed use development in the form of residential uses and commercial opportunities.

Most Neighbourhood-type zones under consideration allow up to 1,000 sqm of 'shop' use and a range of commercial and community uses including offices, consulting room and pre-school.



Figure 1— Affected Area



Source: Government of South Australia, Attorney General's Department

The Proposal to Initiate the West Lakes Residential and Mixed Use Code Amendment, approved by the Minister for Planning and Local Government, sets out a range of further investigations including a ‘Retail analysis assessment’ which is to *‘Identify and provide an assessment of retail floor area and catchments within the locality and implications of the proposed Code Amendment in terms of suitable retail floor area’*.

In discussions with Ekistics Planning and Design, the scope was widened to include medical, childcare and related neighbourhood-level commercial facilities.

This report provides an assessment of the supportable retail, commercial and community-based land uses that could be planned for and developed on the Affected Area having regard to the demands from new on-site and other local area residents and the distribution of competing facilities in the wider area.

# 2

## Local context & demand drivers

### 2.1 Local setting

The Affected Area is generally rectangular in shape with a frontage of 565 metres to Frederick Road or 370 metres excluding the retained SA Water pumping station.

It has residential interfaces to the north, west and south with established brick and tile homes on standard residential blocks of 650-850 sqm built in the 1970's and 80's and in the last 10 years, evidence of infill development with smaller homes and townhouses through the re-subdivision of original blocks.

The Affected Area has a 188 metre frontage to Mariners Reserve with an aspect across the lake to Delfin Island.

East of Frederick Road is the Royal Park Industrial Precinct, zoned Strategic Employment and identified as a 'Prime Industrial Area' in the City of Charles Sturt *Employment Land Review (July 2019)*. The 43 hectares of industrial land use is the fourth largest in the Council area and identified for retention given its high occupancy and location attributes.

Other important uses close to the Affected Area are:

- West Lakes Golf Club, 50 metres south.
- Retailing clustered in small nodes on Tapleys Hill Road including a Drakes supermarket in Royal Park and a new centre under construction on the Hendon side.
- The small Woodlake local centre on Frederick Road, 1.2 km south.
- The regional shopping centre of Westfield West Lakes and surrounding commercial and leisure uses, 2.4 km by road south-west.
- The master planned mixed-use West development located in an Urban Neighbourhood Zone around the former Football Park precinct is progressing



towards an expected full development of 1,600 homes. The first stages of a High Street precinct have been completed with a Carl's Jr burger restaurant, Mosaic Hotel and aged care complex with commercial and retail space. A new library, community hub and medical centre has opened in April 2022. The Master Plan shows other future elements including a child care centre.

- A freestanding ALDI store on Frederick Road, 1.7km south.

Frederick Road is a State Maintained Road and important north-south thoroughfare east of the lake system, between Grange Road in the south and Old Port Road in the north. Where it passes the Affected Land, it carries approximately 14,800 vehicles per day<sup>1</sup>.

The Affected Land has public transport access with a bus stop for the 371 and 372 loop services to the West Lakes interchange just south of the site and the 118 service to the CBD on Old Port Road, a short distance north. Frederick Road has dedicated bicycle lanes with connections to wider networks.

## 2.2 Concept Plan assumptions

The Code Amendment will support a range of housing styles from low rise (1-2 storey) dwellings and townhouses to medium rise (3-6 storey) units and apartments.

The proposed Concept Plan is attached as Figure 2.

For the purposes of this report, we are instructed to assume a mix of Torrens Titled, community housing and apartments with a total yield of approximately **560** dwellings comprising approximately:

- 360 townhouses; and
- 200 apartments.

At 2.3 persons per dwelling, the Affected Land could accommodate approximately **1,290** people.

The Concept Plan shows the Frederick Road frontage (excluding the SDA Water buffer) as a Mixed Use Transitional Subzone.

<sup>1</sup> <https://location.sa.gov.au/viewer/?map=hybrid&uids=138>

Figure 2— Concept Plan



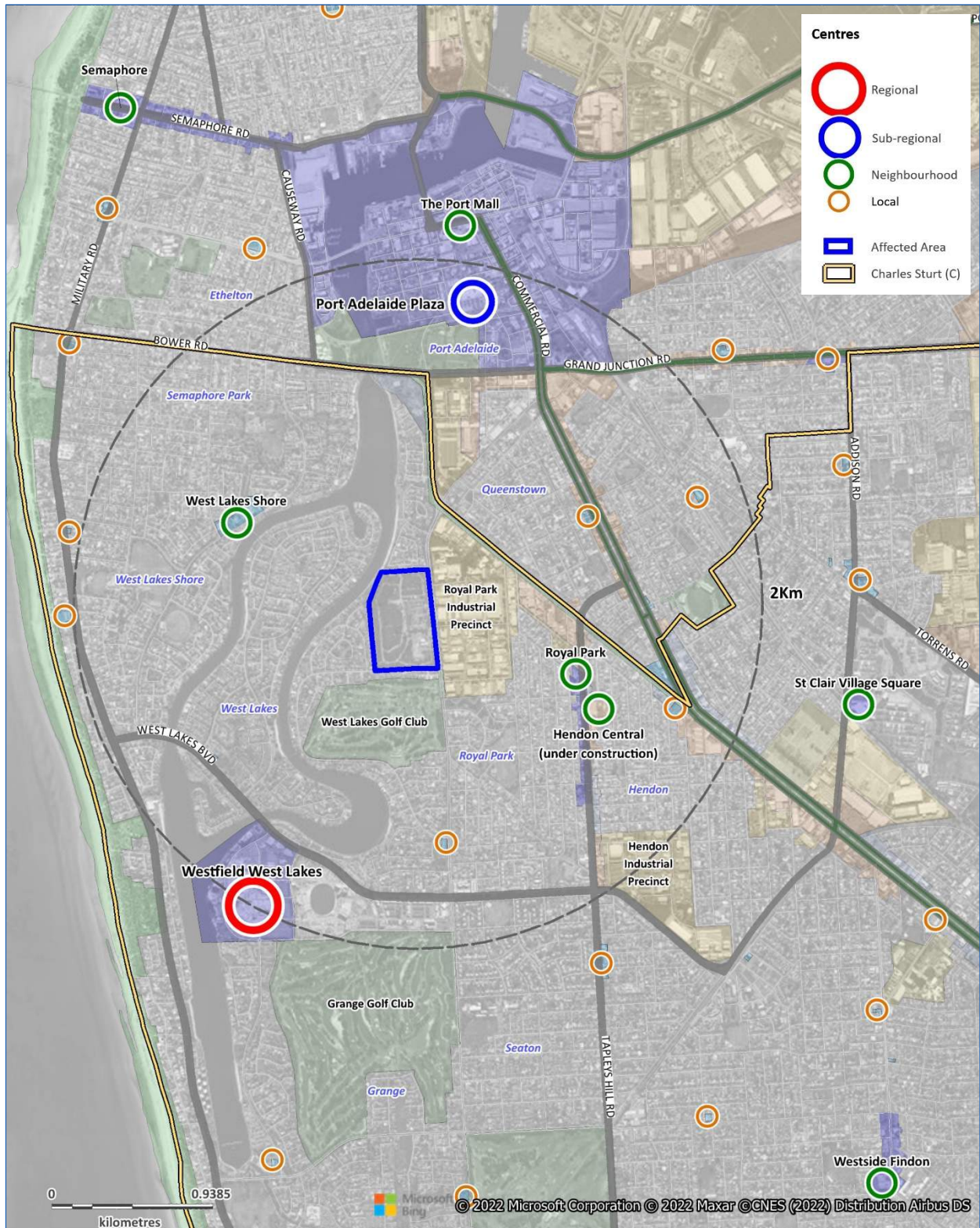


Figure 3— Local context





Figure 4— Regional context





### 2.3 Local catchment

For the purpose of population profiling, a local catchment area within a relatively close walk or drive-time of the Affected Area is defined (refer Figure 5). The catchment extends approximately 1.4 km north to Bower Road and 1.6km south to West Lakes Boulevard. The east-west depth is limited by West Lakes with no crossing points and by retail and other uses to the east on Tapleys Hill Road.

A comfortable walking distance to obtain goods and services is often considered to be 400-500 metres. A 550m radius from the mid-point of the Frederick Road frontage covers all the Affected Area, some adjoining streets and most of the Royal Park Industrial Precinct.

From other parts of the local catchment, the site is still walkable or can be reached in a short 3-4 minute drive.

Figure 5— Local catchment area

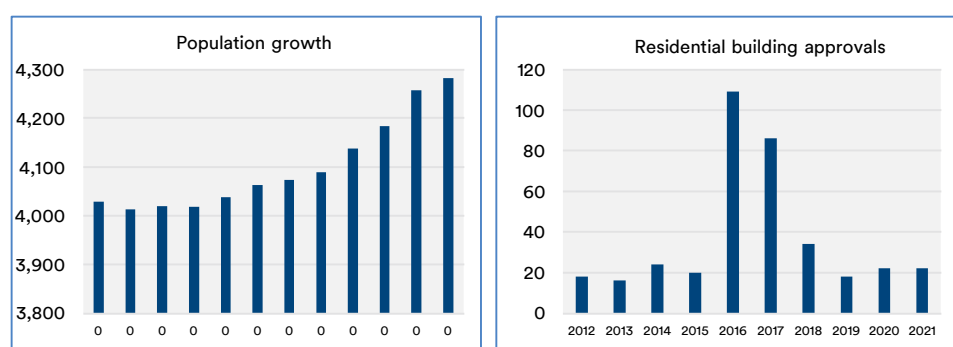


### 2.3.1 Population growth

In June 2021, the local catchment had an ABS-estimated population of **4,280**. The area has grown steadily in the last 5-7 years from about 4,070 in 2016 (refer Figure 6). The steady growth has come through a low underlying level of new homes replacing old homes (two duplexes replacing one house) and several large infill / townhouse developments in 2016 and 2017 (refer Figure 6) which saw higher rates of growth in the last 4 years.

**Figure 6— West Lakes local catchment population & dwelling approvals**

Source: ABS



The effect of the Code Amendment and development of approximately 560 dwellings would be:

- An increase in the dwelling stock in the catchment from an estimated 1,945 dwellings in 2021 to 2,505 (net of any other additions) or an increase of +29%.
- An increase in the resident population of approximately 1,290. At full development and occupancy of the Affected Area by 2031, the local catchment will be approximately 5,970 people (refer Table 1).

**Table 1— Local catchment population with Affected Area**

Source: ABS; Deep End Services

	2011	2016	2021	2026	2031
Local catchment	4,013	4,073	4,282	4,482	4,682
Affected Area <sup>1</sup>	-	-	-	250	1,290
<b>Total</b>	<b>4,013</b>	<b>4,073</b>	<b>4,282</b>	<b>4,732</b>	<b>5,972</b>

<sup>1</sup> Assume 560 dwellings @ 2.3 persons / dwg

### 2.3.2 Demographic and housing profile

The demographic and housing characteristics of the local catchment at the 2016 Census are presented in Table 2 compared to averages for the City of Charles Sturt and Greater Adelaide.

The area is characterised by:

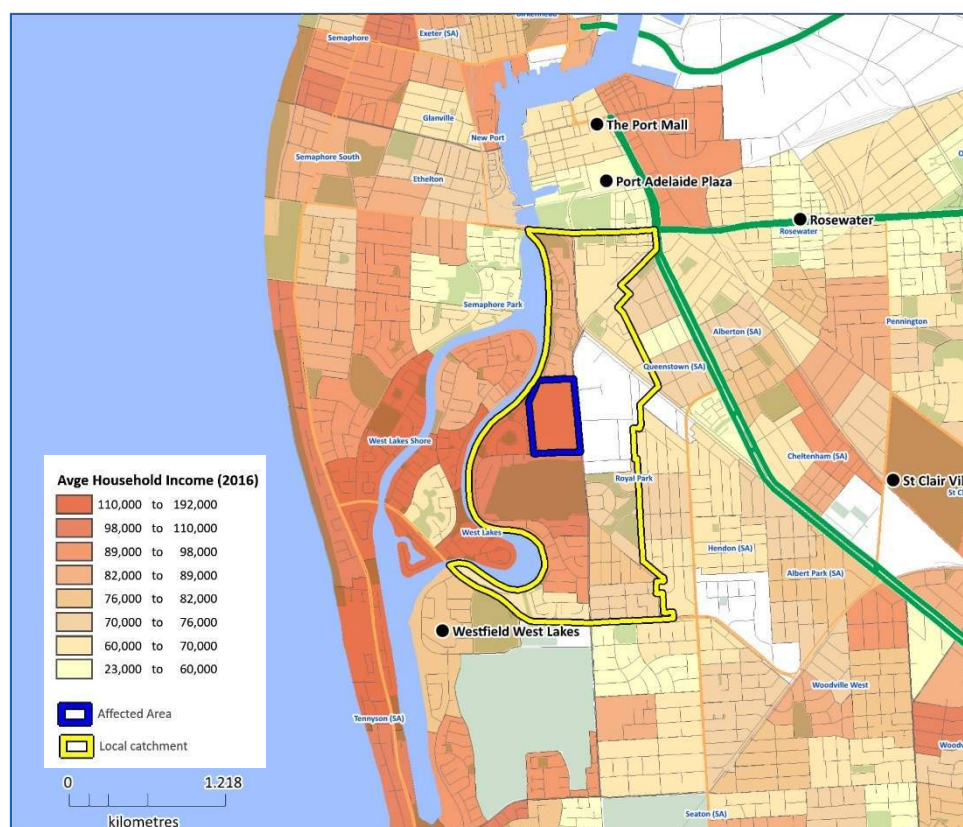
- A high proportion of older 'singles' and 'couples without children' which is reflected in the older age profile (23% aged 65+ years).
- Couples without children (30%) being the largest family type.
- A small average household size of just 2.28 persons.



- Smaller, ageing households are attracted to the smaller, lower maintenance dwelling stock where 33% are townhouses or semi-detached dwellings.
- A slightly higher proportion of Australian-born residents with no significant groups of overseas-born residents.
- Many families are long established, evident by the high proportion (68%) living in the same dwelling as 5 years earlier and the high proportion (40%) who fully own their home.
- Wide variations in income across the local catchment (refer Figure 7). Affluent families west of Frederick Road in the original Delfin subdivisions have income levels up to 33% above the Adelaide average contrasting with lower levels in Royal Park (-15% below average) and the small areas of Queenstown and Port Adelaide to the north (-23% below). On average, household income levels at the 2016 Census across the area were 5% below the Adelaide average.

**Figure 7— Average household income (2016)**

Source: ABS



The demographic profile suggests that the affluent, older population of the area – many already living in townhouses – would be well suited to a future dwelling mix on the Affected Land with a high proportion of townhouses and apartments. This contemporary style suited to smaller families has emerged in the West development at West Lakes.

**Table 2—  
Population and  
housing  
characteristics**

Source: ABS

Demographic characteristic (2016 Census)	Local catchment	Charles Sturt	Adelaide
<u>Persons and dwellings</u>			
Usual resident population	3,960	111,672	1,295,714
Total private dwellings	1,854	51,058	562,089
- % unoccupied	7%	10%	8%
Average household size	2.28	2.37	2.46
At same address:			
- 1 year ago	88%	86%	85%
- 5 years ago	68%	62%	61%
<u>Economic indicators</u>			
Workforce participation	58%	59%	59%
Unemployment rate	6.9%	7.2%	7.7%
White collar workers	46%	50%	49%
Bachelor degree or higher	15%	20%	21%
Socio Economic Index for Areas	964	980	983
<u>Age group</u>			
0-9	10%	11%	12%
10-19	10%	11%	12%
20-34	18%	21%	21%
35-49	18%	20%	20%
50-64	22%	19%	19%
65+	23%	19%	17%
Total	100%	100%	100%
Average age	44.1	41.3	39.8
<u>Annual household income</u>			
Average household income	\$79,808	\$82,367	\$83,748
Variation from Adelaide average	-5%	-2%	-
Average household loan repayment	\$22,208	\$22,214	\$20,580
Average household rent payment	\$13,988	\$14,799	\$14,979
% of household income	22%	25%	25%
<u>Country of birth</u>			
Australia	75%	72%	72%
England	5%	4%	7%
Italy	2%	3%	1%
India	1%	3%	2%
Vietnam	1%	2%	1%
Greece	1%	2%	1%
Other	15%	14%	16%
<u>Occupied private dwelling tenure</u>			
Fully owned	40%	35%	32%
Being purchased	32%	32%	38%
Rented	28%	34%	30%
<u>Dwelling type</u>			
Separate house	64%	63%	75%
Townhouse/semi-detached	33%	27%	17%
Apartment	2%	10%	8%
<u>Household composition</u>			
Couples with children	25%	28%	30%
Couples without children	30%	26%	26%
One parent family	12%	11%	12%
Lone person	31%	31%	28%
Group	3%	4%	4%

## 2.4 Workforce

Figure 8 shows the distribution and size of the workforce in ABS Journey to Work (JTW) zones from the 2016 Census. A high local workforce is important as it can generate demands for local retailing and services such as lunch shops and cafes, pharmacies and medical / personal services.

The JTW Zone bounded by Frederick Road, Port Road, Tapleys Hill Road and West Lakes Boulevard had a significant workforce of **1,311** people in 2016. The bulk of the workforce is based in the Royal Park industrial area adjacent to the Affected Area, east of Frederick Road. By occupation, 45% of the workforce was employed in traditional 'blue collar' positions such as technical and trades, machinery operators and drivers and labourers.

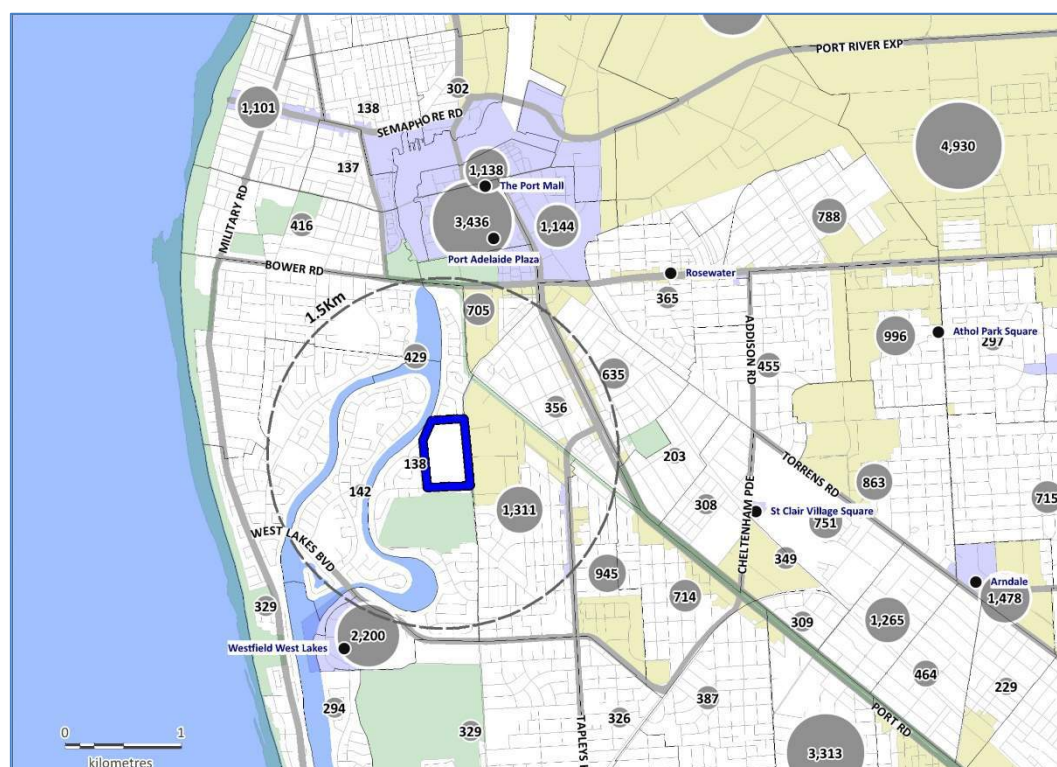
The four JTW zones within 1.5 km of the Affected Area east of West Lakes had a combined workforce of **2,510** people in 2016.

In addition to the local workforce, significant employment clusters within 2.5 km of the Affected Area are in and around the Port Adelaide centre (5,720 in 2016) and West Lakes Regional Centre (2,200). Employment levels in West Lakes will be growing with the completion of commercial and community uses in the West precinct.

A convenient, small range of commercial uses on the Frederick Road frontage of the Affected Area can support demands from the local and wider workforce and leverage the commuter / commercial traffic through the area.

**Figure 8—  
Workforce by local  
area - 2016**

Source: ABS, Deep End Services



## 2.5 Key drivers

In summary, the key drivers for a small retail and commercial node on the Frederick Road frontage of the Affected Area are:

- Good visibility and access to 14,800 vehicles per day.
- Favourable demographics, with higher income levels west of Frederick Road and from new residents moving into new dwellings.
- A significant new population on the site increasing the local catchment population by almost one-third.
- A relatively large workforce within a short drive-time and high levels of passing traffic.

# 3

## Land use assessment

### 3.1 Retailing

The Affected Area has some attributes which support a limited provision of retail uses on the site however the quantum will be influenced by the narrow orientation of the catchment and the size and quality of retailing elsewhere.

#### 3.1.1 Catchment

The local catchment for a local retail centre on the Affected Area, as previously described, is a narrow linear corridor along Frederick Road drawing on adjacent residential areas of West Lakes, Royal Park and Queenstown.

The catchment area reflects some physical and economic constraints including:

- The West Lakes water body with no close east-west road connections limiting any potential draw to the west.
- The Royal Park industrial area. While generating demands from its local workforce, the area is an impediment to local access.
- West Lakes Golf Club and the industrial area within 1km of the site limiting the local population base.
- Competition from larger centres at West Lakes and Port Adelaide and retailing on Tapleys Hill Road.

The local catchment has an estimated 2021 population of **4,280**. With low levels of organic growth and the full development of the Affected Area assumed by 2031, the local catchment will be close to **6,000** people.

Other demand considerations will be the adjoining employment area and passing / commuter traffic.

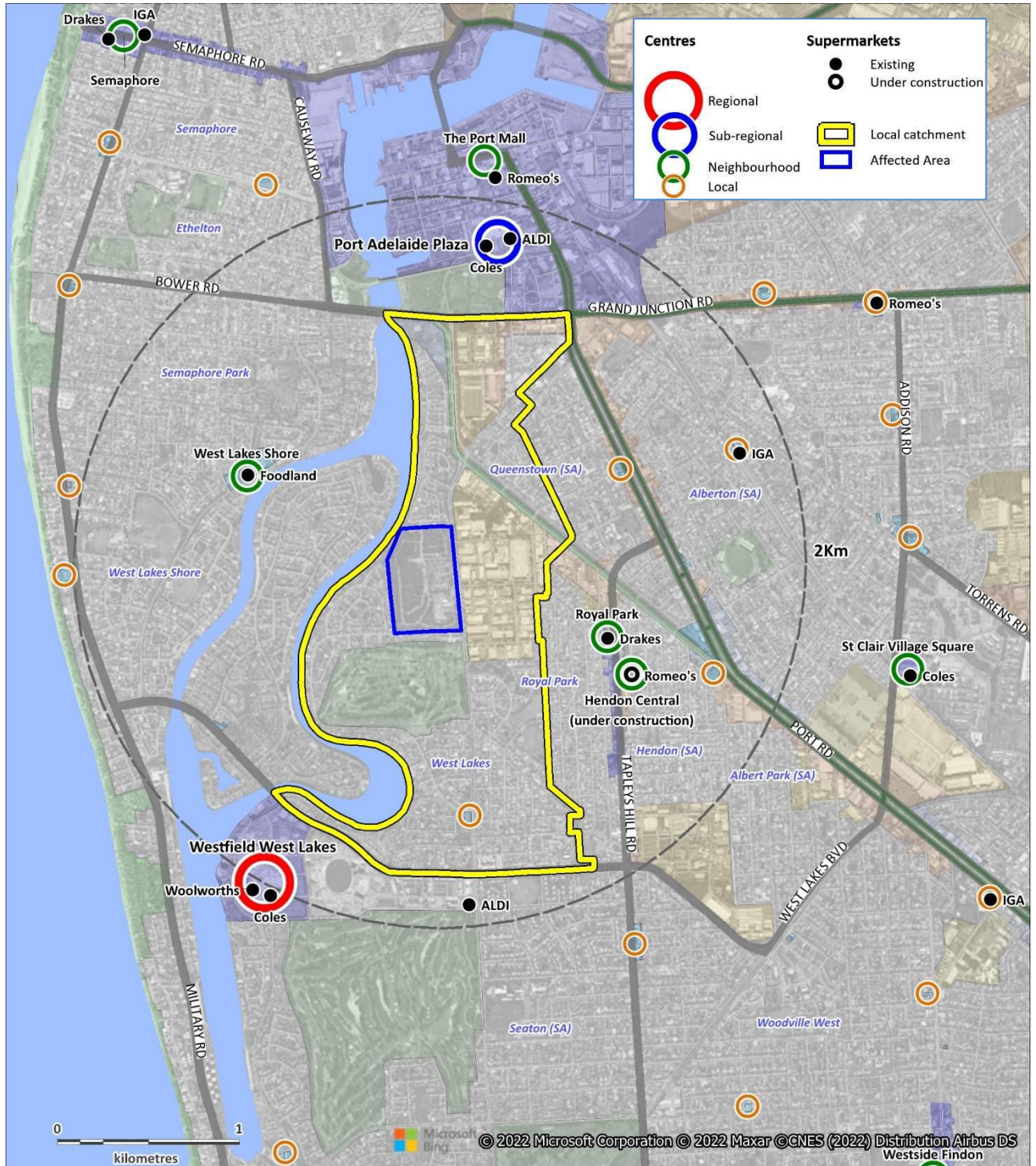
### 3.1.2 Competition

The wider area is well served with major supermarkets and other retailing in a range of centres across all levels of the hierarchy. The influential centres are:

- **Port Adelaide.** A Regional Centre under the 30-Year Plan for Greater Adelaide, the Port Adelaide commercial area has approximately 50,000 sqm of retail floorspace distributed between the recently redeveloped Port Adelaide Plaza (Kmart, Coles, ALDI), Port Mall (Romeo's) and other street-based areas. The north end of the local catchment is likely to be strongly aligned to Port Adelaide falling within 1.5 km of the supermarkets and shops in Port Adelaide Plaza with a direct road connection.
- **Westfield West Lakes** and the emerging **West precinct.** The Westfield centre is one of Adelaide's premier regional shopping centres with Coles, Woolworths, David Jones, Kmart, Target and 180 shops across 63,000 sqm GLA (retail). It would exert a stronger influence on the southern area of the local catchment than Port Adelaide. The West precinct is developing with local retailing, cafes, restaurants and community and health facilities serving the emerging apartment market and the wider West Lakes catchment.
- **Royal Park / Hendon.** The Suburban Activity Centre Zone and Suburban Business Zone apply in sections of a 1km strip fronting Tapleys Hill Road. Retailing is mainly on the western (Royal Park) side but is scattered in small nodes characterised by old groups of shops. At the north end is a freestanding Drakes supermarket (1,250 sqm) which has conditional planning approval for alterations and additional parking. A new centre (Hendon Central) is under construction on the east side of Tapleys Hill Road, 100 metres south of Drakes. The centre will have a Romeo's supermarket (2,050 sqm), 3 shops (819sqm), bulky goods (700 sqm), KFC and Hungry Jacks restaurants and 187 car bays. The improved retail offering on Tapleys Hill Road will appeal to local catchment residents seeking an option away from the busier centres at West Lakes and Port Adelaide however the intervening Royal Park industrial area and its self-contained road network is a barrier to local west-east traffic movements.
- **ALDI West Lakes.** A freestanding ALDI store (1,600 sqm) is located on the corner of Frederick Road and Brebner Drive, 1.5km south of the Affected Area.
- **Woodlake Local Centre.** A group of 6 shops (approx. 650 sqm) on a 2,100 sqm site is located on the west side of Frederick Road, 1km south of the southern end of the Affected Area. The complex is a good model for a small convenience centre with main road and collector road frontages. Tenants include pizza, medical centre (1 GP), pharmacy, mini-mart, take-away food and a café.



Figure 9— Centres &amp; supermarkets



Source: Deep End Services

### 3.1.3 Supply – demand assessment

The area is well supplied with supermarkets of all banner groups. This will only increase with the proposed Romeo's on Tapleys Hill Road. The catchment is not large enough to support a supermarket between existing centres and operators and we expect there will be little or no interest in the site.

There are however good prospects for a small retail node in conjunction with other commercial uses. The relevant considerations for the provision of local shops and services are:

- The suite of Neighbourhood-type zones within the Planning & Design Code generally allows up to 1,000 sqm of 'shop' floorspace.
- There is no local shopping at the north end of Frederick Road. Road links to Tapleys Hill Road are poor while the existing local centre to the south would largely service the southern end of the catchment and passing traffic with its limited range of shops.
- A retail node could have main road access / egress with a secondary entry from a collector road servicing the new housing.
- Up to 1,290 new residents on the Affected Area itself will generate demands for local services which could be provided within an attractive local node designed into the development.
- The industrial area will be an important expenditure source during weekdays.
- The range of tenants that can viably trade in local centres is limited to a range of fresh / convenience store tenants, takeaway food, cafes & restaurants, personal services and some office tenants.
- The COVID-19 period is creating a revival in local shopping as consumers seek safe and simplified shopping experiences close to home.

A simple supply and demand assessment of the local catchment area (refer Table 3) is a guide to the supportable level of local centre floorspace. Using the local catchment area in Figure 9 and the population capacity estimates (Table 1) the key calculations are:

- The 2021 population of 4,282 will increase by underlying growth and development of the Affected Area to almost 6,000 people by 2031.
- Previous analysis by Deep End Services of the *SA Retail Database* found that Adelaide's average rate of retail floorspace provision in 2007 – being the last comprehensive survey of Adelaide's retail floorspace - was 2.12 sqm per capita across all centre and retail floorspace categories. It is conservatively estimated to be 2.20 sqm per capita in 2021. The supply of retail floorspace in Local Centres was calculated at 10% in 2007 or 0.22 sqm per capita in 2021.
- Applying 0.22 sqm to the 2031 population (5,972 persons) generates a theoretical demand for 1,314 sqm of local centre floorspace in 2031.
- Excluding 100% of the existing supply level at Woodlake (650 sqm) the residual opportunity on resident population demand is 664 sqm – a similar area to the Woodlake Centre.

- The Royal Park industrial area with a workforce of 1,300 opposite the site and entering and leaving the precinct via Frederick Road justifies a further uplift to the floorspace generated by resident demands.
- The effect of the workforce should be an uplift of at least 25% increasing the indicative retail floorspace to 830 sqm.

The analysis shows that a Local Centre of up to 1,000 sqm for the Affected Area is supportable by the projected population and local workforce in 2031.

**Table 3— Local Centre floorspace supply & demand**

Source: Deep End Services; SA Retail Database

Variable	Unit	
<b>Catchment population</b>		
2021	Persons	4,282
2031 inc. Affected Area	Persons	5,972
<b>Retail floorspace provision</b>		
All retail (Adelaide)	sqm per capita	2.20
Local centres	(@10% total)	0.22
<b>Local Centre demand (2031)</b>	sqm (pop.x0.22)	<b>1,314</b>
<b>Local Centre supply</b>		
Woodlake	sqm	650
<b>Opportunity on resident demand</b>	sqm (demand - supply)	<b>664</b>
<b>Plus employment area uplift</b>	(@25%)	<b>830</b>

On balance, a shop area of 800-1,000 sqm should be planned for the site. An aspirational but achievable tenant profile would include:

- Convenience store – 200 sqm
- 1 x liquor – 120 sqm
- Pharmacy – 200 sqm (ideally located close to a medical centre on-site)
- 2x Café / lunch bar / bakery – 200 sqm
- 2 x basic or franchised lunch /evening take away food operators – e.g., Subway, pizza, chicken, fish & chips – 200 sqm
- 1 x hairdresser – 70 sqm

### 3.2 Fuel station

Fuel outlets by brand are mapped for the region in Figure 10.

Subject to site availability and design objectives for the Mixed Use land, the site could be of interest to a fuel operator based on:

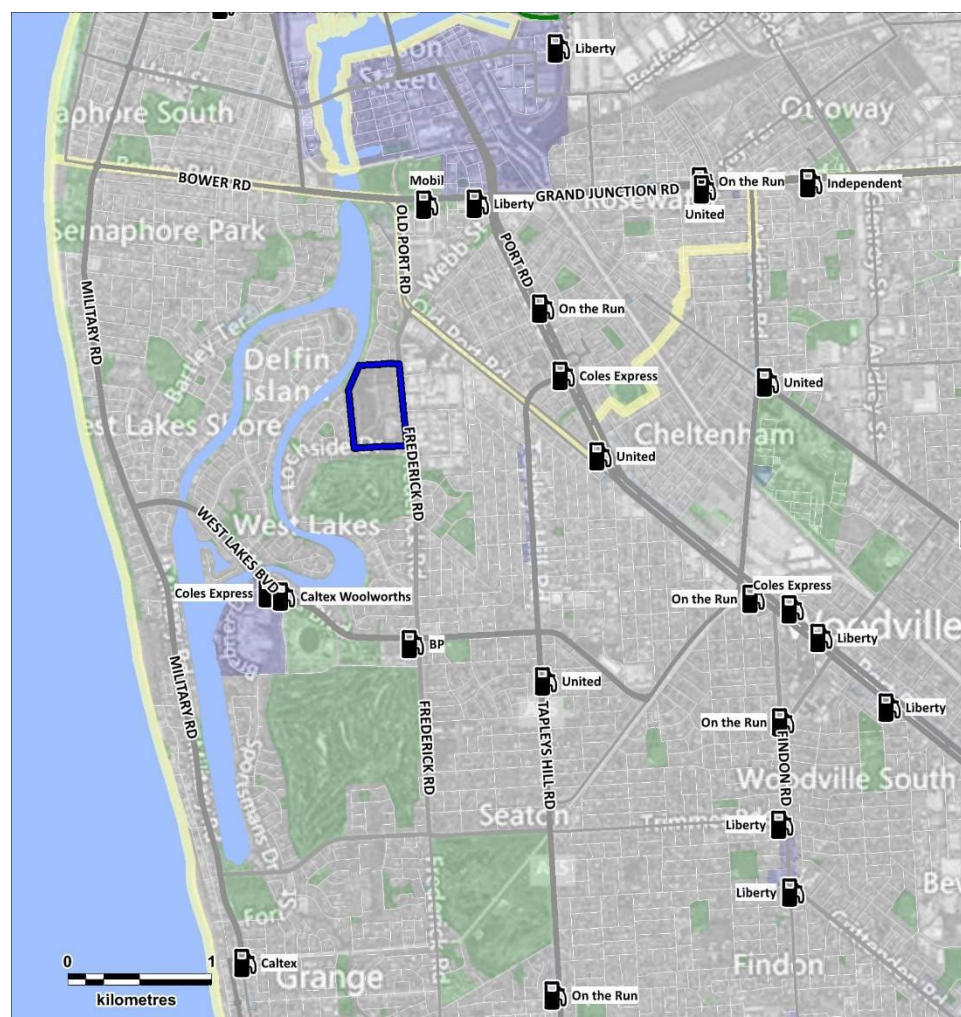
- Approximately 14,800 vpd on Frederick Road with the potential for north and south bound access.
- Only one fuel operator on the 6km section of Old Port Road and Frederick Road between Grand Junction Road and Grange Road. This is a lower density of outlets compared to other north-south arterials such as Tapleys Hill Road and Findon Road, allowing for differences in traffic volumes.
- Difficult access to the BP on Frederick Road / West Lakes Boulevard for south-bound traffic.



A fuel outlet is compatible with a local centre and may include on-site food premises and other franchised outlets. The extent of these offerings could reduce the local centre floorspace however this would be a consideration if, or when, fuel is included in the land use mix and commercial interest is sought.

**Figure 10—Fuel stations**

Source: Deep End Services



### 3.3 Franchised food

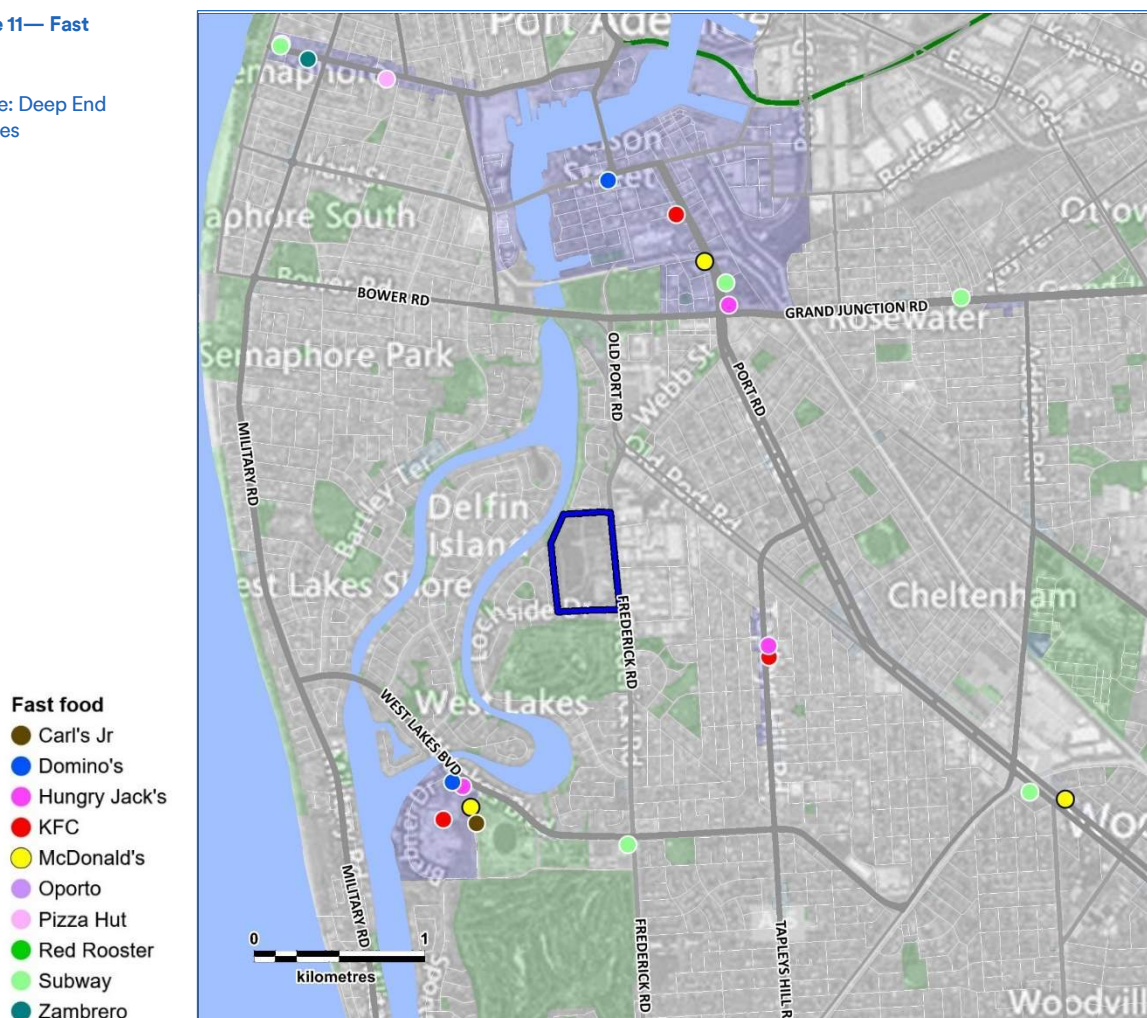
Franchised and company owned quick service restaurants or takeaway food outlets are clustered at Westfield West Lakes and Port Adelaide (refer Figure 11). KFC and Hungry Jacks will be developed at the new Hendon Shopping Centre.

The site could be attractive to operators for the same reasons as fuel plus the significant workforce in the light industrial area west of Frederick Road.

A major operator such as McDonalds, KFC or Hungry Jacks seems unlikely but new market entrants (Gusman y Gomez, Taco Bell) or small or franchises without drive-thru (Subway, Dominos, Nandos, Pizza Hut, Zambrero's) could be attracted with fuel or to a small group of in-line shops with convenient parking.

**Figure 11— Fast food**

Source: Deep End Services



### 3.4 Medical centre

The distribution of medical centres in the region with the number of attending general practitioners (GPs) is shown in Figure 12.

The nearest medical centres are:

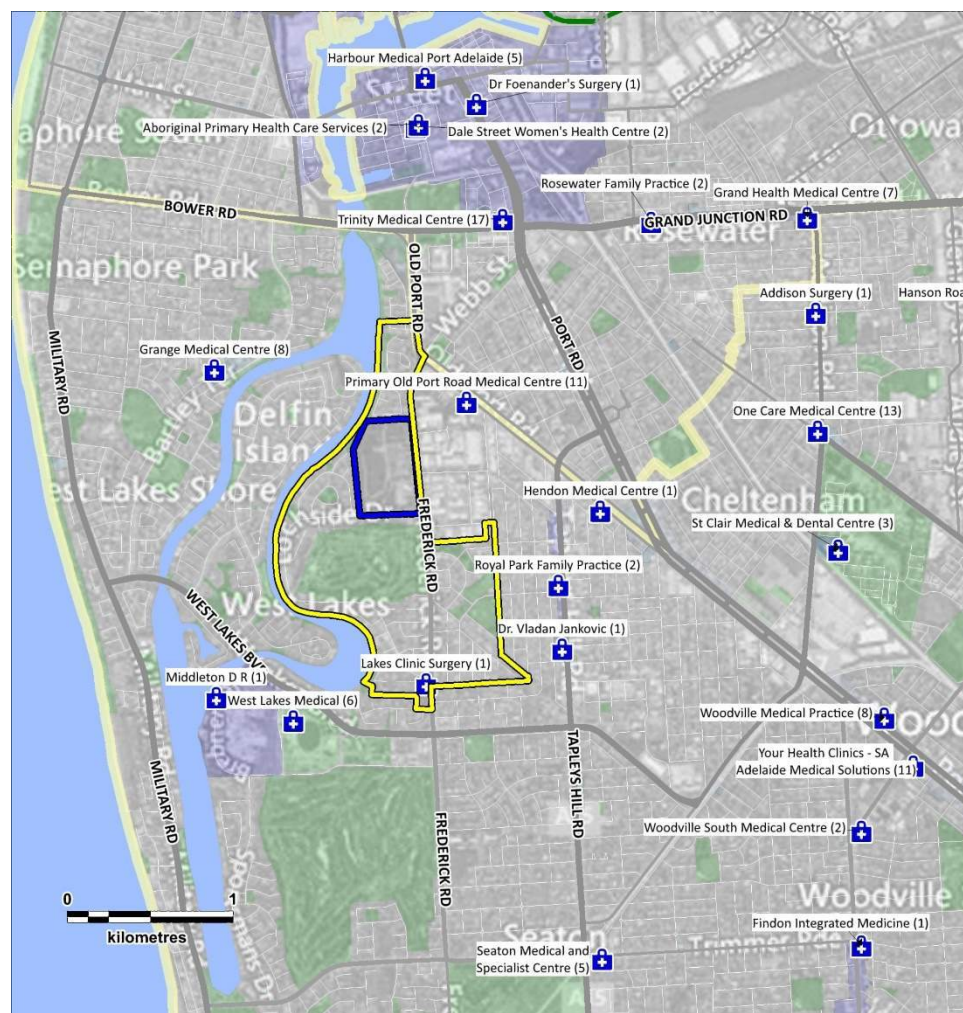
- A large medical centre on Port Road, just north of the Affected Area with 11 GPs, a pharmacy, dentists, physiotherapy and skin care clinic. This centre would be serving a broad area along Port Road including Queenstown, Alberton, Royal Park and areas of Port Adelaide.
- A single GP practice in the Woodlake centre on Frederick Road, 1km south.
- Several small practices of 1 or 2 GPs on Tapleys Hill Road.

Having regard to the distribution of large and small medical centres in the area, a catchment for a medical centre on the mixed use portion of the Affected Area is defined in Figure 12. The catchment is slightly less than the retail catchment due to the two large medical centres on Port Road and Grand Junction Road to the north. Others in the area are relatively small.



**Figure 12— Medical Centres & GP count**

Source: Deep End Services



Patterns of medical centre visitation will vary widely across the area and catchments will be only indicative of the future source of patients to a given site.

A simple demand – supply analysis of GPs based on population levels, a benchmark provision rate and existing supply levels is presented in Table 4. The steps are:

- The catchment area has a 2021 population of 2,671 increasing to 4,217 with organic growth and the full development of the Affected Area in 2031.
- The current rate of provision of GPs in Adelaide is one full service equivalent<sup>2</sup> (FSE) GP per 917 people.
- At full development, the local catchment will generate a demand for 5 FSE GPs or 7 full and part time GPs.
- There is just one full time GP in the catchment in the Woodlake Centre to the south.
- The demand level (7) versus current supply (1) creates a potential opportunity for 6 full and part time GPs in the area.

<sup>2</sup> Full service equivalent (FSE) is a GP working 37.5 hours per week. The conversion factor for full & part time GPs to FSE is 0.68 (Source: AMA)



**Table 4— GP  
supply & demand  
analysis**

Source: AMA; Deep  
End Services

Medical centre catchment	Unit	
Population - 2031	no.	4,217
<u>GP provision benchmark</u>		
Adelaide average (pop per FSE <sup>1</sup> )	Pop per FSE GP	917
<u>GP catchment demand</u>		
FSE	no.	5
Full & part time	no.	7
<u>Existing medical centres</u>		
Full & part time GPs	no.	1
<b>Full &amp; part time opportunity</b>	<b>no.</b>	<b>6</b>

<sup>1</sup> FSE = Full service equivalent working 37.5 hours per week

While recognising the availability of GPs in other medical centres outside the catchment, the analysis shows that a locally focussed medical centre could be supported on the site, especially with the influx of new residents who alone will support two full and part time GPs.

The mixed use portion of the Affected Area could be planned with a small to mid-sized medical practice.

The medical centre could be developed with additional consulting rooms to accommodate a range of para-medical services or specialists that chose to operate as a single practitioner or service within a broad health and wellness practice. While dentists tend to operate from separate premises, compatible sessional services well-suited to a medical centre are:

- Physiotherapy
- Psychiatry
- Dietician
- Podiatry
- Audiology
- Blood collection

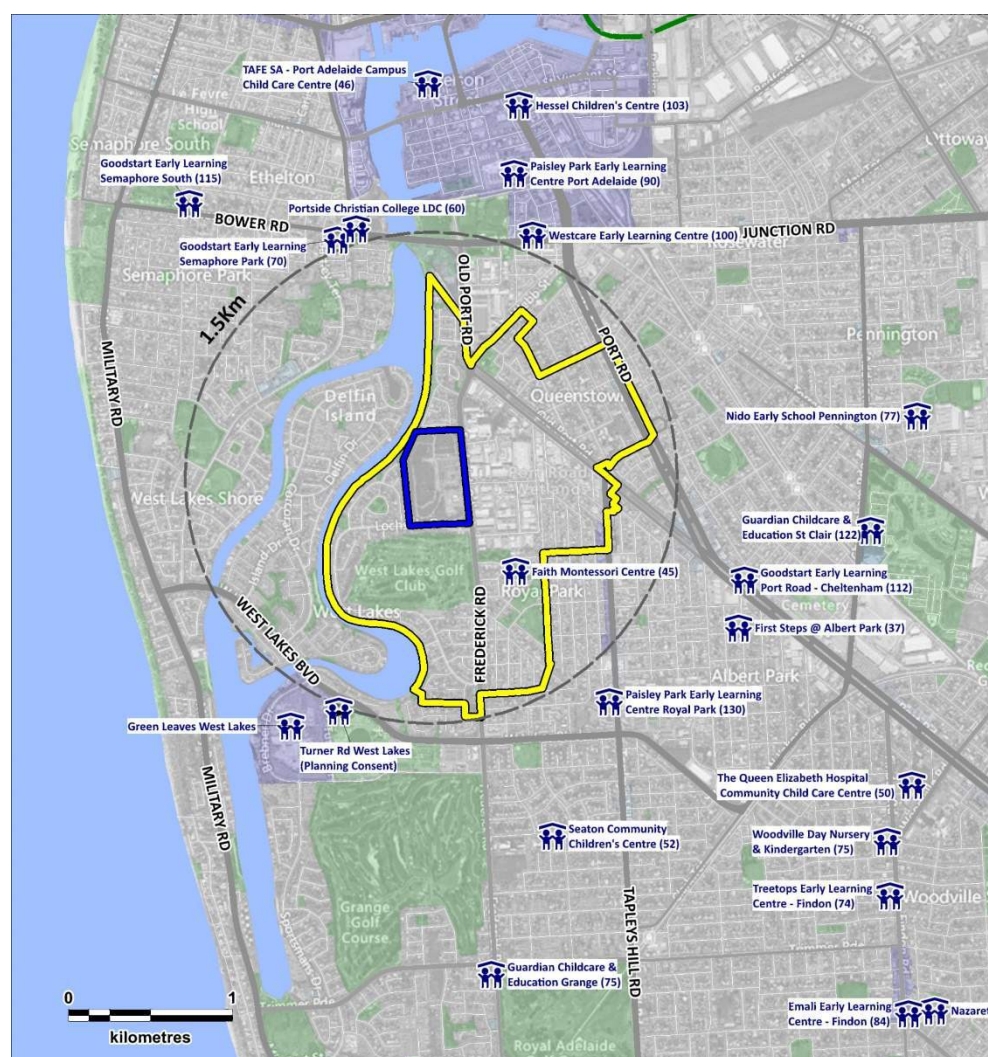
### 3.5 Child care

A mixed use precinct in the Affected Area presents an opportunity for a long day childcare centre (LDC) to service existing and new families in the area, the adjacent industrial area and other workers commuting through the area who may find the site convenient, being either close to home or work.

The distribution of existing LDCs with licensed capacities is shown in Figure 13. A catchment area for a future LDC on the site is overlaid (yellow line).

**Figure 13—Child care centres**

Source: Australian Education & Care Quality Authority; Deep End Services



The nearest LDC to the Affected Area is a small 45-place centre embedded in the Royal Park residential area. Elsewhere, the nearest centres are at least 1.5 km north on Bower Road, Port Adelaide and on Tapleys Hill Road, Royal Park.

The distribution shows there are no LDCs directly servicing the 10,000 people in West Lakes or West Lakes Shore. From these areas, families must either travel north to Semaphore or Port Adelaide or to centres in Royal Park, Grange, Seaton or Findon.

A Green Leaves Early Learning Centre has recently opened on the rooftop of Westfield West Lakes. The City of Charles Sturt has also issued planning consent for a childcare centre at Lot 6008 Turner Drive, West Lakes. These centres will address the deficiency in places in the Delfin Island and West Lakes Shore areas and the growing apartment and townhouse population in the area.

In view of the current distribution of LDCs, a LDC catchment is shown in Figure 13 which generally extends 1-1.5km from the Affected Area. While the demand-supply analysis of LDC places is based on 0-4 year old children in the catchment, a LDC facility on the site would also draw on a wider area, commuters and workers in the area.

The first assessment (Table 5) reviews the current supply of places relative to the 0-4 year old population. The results indicate:

- Greater Adelaide has 365 LDCs at an average size of 79 places per centre. The 79,500 child care places equate to one place for every **2.7** children aged 0-4 years.
- The City of Charles Sturt has 24 LDCs (February 2022) with almost 2,100 places. The place provision is lower than the Adelaide average with **3.1** children for every registered place. In other words, with more children per place Charles Sturt has a deficiency in child care places relative to Greater Adelaide.
- The defined catchment area has an estimated 2021 population of 4,300 including 215 children aged 0-4 years old. The Faith Montessori LDC in Royal Park with 45 places is an effective provision of 4.8 children per place. This is a higher rate than the benchmarks indicating that children are placed at other centres outside the catchment. It does however indicate a potential opportunity for a LDC on the Affected Area.

**Table 5—LDC place provision rates**

Source: Australian Education & Care Quality Authority; ABS; Deep End Services

Area	Child care centres			0-4 year olds (2021 est.)		
	No. centres	No. places	Avg per centre	No.	% of total pop.	0-4 yr olds per place
Catchment	1	45	45	215	5.0%	4.8
City of Charles Sturt	24	2,081	87	6,411	5.3%	3.1
Adelaide	365	28,920	79	79,524	5.8%	2.7

A conservative analysis of the LDC place demand for the site is calculated in Table 6. The assumptions and calculations are:

- The 2021 population is projected to increase from 4,300 to approximately 5,990 by 2031 allowing for a continuation of low underlying growth plus the 1,290 residents of the Affected Area.
- Assuming a constant proportion of 0-4 year old's at 5%, the population aged 0-4 will increase from 215 in 2021 to 299 by 2031 – a 40% increase.
- Adopting the 2022 Adelaide-wide provision rate of 2.7 children per LDC place, the catchment can effectively support **78** places in 2021 increasing to **109** in 2031.



- Based on the current supply of 45 places there is an existing deficiency or net outflow of 33 places sourced at centres outside the catchment.
- With no change to existing supply levels by 2031, the deficiency will rise to **64** places.

**Table 6—LDC supply & demand**

Source: Deep End Services

	Unit	2021	2031
Catchment population	Persons	4,300	5,990
Population aged 0-4 years	%	5.0%	5.0%
	Children	215	299
LDC demand at Adelaide ave <sup>1</sup> .	Places	78	109
Existing catchment LDC supply	Places	45	45
<b>Deficiency / Opportunity</b>	<b>Places</b>	<b>33</b>	<b>64</b>

<sup>1</sup> Adelaide average = 2.7 children (0-4 years) per LDC place.

A nominal shortage of 64 places in the catchment by 2031 would indicate an opportunity for a mid-sized LDC (up to 80 places) on the site. This is a conservative assessment as it makes no specific allowance for:

- Likely higher rates of LDC usage by 0-4 year old children over time, continuing a long term trend.
- Passing traffic / commuters along Frederick Road living outside the area who will find the site convenient on their daily / weekly travel patterns.
- The Royal Park industrial area workforce who will have a convenient option at the main entry / exit point to the estate.
- The added attraction of a modern facility compared to older LDCs in the area.

### 3.6 Gym & fitness centres

The distribution of gyms and fitness clubs and instructional fitness classes held within commercial or industrial premises is mapped in Figure 14. The personal fitness industry is diverse ranging from large purpose-built premises with 24/7 member access to small studios and instructional sessions where the facility may be open for limited hours with simple fittings and amenities.

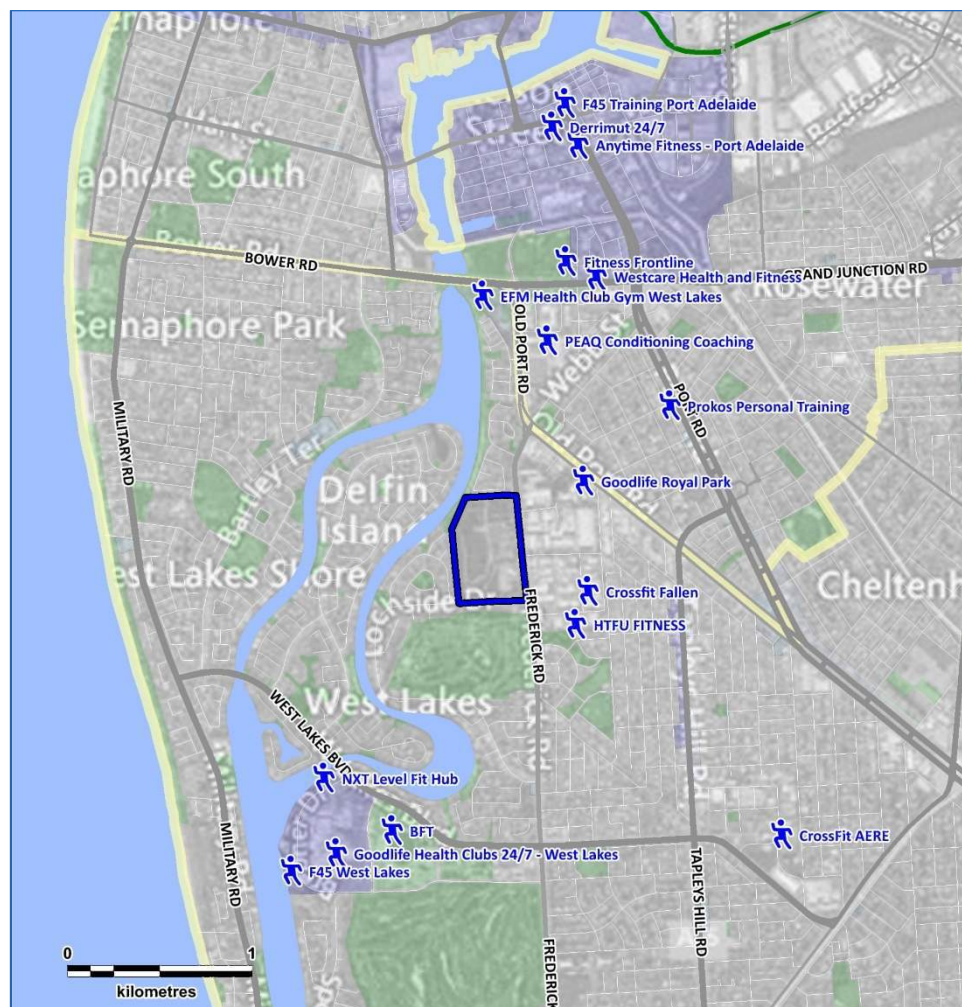
Two fitness clubs are situated in the Royal Park industrial area which appear to be instructional / group-based studios. Goodlife is a formal and casual-use member-based club on Old Port Road, located with the large medical centre.

Outside the immediate area, clusters appear in and around Westfield West Lakes and the Port Adelaide centre which seem to be serving a large vacuum in facilities through the coastal suburbs of Semaphore Park and West Lakes Shore.

With a quality residential development on the Affected Area there are good prospects to attract either a casual use or group-based fitness club that would identify with the positioning of the development.

**Figure 14—Gyms & fitness clubs**

Source: Deep End Services



### 3.7 Flexible commercial space

A well designed mixed use node with retail, medical, child care and food or fuel uses could also provide some flexible office or commercial space attractive to small professional services firms, health practitioners, service businesses, NGOs or instructional services /classes such as educational tuition, self-defence, music, fitness, yoga, Pilates or dance classes.

This space could be a mix of ground level publicly accessible commercial / showroom type space with larger floor plates than the retail node and / or upper level areas which can also provide a design element to reinforce a corner building or entry point.

Demand levels are difficult to predict however for master planning purposes up to 500 sqm of lower level space complementing the retail node and 500 sqm of upper level use would be appropriate.

# 4

## Conclusions

The West Lakes Residential and Mixed Use Code Amendment presents an opportunity to activate an underutilised site with new housing and a range of commercial uses servicing existing residents and new families.

The Affected Area and its local catchment have a range of positive attributes which support local retail and commercial uses on Frederick Road. The favourable characteristics are:

- A potentially strong local catchment along the Frederick Road axis which has a limited range of local retailing.
- An established population base of about 4,300 which could increase to almost 6,000 with underlying growth and approximately 1,290 new residents on the Affected Area by about 2030.
- A contemporary, high quality subdivision on the Affected Area with a mix of housing styles for different family groups. This will reimage the profile of the area which is characterised by a mix of 1970's and 80's dwelling stock around the lake from the original Delfin development and more recent infill development and older housing and industrial areas in Royal Park to the east.
- The development will complement the higher density projects underway in West Lakes around the former Football Park with a lower rise scheme with a small commercial component appropriately scaled to the area and passing traffic.
- A broad demographic mix of high and low income residents and old and young families. There is evidence of housing renewal and gradually higher population levels in the older areas of West lakes and Royal Park.



- Moderate traffic levels on the free flowing Frederick Road with potentially good sight lines to the Mixed Use land and safe and convenient access / egress options.
- The large employment base in the Royal Park Industrial Precinct which mostly enters and leaves the estate via Schenker Drive, Brandwood Street and Wilson Street, opposite the potential Mixed Use land. This workforce has poor connections to local retailing and should strongly support services developed on the site.

The demand analysis showed a range of uses can be supported on the site both through a current deficiency in the area and from the new demands that will flow from new housing on the Affected Area. These demands will be supplemented by the local workforce and passing traffic.

The supportable commercial land use and indicative land area requirements for the Affected Area are summarised in Table 7.

A Local Centre with up to 1,000 sqm of shop / retail uses, a gym and other flexible commercial areas (1,000 sqm) would present a low scale but valuable asset for the local area. A medical centre with potentially other allied health professionals would complement the retail, gym and commercial uses.

Existing networks and demand analysis show there could be interest in a fuel site, one or more franchised food outlets and a child care centre on the land.

All uses, if accommodated, could take up to 1.4 hectares of land although some efficiencies could be gained to reduce the land take.

**Table 7—West  
Lakes mixed use  
site  
recommendations**

Land use	Gross leasable floor area (sqm)	Estimated land area (sqm)
<u>Local centre</u>		
Shops/ retail	1,000	
Ground level commercial	500	
Upper level commercial	500	
Gym	400	
Medical centre	400	
<b>Total Local Centre</b>	<b>2,800</b>	<b>7,000</b>
<u>Pad sites</u>		
Fuel	250	2,500
Franchised food	200	2,500
Childcare centre	500	2,000
<b>Total area</b>		<b>14,000</b>

The retail floor area and other recommended uses on the Affected Area will have little or no overall effect on the large Port Adelaide and West Lakes centres or the smaller nodes on Tapleys Hill Road because:

- The convenience nature of the floorspace and expected range of shops (with no supermarket) provides a different role and function to most other centres in the wider area. The recommended retail floorspace (up to 1,000 sqm GLA) is minor in the context of the 63,000 sqm at Westfield West Lakes or 50,000 sqm in Port Adelaide.
- Retailing along Tapleys Hill Road is fragmented and of low quality. The new Hendon Central will strengthen the centre and concentrate activity to the northern end with Drakes. The new Hendon Centre has a low provision of specialty shops and, like Drakes, would be unaffected by the small allocation to Frederick Road.
- The Frederick Road mixed use area is likely to develop in later stages, after much of the new housing is established in the Affected Area. It is therefore likely to be serving new demands generated by new residents.
- Custom generated by passing trade and the employment zone is likely to be transferred spending from a wide range of locations.
- The local area is either deficient in the recommended uses and / or demands will be generated by the on-site population.

The retail floor area and other recommended uses on the Affected Area will have limited impact on the small Woodlake Local Centre 1km south because:

- Woodlake is similarly small at about 650 sqm with a narrow range of tenants and limited competition.
- Woodlake is separated from the Affected Area by West Lakes Golf Course and is more convenient for the southern areas of Royal Park.
- Woodlake has been established for many years and appears to date back to the subdivision of the area. It is a well-presented centre that was redeveloped in about 2012 and still presents well. Google Streetview shows that at least 4 of the 6 existing tenants (pizza, surgery, pharmacy & mini-mart) have been at the centre since at least 2008. This suggests a strong mix and viable centre.

A small local retail and commercial land use mix on the Affected Area will have a range of positive benefits including:

- It will provide an active focus and hub for the existing and new residential area and place for the employment zone workers to source food and other daily needs .
- New and existing residents will access essential retail stores and potentially childcare and medical services by foot. This enhances the efficiency and sustainability credentials of a future development.
- It will generate up to 155 full and part-time employment opportunities.
- A significant part of the floorspace will be sustained by the new on-site population.
- Improved choice and convenience for residents and better efficiency and serviceability of the centres network in the City of Charles Sturt.

## ATTACHMENT F – TRANSPORT INVESTIGATIONS

DRAFT



# West Lakes Residential and Mixed Use Code Amendment

Lot 100 & 101 Frederick Road

## **Transport Impact Assessment**

23/05/2022

Ref: 300303510

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**PREPARED FOR:**


Potential West Lakes Pty Ltd

**PREPARED BY:**

Stantec

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# Quality Record

Issue	Date	Description	Prepared By	Checked By	Approved By	Signed
1	23/5/2022	Final	Paul Morris	Tim Jones	Paul Morris	

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# 1. Introduction

## 1.1 Background

An amendment to the Planning and Design Code is being sought relating to land located at Lot 100 and 101 Frederick Road, West Lakes to change the land use from the existing Infrastructure zone to new policy which accommodates residential and commercial uses on the land.

Stantec was commissioned by Potential West Lakes Pty Ltd to undertake a transport impact assessment of the proposed code amendment.

## 1.2 Purpose of this Report

This report sets out an assessment of the anticipated transport implications of the Code Amendment, including consideration of the following:

- Anticipated uses in the Affected Area
- Existing traffic and parking conditions surrounding the Affected Area
- Traffic demands of the anticipated uses
- Possible access arrangements for the Affected Area
- Transport impact of the Intended Policy on the surrounding road network
- Suitability of the policy framework to cater for anticipated uses

## 1.3 References

In preparing this report, reference has been made to the following:

- South Australian Planning and Design Code
- concept plans for the affected area
- traffic and car parking surveys undertaken by Stantec as referenced in the context of this report
- various technical data as referenced in this report
- an inspection of the Affected Area and its surrounds
- other documents as nominated.



## 2. Affected Area

The Affected Area is located in land being Lot 100 and Lot 101 Frederick Road in West Lakes. The Affected Area is located on the western side of Frederick Road at West Lakes, to the north of Lochside Drive. It is approximately 19.8 hectares in area with approximate frontages of 565.4 metres to Frederick Road and 365.6 metres to Lochside Drive. The Affected Area also has a frontage to 'Mariners Reserve' on the north-western corner of the Affected Area, which provides direct access to the lake frontage. The Affected Area is located within an Infrastructure zone and is currently occupied by the former Port Adelaide Wastewater Treatment Plant.

The surrounding properties include a mix of land uses including low density residential to the north, west and south, and industrial and commercial to the east (over Frederick Road). The West Lakes waterway is located to the west of the Affected Area. The West Lakes Golf Club is located to the south of Lochside Drive.

The location of the Affected Area and the surrounding environs is shown in Figure 2.1.

**Figure 2.1: Affected Area and its Environs**



(PhotoMap courtesy of SAPPA)

The Affected Area has an existing access point on Frederick Road between Brandwood Street and Schenker Drive. The existing access point includes an existing median opening with a right turn lane.

## 3. Existing Conditions

### 3.1 Road Network

#### 3.1.1 Frederick Road

Frederick Road is an arterial road managed and maintained by the Department for Infrastructure and Transport. It is classed as an Urban Transport Route in the Planning and Design Code, which indicates it is a secondary arterial road. It comprises dual carriageways which are 7.2 metres wide aligned in a north-south direction and configured with two lanes in each direction, separated by a raised central 4.0 metre median. There is a parking lane on the eastern side of the road for a portion of the Affected Area frontage. A bicycle lane operates on each carriageway.

The road reserve is approximately 25 metres wide adjacent the Affected Area. Kerbside parking is not permitted along the Affected Area frontage due to the bicycle lane operating at all times. No other parking controls apply.

Frederick Road has a posted speed limit of 60km/h and carries approximately 14,800 vehicles per day (based on Department for Infrastructure and Transport traffic data from 2021) and approximately 1,000 vehicles per hour during the AM and PM peak periods (based on traffic surveys in March 2022).

The intersection of Old Port Road/Frederick Road/Webb Street is located approximately 1 kilometre to the north of Lochside Drive and is controlled by traffic signals. The intersection of West Lakes Boulevard/Frederick Road is located approximately 1.3 kilometres to the south of Lochside Drive and is controlled by traffic signals.

**Figure 3.1: Frederick Road (view north)**



#### 3.1.2 Lochside Drive

Lochside Drive is a local collector road managed by the City of Charles Sturt council and is aligned in an east-west direction forming a T-junction with Frederick Road. Lochside Drive loops around to the west to connect to Frederick Road further south as a collector road through this precinct of West Lakes. It is a single carriageway two-way road configured with one lane in each direction. The carriageway width is 9.3 metres (approx.) and is set within a 15.2 metre wide road reserve. No parking is permitted on both sides close to Frederick Road intersection and is unrestricted on both sides to the west.



Lochside Drive has an urban default speed limit of 50km/h and carries approximately 1,500 vehicles per day<sup>1</sup> and 150 and 125 vehicles per hour during the AM and PM peak periods respectively.

**Figure 3.2: Lochside Drive (view west)**



**Figure 3.3: Lochside Drive Intersection with Frederick Road**



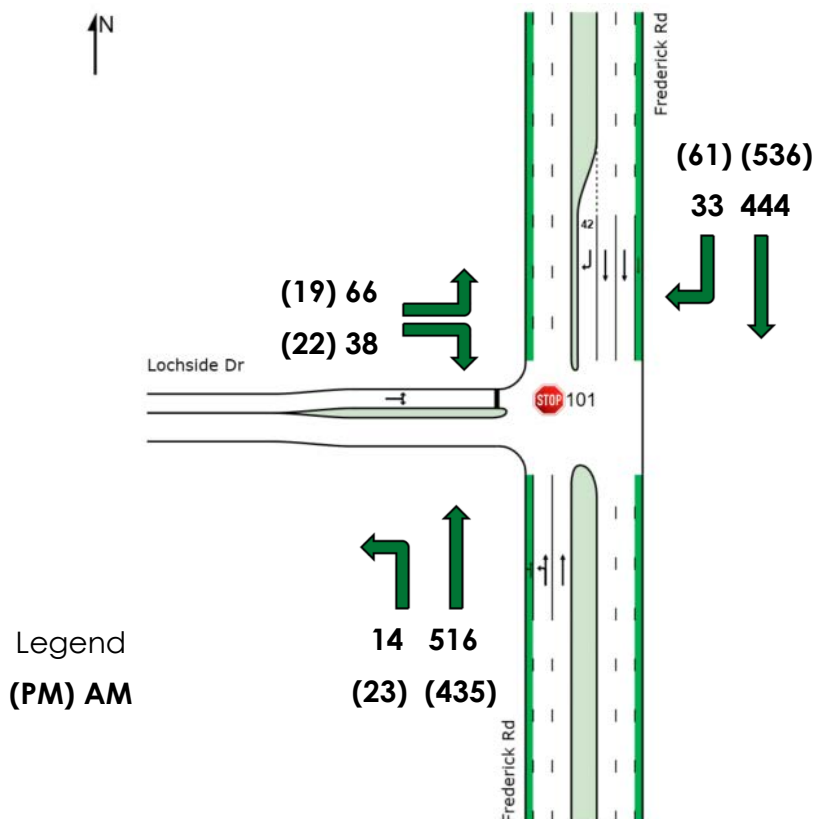
## 3.2 Traffic Volumes

Stantec undertook traffic movement counts at the Frederick Road and Lochside Drive intersection on 24 March 2022 during the 8-9 AM and 5-6 PM peak periods

<sup>1</sup> Based on peak hour traffic counts undertaken by Stantec in March 2022 assuming a peak-to-daily ratio of 10% for local roads.

The AM and PM peak hour traffic volumes are shown in Figure 3.4.

**Figure 3.4: Existing Peak Hour Traffic Volumes**



### 3.3 Intersection Operation

Observations during the surveys identified the following:

- Traffic flows on Frederick Road were highly platooned (or bunched) with long duration of gaps between platoons. There was noticeably little traffic between these platoons.
- Vehicles from Lochside Drive could turn generally at will unless a platoon of traffic was passing on Frederick Road.
- Most traffic to and from Lochside Drive was to and from the north of the intersection.
- The intersection operated very efficiently with little queuing observed.

The operation of the intersection has been assessed using SIDRA INTERSECTION, a computer based modelling package which calculates intersection performance. The commonly used measure of intersection performance is referred to as the Degree of Saturation (DOS). The DOS represents the flow-to-capacity ratio for the most critical movement on each leg of the intersection. For unsignalised intersections, a DOS of less than 0.8 is sought by Department for Infrastructure and Transport.

Table 3.1 and Table 3.2 presents a summary of the existing operation of the intersection.

**Table 3.1: Lochside Dr/Frederick Road Intersection – Existing AM Peak Operation**

Vehicle Movement Performance														
Mov ID	Turn	INPUT VOLUMES [ Total veh/h ] HV ] %		DEMAND FLOWS [ Total veh/h ] HV ] %		Deg. Satn v/c	Aver. Delay sec	Level of Service	95% BACK OF QUEUE [ Veh. veh ] Dist ] m		Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed km/h
South: Frederick Rd														
1	L2	14	0.0	15	0.0	0.150	5.6	LOS A	0.0	0.0	0.00	0.03	0.00	58.0
2	T1	516	5.0	543	5.0	0.150	0.0	LOS A	0.0	0.0	0.00	0.02	0.00	59.8
Approach		530	4.9	558	4.9	0.150	0.2	NA	0.0	0.0	0.00	0.02	0.00	59.7
North: Frederick Rd														
8	T1	444	5.0	467	5.0	0.126	0.0	LOS A	0.0	0.0	0.00	0.00	0.00	59.9
9	R2	33	0.0	35	0.0	0.064	9.5	LOS A	0.2	1.4	0.49	0.73	0.49	47.3
Approach		477	4.6	502	4.6	0.126	0.7	NA	0.2	1.4	0.03	0.05	0.03	58.8
West: Lochside Dr														
10	L2	66	0.0	69	0.0	0.345	9.3	LOS A	1.4	10.1	0.00	1.00	0.00	41.4
12	R2	38	0.0	40	0.0	0.345	36.9	LOS E	1.4	10.1	0.00	1.00	0.00	41.4
Approach		104	0.0	109	0.0	0.345	19.4	LOS C	1.4	10.1	0.00	1.00	0.00	41.4
All Vehicles		1111	4.3	1169	4.3	0.345	2.2	NA	1.4	10.1	0.01	0.12	0.01	57.0

**Table 3.2: Lochside Dr/Frederick Road Intersection – Existing PM Peak Operation**

Vehicle Movement Performance														
Mov ID	Turn	INPUT VOLUMES [ Total veh/h    HV ] %		DEMAND FLOWS [ Total veh/h    HV ] %		Deg. Satn v/c	Aver. Delay sec	Level of Service	95% BACK OF QUEUE [ Veh. veh    Dist ] m		Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed km/h
South: Frederick Rd														
1	L2	23	0.0	24	0.0	0.130	5.6	LOS A	0.0	0.0	0.00	0.06	0.00	57.8
2	T1	435	5.0	458	5.0	0.130	0.0	LOS A	0.0	0.0	0.00	0.03	0.00	59.6
Approach		458	4.7	482	4.7	0.130	0.3	NA	0.0	0.0	0.00	0.03	0.00	59.5
North: Frederick Rd														
8	T1	536	5.0	564	5.0	0.153	0.0	LOS A	0.0	0.0	0.00	0.00	0.00	59.9
9	R2	61	0.0	64	0.0	0.107	8.9	LOS A	0.3	2.4	0.44	0.72	0.44	51.0
Approach		597	4.5	628	4.5	0.153	0.9	NA	0.3	2.4	0.05	0.07	0.05	58.8
West: Lochside Dr														
10	L2	19	0.0	20	0.0	0.199	8.0	LOS A	0.6	4.4	0.00	1.00	0.00	42.7
12	R2	22	0.0	23	0.0	0.199	35.8	LOS E	0.6	4.4	0.00	1.00	0.00	42.7
Approach		41	0.0	43	0.0	0.199	22.9	LOS C	0.6	4.4	0.00	1.00	0.00	42.7
All Vehicles		1096	4.4	1154	4.4	0.199	1.5	NA	0.6	4.4	0.02	0.09	0.02	58.3

Both the AM and PM peak periods were calculated to operate with a low Degree of Saturation at less than 0.350 which indicates a high level of spare capacity and relative intersection efficiency. The SIDRA analysis for the existing intersection operation reflects observations on Affected Area however it does not fully encapsulate the long gaps available between the platoons of traffic on Frederick Road, and little delay for vehicles turning right from Lochside Drive.

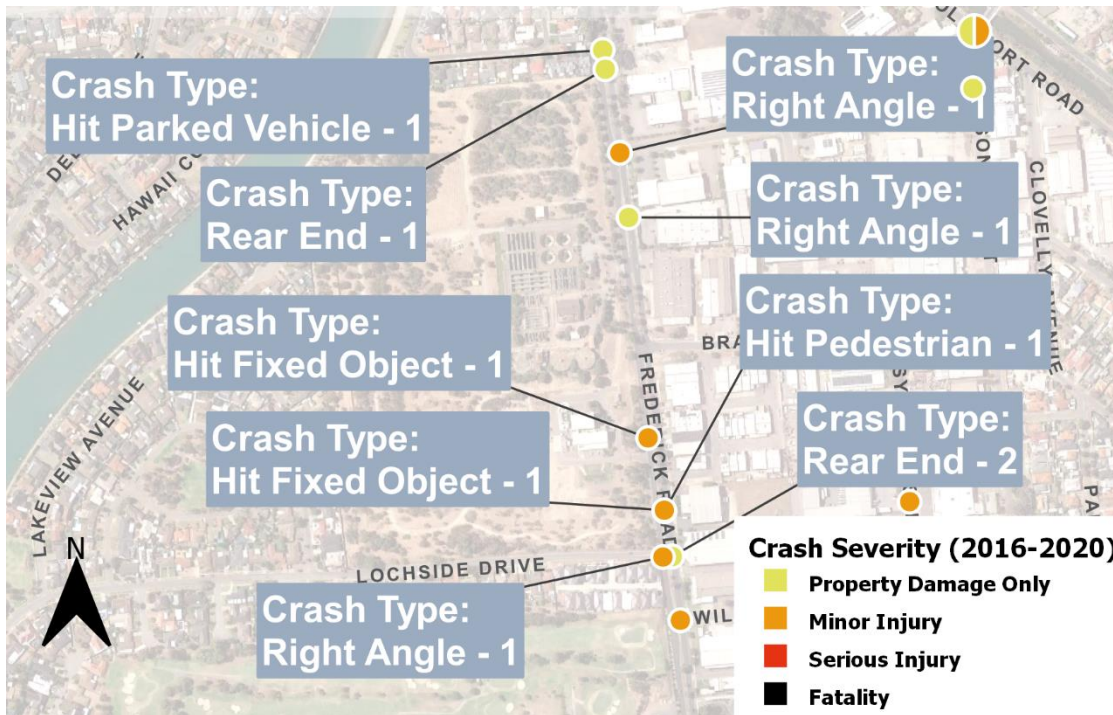


### 3.4 Crash History

A review of the reported crash history for the roads and intersections adjacent to the Affected Area has been sourced from the Department for Infrastructure and Transport database via Location SA datasets.

A summary of the accidents for the last available five-year period (2016-2020) is presented in Figure 3.5.

**Figure 3.5: Existing Crash Records (2016-2020)**



Source: Department for Infrastructure and Transport

The review of crash data has found crashes have occurred on Frederick Road in both mid-block and intersection locations, and none on Lochside Drive along the frontage of the Affected Area. However, there is no specific pattern to crashes on this section of Frederick Road which suggests the location would be a black spot.

### 3.5 Walking & Cycling

Pedestrian paths are located as follows:

- Lochside Drive – southern side
- Frederick Road – eastern side.

Cycle paths/routes are located as follows (as required):

- Frederick Road – bicycle lanes on each side of the road.

### 3.6 Public Transport

Figure 3.6 shows the Affected Area in relation to existing public transport routes within its vicinity and summarises the road based routes and major destinations that can be reached using these services.



Figure 3.6: Public Transport Map



There are no bus services located adjacent the Affected Area, with surrounding services travelling to and from West Lakes and Port Adelaide interchanges to the south and north respectively.

### 3.7 Future Road Widening

The South Australian Property and Planning Atlas does not contain any Metropolitan Adelaide Road Widening Plan requirement for this Affected Area.

## 4. Intended Policy

The Code Amendment intends to replace the existing 'Infrastructure Zone' with the 'Urban Renewal Neighbourhood Zone' (or similar Neighbourhood-Type Zone pending the outcome of investigations). It is possible that either a Local Activity Centre Zone, Community Facilities Zone or a Mixed Use Subzone or one of the neighbourhood type zones may be required to provide a focus for retail, commercial and recreational facilities (subject to further investigation).

With regards to Traffic and Transport, the relevant parts of the P&D Code include:

### Part 3 – Overlays

Traffic Generating Development Overlay

Urban Transport Routes Overlay

### Part 4 – General Development Policies

Design

Land Division

Transport, Access and Parking

### 4.1 Anticipated Uses

The anticipated uses within the Affected Area based on the Intended Policy is anticipated to provide predominantly residential uses across the Affected Area, however there could be some commercial uses located on the Affected Area. These anticipated uses are shown in Table 4.1.

**Table 4.1: Anticipated Uses**

USE	SIZE
Low Density Residential	325 dwellings
Medium Density Residential	245 dwellings
Shop	1,000 sq.m GLFA
Service Station	200 sq.m GLFA (store size plus bowsters)
Shop – Take Away Food	100 sq.m GLFA (part of service station)
Child Care Centre	100 children
Medical Centre	1,000 sq.m GLFA
Gymnasium/Office/Commercial	1,000 Sqm GLFA

*GLFA – Gross Leasable Floor Area*

It is anticipated there will be a new access road on the southern frontage of the Affected Area on Lochside Drive, located approximately 220 metres west of Frederick Road. A new access road utilising the existing Frederick Road access point could be located approximately 300 metres north of Lochside Drive.



## 5. Traffic Impact Assessment

### 5.1 Traffic Demands

Traffic generation estimates for the proposed development have been sourced from Transport For New South Wales 'Guide to Traffic Generating Developments', and other similar uses surveyed by Stantec. The traffic generation rates applicable to the anticipated uses and the resultant traffic volumes are set out in Table 5.1 and Table 5.2 for the residential and commercial uses respectively.

**Table 5.1: Traffic Generation Estimates - Residential**

Land Use	Number of Dwellings	Traffic Generation Rate (Trips/Dwelling)		Vehicle Movements	
		Peak	Daily	Peak	Daily
Dwelling Low Density	325	0.85	9.0	276	2925
Dwelling Medium Density	245	0.65	6.5	159	1593
<b>Totals</b>	<b>570</b>	<b>-</b>	<b>-</b>	<b>435</b>	<b>4518</b>

**Table 5.2: Traffic Generation Estimates - Commercial**

Use	Size	Traffic Generation Rates (per 100sq.m GLFA)			Traffic Volumes		
		Daily (v/day)	AM (v/hr)	PM (v/hr)	Daily (v/day)	AM (v/hr)	PM (v/hr)
Shop	1,000 sqm	120	3	12	1200	30	120
Service Station	250 sqm	7	0.8	0.6	1750	200	150
Fast Food (in Service Station)	200 sqm	1200	30	120	2400	60	240
Child Care	100 children	2	0.7	0.8	200	70	80
Medical Centre	400 sq.m	90	5	9	360	20	36
Gymnasium/Commercial	400 sqm	90	9	9	360	36	36
Office/Commercial	1,000 sqm	20	2	2	200	20	20
<b>Total</b>					<b>6470</b>	<b>436</b>	<b>682</b>

v/day – vehicles per day

v/hr – vehicles per hour

GLFA – Gross Leasable Floor Area

The anticipated uses for the commercial precinct of the Affected Area could generate collectively 6,470 vehicles per day, with 436 and 682 vehicles per hour during the AM and PM peak periods. Given the residential uses adjacent the Affected Area, it is anticipated there would be "passing trade" which could be up to 20% of the traffic volumes shown. Hence, the net traffic generation on the adjacent road network of these uses would be 5,176 vehicles per day and 349 and 546 vehicles per hour during the AM and PM peak hours respectively.

Hence the combined traffic volumes generated by the Affected Area would be approximately 9,700 vehicles per day, 784 and 981 vehicles per hour during the AM and PM peak hours respectively

The directional distribution and assignment of traffic generated by the proposed development will be influenced by a number of factors, including the:

- configuration of the arterial road network in the immediate vicinity of the Affected Area;



- existing operation of intersections providing access between the local and arterial road network;
- surrounding employment centres, retail centres and schools in relation to the Affected Area;
- configuration of access points to the Affected Area.
- Attraction of existing residents to the south and west of the Affected Area.

Having consideration to the above, for the purposes of estimating vehicle movements, the following directional distributions have been assumed:

- to and from the north - 60%
- to and from the south - 40%

It has been assumed that a small amount of traffic will use Lochside Drive to the west of the Affected Area given this road loops back to Frederick Road further to the south, and may be used by adjacent residents to access the commercial uses in the Affected Area.

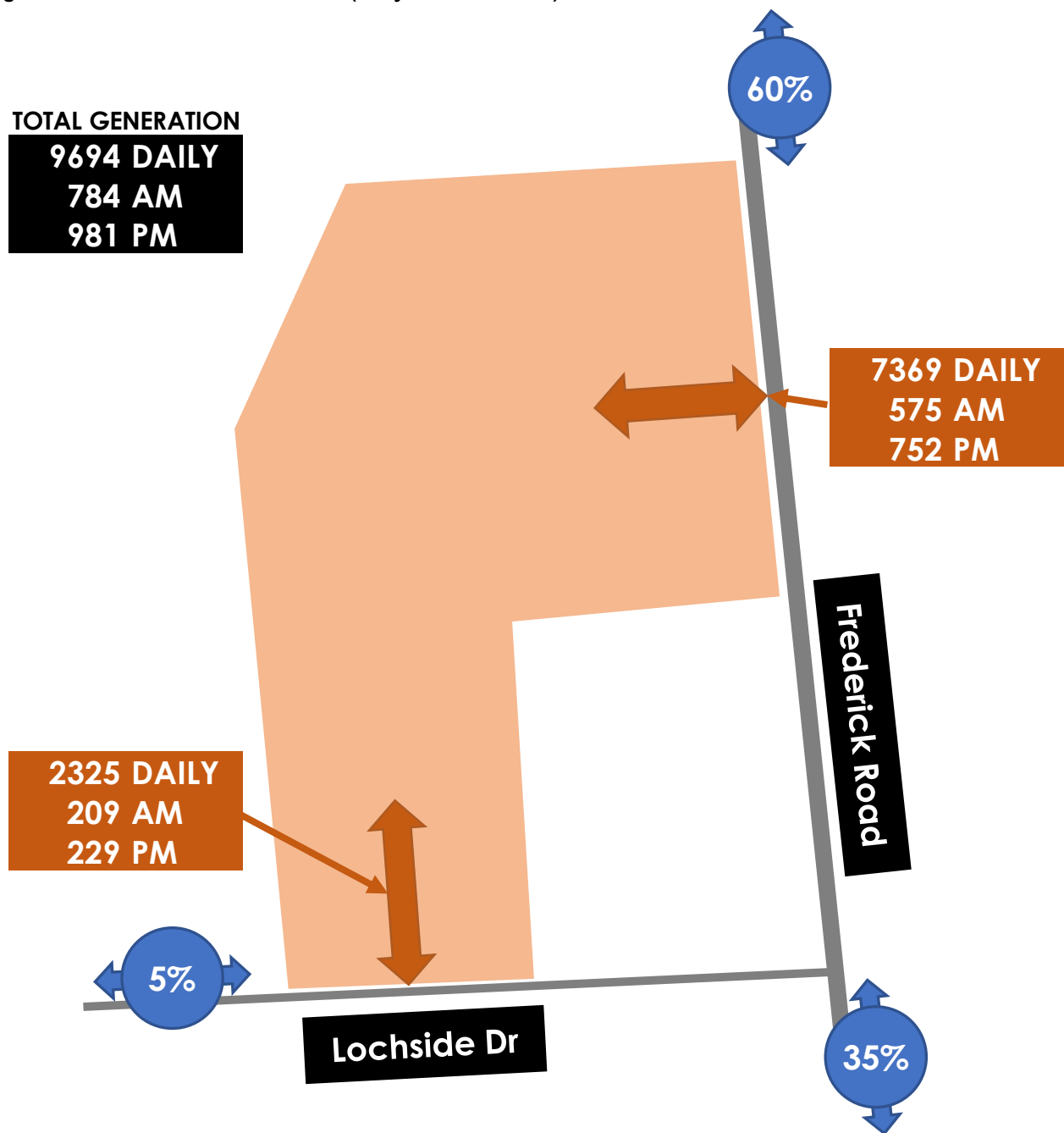
It is also anticipated that 10% of the commercial traffic generation would enter from the west through the Affected Area from Lochside Drive to the south, where surrounding residents may travel to the commercial uses.

In addition, the directional split of traffic (i.e. the ratio between the inbound and outbound traffic movements) has been assumed as 20:80 in the AM peak period, 80:20 in the PM peak period (for the residential uses), and 50:50 for the commercial uses during these periods.





Figure 5.1: Predicted Traffic Volumes (Daily and Peak Hour)



## 5.2 Impact on Road Network

The predicted traffic volumes for the anticipated uses in the Affected Area will distribute to the adjacent road network based on the distributions discussed earlier in this report. Based on these distributions, the impact of traffic on the adjacent road network is shown in Table 5.3

**Table 5.3: Predicted Daily Traffic Volumes on Road Network**

Road	Existing	Additional (approximately)	Predicted (rounded)
New Access Road to Frederick Road	-	7,400	<b>7,400</b>
New Access Road to Lochside Drive	-	2,300	<b>2,300</b>
Frederick Road (north of Affected Area)	14,800	5,500	<b>20,000</b>
Frederick Road (south of Lochside Drive)	14,800	3,400	<b>18,200</b>
Lochside Drive (west of new access)	1,200	700	<b>1,900</b>
Lochside Drive (east to Frederick Road)	1,500	1,600	<b>3,100</b>

The predicted impact on the adjacent road network will cause an increase in traffic on Lochside Drive and Frederick Road. However, the resultant traffic volumes for each road will remain within the available capacity and the intended function of these roads.

Lochside Drive will increase to approximately 3,100 vehicles per day on its eastern portion to Frederick Road. This will be within the desired traffic volume for a collector road, which typically ranges from 3,000 to 5,000 vehicles per day. Lochside Drive to the west will have a minor increase, with much of that predicted from local residents (to the west and south) accessing the new mixed uses in the Affected Area through the internal road network.

Frederick Road will increase to around 20,000 vehicles per day to the north and 18,200 vehicles per day to the south, which will remain within capacity for a four lane arterial road which can carry up to 45,000 vehicles per day based on uninterrupted flow (with no significant intersections or limited access) as found along this section of Frederick Road between Old Port Road and West Lakes Boulevard.



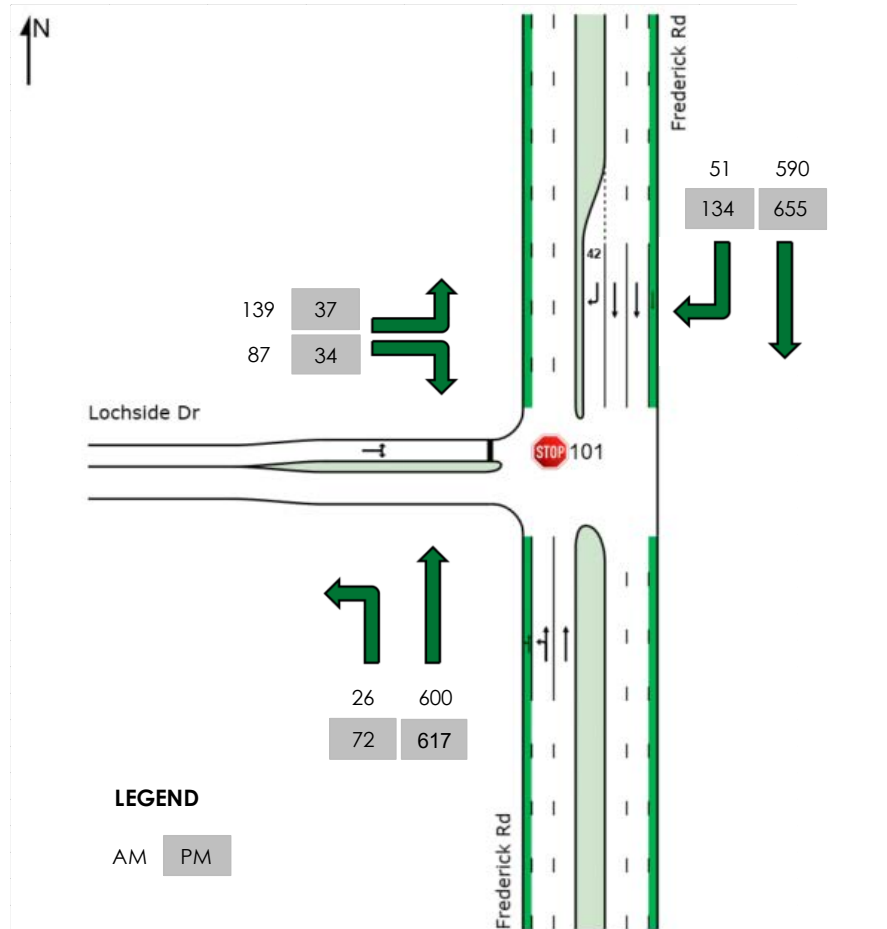
## 5.3 Impact on Intersections

A review of the anticipated traffic volumes at the following intersections was undertaken to assess the impact of the anticipated land uses from the Affected Area. Turning movements at each intersection have been developed based on the general distribution principles.

### 5.3.1 Lochside Drive and Frederick Road

The new intersection was analysed with SIDRA Intersection software using the anticipated traffic volumes from the Affected Area. The layout of the intersection is shown in Figure 5.2.

**Figure 5.2: Schematic Layout and Predicted Peak Hour Volumes for existing Lochside Dr intersection**



The results of the SIDRA assessment are shown in Table 5.4 and Table 5.5.

**Table 5.4: Lochside Dr & Frederick Rd Intersection – Predicted AM Summary**

Vehicle Movement Performance														
Mov ID	Turn	INPUT VOLUMES [ Total veh/h      HV ] %		DEMAND FLOWS [ Total veh/h      HV ] %		Deg. Satn v/c	Aver. Delay sec	Level of Service	95% BACK OF QUEUE [ Veh.      Dist ] veh      m		Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed km/h
South: Frederick Rd														
1	L2	26	0.0	27	0.0	0.177	5.6	LOS A	0.0	0.0	0.00	0.05	0.00	57.8
2	T1	600	5.0	632	5.0	0.177	0.0	LOS A	0.0	0.0	0.00	0.02	0.00	59.6
Approach		626	4.8	659	4.8	0.177	0.3	NA	0.0	0.0	0.00	0.02	0.00	59.5
North: Frederick Rd														
8	T1	590	5.0	621	5.0	0.168	0.0	LOS A	0.0	0.0	0.00	0.00	0.00	59.9
9	R2	51	0.0	54	0.0	0.113	10.9	LOS B	0.3	2.4	0.57	0.82	0.57	46.5
Approach		641	4.6	675	4.6	0.168	0.9	NA	0.3	2.4	0.05	0.07	0.05	58.5
West: Lochside Dr														
10	L2	139	0.0	146	0.0	1.257	293.3	LOS F	821.3	5749.0	1.00	0.46	1.06	0.9
12	R2	87	0.0	92	0.0	1.257	8113.6	LOS F	821.3	5749.0	1.00	0.46	1.06	0.9
Approach		226	0.0	238	0.0	1.257	3303.8	LOS F	821.3	5749.0	1.00	0.46	1.06	0.9
All Vehicles		1493	4.0	1572	4.0	1.257	500.6	NA	821.3	5749.0	0.17	0.11	0.18	5.4

**Table 5.5: Lochside Dr & Frederick Rd Intersection – Predicted PM Summary**

Vehicle Movement Performance														
Mov ID	Turn	INPUT VOLUMES		DEMAND FLOWS		Deg. Satn	Aver. Delay	Level of Service	95% BACK OF QUEUE		Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed
		[ Total veh/h	HV ] %	[ Total veh/h	HV ] %	v/c	sec		[ Veh. veh	Dist ] m				km/h
South: Frederick Rd														
1	L2	72	0.0	76	0.0	0.195	5.6	LOS A	0.0	0.0	0.00	0.12	0.00	57.2
2	T1	617	5.0	649	5.0	0.195	0.1	LOS A	0.0	0.0	0.00	0.05	0.00	59.3
Approach		689	4.5	725	4.5	0.195	0.6	NA	0.0	0.0	0.00	0.06	0.00	59.1
North: Frederick Rd														
8	T1	655	5.0	689	5.0	0.186	0.0	LOS A	0.0	0.0	0.00	0.00	0.00	59.9
9	R2	134	0.0	141	0.0	0.325	13.3	LOS B	1.2	8.7	0.67	0.90	0.81	48.0
Approach		789	4.1	831	4.1	0.325	2.3	NA	1.2	8.7	0.11	0.15	0.14	57.4
West: Lochside Dr														
10	L2	37	0.0	39	0.0	0.726	61.3	LOS F	3.9	27.3	0.01	1.00	0.02	23.0
12	R2	34	0.0	36	0.0	0.726	134.8	LOS F	3.9	27.3	0.01	1.00	0.02	23.0
Approach		71	0.0	75	0.0	0.726	96.5	LOS F	3.9	27.3	0.01	1.00	0.02	23.0
All Vehicles		1549	4.1	1631	4.1	0.726	5.9	NA	3.9	27.3	0.06	0.15	0.07	54.4

The AM peak period analysis indicates the intersection will operate satisfactorily except for the right turn movement from Lochside Drive. Whilst it is likely that the right turn will operate better than calculated given the large gaps available in platooned traffic on Frederick Road, consideration has been given to the ability for vehicles to stage right turn from the new access road. A staged right turn is available within the current intersection configuration with a relatively wide median (4.0 metres) which will allow vehicles turning right to wait in the median before completing the turn to travel southbound on Frederick Road. An analysis of this type of movement follows this discussion.

The SIDRA analysis indicates the PM peak period will operate at Degree of Saturation 0.726 indicating spare capacity available at the intersection, with some queueing for the right turn from Lochside Drive. Based on Affected Area observations, it is likely that the right turn will operate better than calculated given the large gaps available in platooned traffic on Frederick Road. The existing single lane on Lochside Drive will provide some restraint on additional traffic using Lochside Drive to enter and exit the Affected Area.

A SIDRA analysis of staged right turns for the AM peak period was undertaken with summaries of each shown in the following tables.



**Table 5.6: Lochside Dr & Frederick Rd Intersection – Predicted AM Summary – Stage 1 Right Turn**

Vehicle Movement Performance														
Mov ID	Turn	INPUT VOLUMES [ Total veh/h    HV ] %		DEMAND FLOWS [ Total veh/h    HV ] %		Deg. Satn v/c	Aver. Delay sec	Level of Service	95% BACK OF QUEUE [ Veh. veh    Dist ] m		Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed km/h
South: Frederick Rd														
1	L2	26	0.0	27	0.0	0.177	5.6	LOS A	0.0	0.0	0.00	0.05	0.00	57.8
2	T1	600	5.0	632	5.0	0.177	0.0	LOS A	0.0	0.0	0.00	0.02	0.00	59.7
Approach		626	4.8	659	4.8	0.177	0.3	NA	0.0	0.0	0.00	0.02	0.00	59.6
North: Frederick Rd														
9	R2	51	0.0	54	0.0	0.113	10.9	LOS B	0.3	2.4	0.57	0.82	0.57	46.5
Approach		51	0.0	54	0.0	0.113	10.9	NA	0.3	2.4	0.57	0.82	0.57	46.5
West: Lochside Dr														
10	L2	139	0.0	146	0.0	0.368	7.8	LOS A	1.9	13.1	0.00	1.00	0.00	45.3
11	T1	87	0.0	92	0.0	0.368	18.6	LOS C	1.9	13.1	0.00	1.00	0.00	45.2
Approach		226	0.0	238	0.0	0.368	12.0	LOS B	1.9	13.1	0.00	1.00	0.00	45.2
All Vehicles		903	3.3	951	3.3	0.368	3.8	NA	1.9	13.1	0.03	0.31	0.03	54.4

**Table 5.7: Lochside Dr & Frederick Rd Intersection – Predicted AM Summary – Stage 2 Right Turn**

Vehicle Movement Performance														
Mov ID	Turn	INPUT VOLUMES [ Total veh/h    HV ] %		DEMAND FLOWS [ Total veh/h    HV ] %		Deg. Satn v/c	Aver. Delay sec	Level of Service	95% BACK OF QUEUE [ Veh. veh       Dist ] m		Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed km/h
North: Frederick Rd														
8	T1	590	5.0	621	5.0	0.167	0.0	LOS A	0.0	0.0	0.00	0.00	0.00	59.9
Approach		590	5.0	621	5.0	0.167	0.0	NA	0.0	0.0	0.00	0.00	0.00	59.9
West: Lochside Dr														
12	R2	87	0.0	92	0.0	0.125	9.9	LOS A	0.4	3.0	0.49	0.97	0.49	46.4
Approach		87	0.0	92	0.0	0.125	9.9	LOS A	0.4	3.0	0.49	0.97	0.49	46.4
All Vehicles		677	4.4	713	4.4	0.167	1.3	NA	0.4	3.0	0.06	0.12	0.06	57.8

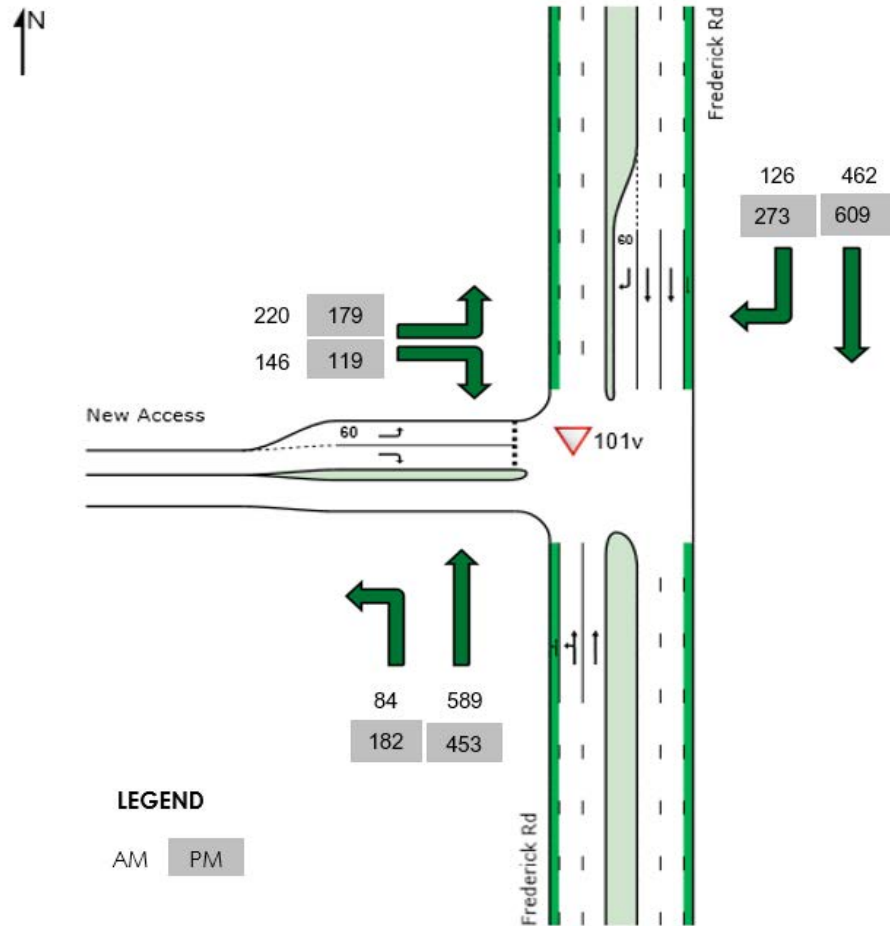
A SIDRA analysis of this staged movement during the AM peak period indicates the movement will operate with a Degree of Saturation of 0.368, average delay of 10.9 seconds and queue length of 1 vehicles. This analysis provides a more meaningful assessment of the intersection which when using the staged right turn, where the PM peak would operate with a DoS of 0.359 overall.

The existing intersection arrangement, including the existing length of right turn lane on Frederick Road, will be suitable to cater for the anticipated traffic volumes from the anticipated land uses in the Affected Area. The existing intersection can continue to operate satisfactorily with the existing traffic control (Stop sign). No changes are recommended.

### 5.3.2 New Access Road and Frederick Road (new)

The existing intersection was analysed with SIDRA Intersection software using the anticipated traffic volumes from the Affected Area. The layout of the intersection is shown in Figure 5.3.

**Figure 5.3: Schematic Layout & Predicted Peak Hour Volumes for New Access Rd intersection on Frederick Rd**



The results of the SIDRA assessment are shown in Table 5.8 and Table 5.9.

**Table 5.8: New Access Rd & Frederick Rd Intersection – Predicted AM Summary**

Vehicle Movement Performance														
Mov ID	Turn	INPUT VOLUMES		DEMAND FLOWS		Deg. Satn	Aver. Delay	Level of Service	95% BACK OF QUEUE		Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed
		[ Total veh/h	HV ] %	[ Total veh/h	HV ] %				[ Veh. veh	Dist ] m				
South: Frederick Rd														
1	L2	84	3.0	88	3.0	0.191	5.6	LOS A	0.0	0.0	0.00	0.15	0.00	56.9
2	T1	589	5.0	620	5.0	0.191	0.1	LOS A	0.0	0.0	0.00	0.06	0.00	59.3
Approach		673	4.7	708	4.7	0.191	0.7	NA	0.0	0.0	0.00	0.07	0.00	59.0
North: Frederick Rd														
8	T1	462	5.0	486	5.0	0.131	0.0	LOS A	0.0	0.0	0.00	0.00	0.00	59.9
9	R2	126	3.0	133	3.0	0.307	13.2	LOS B	1.1	8.2	0.66	0.89	0.78	45.3
Approach		588	4.6	619	4.6	0.307	2.9	NA	1.1	8.2	0.14	0.19	0.17	56.1
West: New Access														
10	L2	220	3.0	232	3.0	0.176	4.6	LOS A	0.8	5.6	0.01	0.52	0.01	49.7
12	R2	146	3.0	154	3.0	1.531	535.4	LOS F	39.4	282.6	1.00	3.37	9.62	5.9
Approach		366	3.0	385	3.0	1.531	216.3	LOS F	39.4	282.6	0.41	1.66	3.85	12.6
All Vehicles		1627	4.3	1713	4.3	1.531	50.0	NA	39.4	282.6	0.14	0.47	0.93	31.9

**Table 5.9: New Access Rd & Frederick Rd Intersection – Predicted PM Summary**

Vehicle Movement Performance														
Mov ID	Turn	INPUT VOLUMES [ Total veh/h    HV ] %		DEMAND FLOWS [ Total veh/h    HV ] %		Deg. Satn v/c	Aver. Delay sec	Level of Service	95% BACK OF QUEUE [ Veh. veh    Dist ] m		Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed km/h
South: Frederick Rd														
1	L2	182	3.0	192	3.0	0.182	5.6	LOS A	0.0	0.0	0.00	0.34	0.00	55.3
2	T1	453	5.0	477	5.0	0.182	0.0	LOS A	0.0	0.0	0.00	0.10	0.00	59.0
Approach		635	4.4	668	4.4	0.182	1.6	NA	0.0	0.0	0.00	0.17	0.00	57.9
North: Frederick Rd														
8	T1	609	5.0	641	5.0	0.173	0.0	LOS A	0.0	0.0	0.00	0.00	0.00	59.9
9	R2	273	3.0	287	3.0	0.628	16.8	LOS C	3.7	26.8	0.77	1.07	1.33	43.4
Approach		882	4.4	928	4.4	0.628	5.2	NA	3.7	26.8	0.24	0.33	0.41	53.6
West: New Access														
10	L2	179	3.0	188	3.0	0.143	4.6	LOS A	0.6	4.4	0.01	0.52	0.01	49.7
12	R2	119	3.0	125	3.0	1.898	873.4	LOS F	43.2	310.2	1.00	3.18	9.24	3.8
Approach		298	3.0	314	3.0	1.898	351.5	LOS F	43.2	310.2	0.40	1.59	3.69	8.5
All Vehicles		1815	4.2	1911	4.2	1.898	60.8	NA	43.2	310.2	0.18	0.48	0.81	29.0

The SIDRA analysis indicates both AM and PM peak period will operate satisfactorily except for the right turn movement from the new access road to Frederick Road. The analysis indicates these movements for both AM and PM peak periods will be over-capacity with a Degree of Saturation over 1.0 for each.

Based on Affected Area observations however, it is likely that the right turn will operate better than calculated given the large gaps available in platooned traffic observed on Frederick Road. In addition, a staged right turn is available within the current intersection configuration with a relatively wide median (4.0 metres) which will allow vehicles turning right to wait in the median before completing the turn to travel southbound on Frederick Road.

A SIDRA analysis of staged right turns for the AM and PM peak periods was undertaken with summaries of each stage for AM and PM shown in the following tables.

**Table 5.10: New Access Rd & Frederick Rd Intersection – Predicted AM Summary – Stage 1 Right Turn**

Vehicle Movement Performance														
Mov ID	Turn	INPUT VOLUMES		DEMAND FLOWS		Deg. Satn	Aver. Delay	Level of Service	95% BACK OF QUEUE		Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed
		[ Total veh/h	HV ] %	[ Total veh/h	HV ] %				[ Veh. veh	Dist ] m				
South: Frederick Rd														
1	L2	84	3.0	88	3.0	0.191	5.6	LOS A	0.0	0.0	0.00	0.15	0.00	56.9
2	T1	589	5.0	620	5.0	0.191	0.1	LOS A	0.0	0.0	0.00	0.06	0.00	59.3
Approach		673	4.7	708	4.7	0.191	0.7	NA	0.0	0.0	0.00	0.07	0.00	59.0
North: Frederick Rd														
9	R2	126	3.0	133	3.0	0.307	13.2	LOS B	1.1	8.2	0.66	0.89	0.78	45.3
Approach		126	3.0	133	3.0	0.307	13.2	NA	1.1	8.2	0.66	0.89	0.78	45.3
West: New Access														
10	L2	220	3.0	232	3.0	0.176	4.6	LOS A	0.8	5.6	0.01	0.52	0.01	49.7
11	T1	146	3.0	154	3.0	0.416	17.3	LOS C	2.1	15.4	0.77	0.98	1.07	45.9
Approach		366	3.0	385	3.0	0.416	9.7	LOS A	2.1	15.4	0.32	0.70	0.43	48.1
All Vehicles		1165	4.0	1226	4.0	0.416	4.9	NA	2.1	15.4	0.17	0.36	0.22	53.5

**Table 5.11: New Access Rd & Frederick Rd Intersection – Predicted AM Summary – Stage 2 Right Turn**

Vehicle Movement Performance														
Mov ID	Turn	INPUT VOLUMES		DEMAND FLOWS		Deg. Satn	Aver. Delay	Level of Service	95% BACK OF QUEUE		Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed
		[ Total veh/h	HV ] %	[ Total veh/h	HV ] %				[ Veh. veh	Dist ] m				
North: Frederick Rd														
8	T1	462	5.0	486	5.0	0.130	0.0	LOS A	0.0	0.0	0.00	0.00	0.00	59.9
Approach		462	5.0	486	5.0	0.130	0.0	NA	0.0	0.0	0.00	0.00	0.00	59.9
West: New Access														
12	R2	146	3.0	154	3.0	0.154	2.0	LOS A	0.6	4.6	0.48	0.39	0.48	16.6
Approach		146	3.0	154	3.0	0.154	2.0	LOS A	0.6	4.6	0.48	0.39	0.48	16.6
All Vehicles		608	4.5	640	4.5	0.154	0.5	NA	0.6	4.6	0.12	0.09	0.12	36.9

**Table 5.12: New Access Rd & Frederick Rd Intersection – Predicted PM Summary – Stage 1 Right Turn**

Vehicle Movement Performance														
Mov ID	Turn	INPUT VOLUMES [ Total veh/h      HV ] %		DEMAND FLOWS [ Total veh/h      HV ] %		Deg. Satn v/c	Aver. Delay sec	Level of Service	95% BACK OF QUEUE [ Veh. veh      Dist ] m		Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed km/h
South: Frederick Rd														
1	L2	182	3.0	192	3.0	0.166	5.6	LOS A	0.0	0.0	0.00	0.35	0.00	55.2
2	T1	453	5.0	477	5.0	0.166	0.0	LOS A	0.0	0.0	0.00	0.09	0.00	59.1
Approach		635	4.4	668	4.4	0.166	1.6	NA	0.0	0.0	0.00	0.17	0.00	57.9
North: Frederick Rd														
9	R2	273	3.0	287	3.0	0.621	16.5	LOS C	3.7	26.3	0.76	1.07	1.31	43.6
Approach		273	3.0	287	3.0	0.621	16.5	NA	3.7	26.3	0.76	1.07	1.31	43.6
West: New Access														
10	L2	179	3.0	188	3.0	0.143	4.6	LOS A	0.6	4.4	0.01	0.52	0.01	49.7
11	T1	119	3.0	125	3.0	0.365	20.9	LOS C	1.7	12.4	0.78	1.01	1.00	15.4
Approach		298	3.0	314	3.0	0.365	11.1	LOS B	1.7	12.4	0.32	0.72	0.41	26.3
All Vehicles		1206	3.7	1269	3.7	0.621	7.3	NA	3.7	26.3	0.25	0.51	0.40	42.2



**Table 5.13: New Access Rd & Frederick Rd Intersection – Predicted PM Summary – Stage 2 Right Turn**

Vehicle Movement Performance														
Mov ID	Turn	INPUT VOLUMES		DEMAND FLOWS		Deg. Satn	Aver. Delay	Level of Service	95% BACK OF QUEUE		Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed
		[ Total veh/h	HV ] %	[ Total veh/h	HV ] %	v/c	sec		[ Veh. veh	Dist ] m				km/h
North: Frederick Rd														
8	T1	609	5.0	641	5.0	0.172	0.0	LOS A	0.0	0.0	0.00	0.00	0.00	59.9
Approach		609	5.0	641	5.0	0.172	0.0	NA	0.0	0.0	0.00	0.00	0.00	59.9
West: New Access														
12	R2	119	3.0	125	3.0	0.147	2.8	LOS A	0.6	4.2	0.54	0.49	0.54	16.5
Approach		119	3.0	125	3.0	0.147	2.8	LOS A	0.6	4.2	0.54	0.49	0.54	16.5
All Vehicles		728	4.7	766	4.7	0.172	0.5	NA	0.6	4.2	0.09	0.08	0.09	41.9

A SIDRA analysis of staged right turns in the AM peak period indicates the movement will operate with a Degree of Saturation (DOS) of 0.4, average delay of 13.2 seconds and queue length of 2 vehicles. This analysis provides a more meaningful assessment of the intersection which when using the staged right turn.

A SIDRA analysis of staged right turns in the PM peak period indicates the movement will operate with a Degree of Saturation of 0.621, average delay of 16.5 seconds and queue length of less than 4 vehicles. This analysis provides a more meaningful assessment of the intersection which when using the staged right turn, the PM peak would operate with a DOS of 0.511 overall.

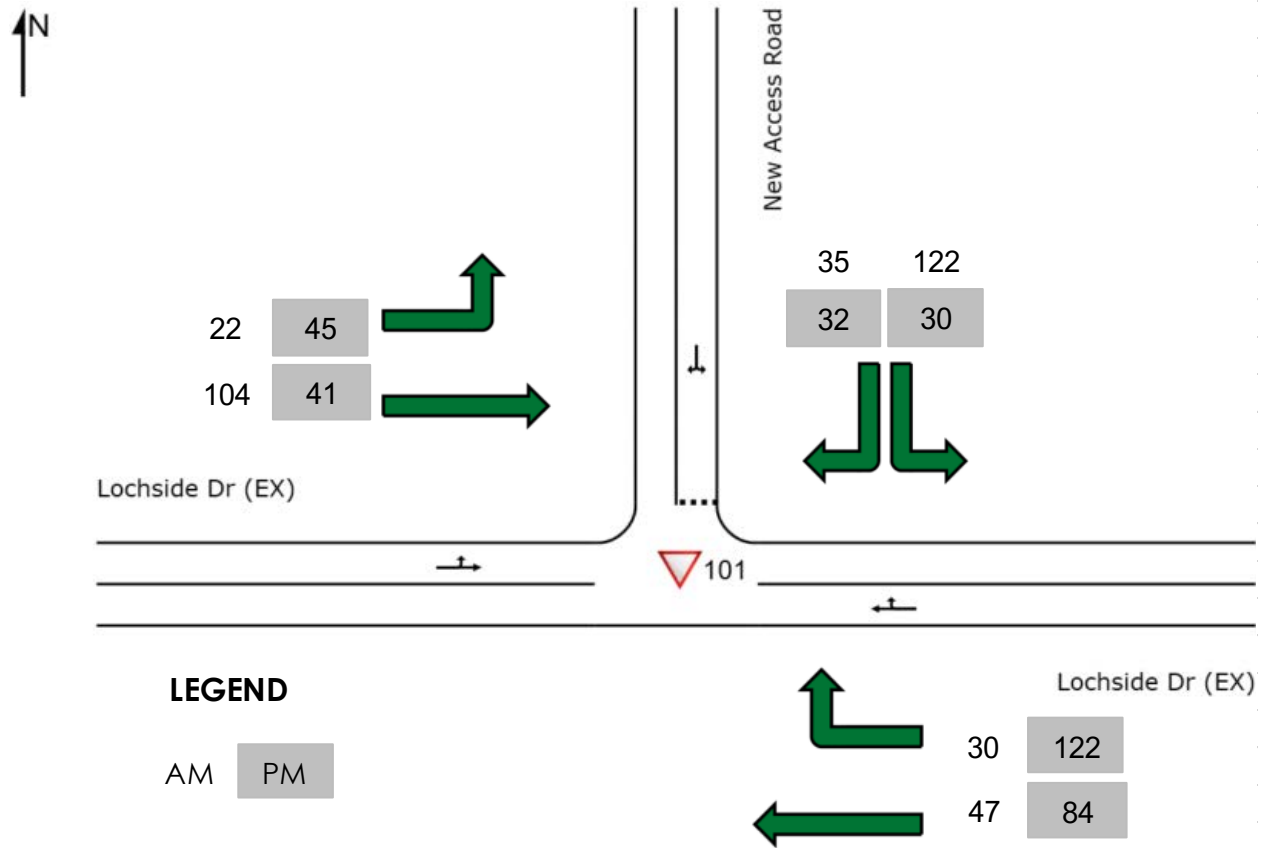
The SIDRA analysis when considering staged right turns from the new access road has found both AM and PM peak periods will operate satisfactorily with the schematic intersection layout shown. The existing right turn lane on Frederick Road can be utilized, with the length providing suitable storage length, however the actual location of the new access road may require some modifications. The lane can be brought up to current standards in length if modifications are required.

The location of the access road intersection will be suitable with offset spacing from adjacent side streets (on the eastern side of Frederick Road) and the existing straight alignment of Frederick Road which provides clear sight distance in each direction.

### 5.3.3 New Access Road and Lochside Drive (new)

The new intersection was analysed with SIDRA Intersection software using the anticipated traffic volumes from the Affected Area. The layout of the intersection is shown in Figure 5.4.

**Figure 5.4: Schematic Layout and Predicted Peak Hour Volumes for New Access Rd intersection on Lochside Dr**



The results of the SIDRA assessment are shown in Table 5.14 and Table 5.15.

**Table 5.14: Lochside Dr & New Access Rd Intersection – Predicted AM Summary**

Vehicle Movement Performance														
Mov ID	Turn	INPUT VOLUMES [ Total veh/h HV ] %		DEMAND FLOWS [ Total veh/h HV ] %		Deg. Satn v/c	Aver. Delay sec	Level of Service	95% BACK OF QUEUE [ Veh. veh Dist ] m		Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed km/h
East: Lochside Dr (EX)														
5	T1	47	0.0	49	0.0	0.044	0.2	LOS A	0.2	1.2	0.18	0.21	0.18	48.3
6	R2	30	0.0	32	0.0	0.044	5.0	LOS A	0.2	1.2	0.18	0.21	0.18	47.8
Approach		77	0.0	81	0.0	0.044	2.1	NA	0.2	1.2	0.18	0.21	0.18	48.1
North: New Access Road														
7	L2	122	0.0	128	0.0	0.120	4.9	LOS A	0.5	3.4	0.22	0.52	0.22	46.1
9	R2	35	0.0	37	0.0	0.120	5.4	LOS A	0.5	3.4	0.22	0.52	0.22	46.0
Approach		157	0.0	165	0.0	0.120	5.0	LOS A	0.5	3.4	0.22	0.52	0.22	46.1
West: Lochside Dr (EX)														
10	L2	22	0.0	23	0.0	0.064	4.6	LOS A	0.0	0.0	0.00	0.10	0.00	49.0
11	T1	104	0.0	109	0.0	0.064	0.0	LOS A	0.0	0.0	0.00	0.10	0.00	49.4
Approach		126	0.0	133	0.0	0.064	0.8	NA	0.0	0.0	0.00	0.10	0.00	49.4
All Vehicles		360	0.0	379	0.0	0.120	2.9	NA	0.5	3.4	0.13	0.30	0.13	47.6

**Table 5.15: Lochside Dr & New Access Rd Intersection – Predicted PM Summary**

Vehicle Movement Performance														
Mov ID	Turn	INPUT VOLUMES [ Total veh/h HV ] %		DEMAND FLOWS [ Total veh/h HV ] %		Deg. Satn v/c	Aver. Delay sec	Level of Service	95% BACK OF QUEUE [ Veh. veh Dist ] m		Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed km/h
East: Lochside Dr (EX)														
5	T1	84	0.0	88	0.0	0.121	0.2	LOS A	0.6	4.2	0.19	0.31	0.19	47.7
6	R2	122	0.0	128	0.0	0.121	4.9	LOS A	0.6	4.2	0.19	0.31	0.19	47.2
Approach		206	0.0	217	0.0	0.121	3.0	NA	0.6	4.2	0.19	0.31	0.19	47.4
North: New Access Road														
7	L2	30	0.0	32	0.0	0.054	4.7	LOS A	0.2	1.3	0.12	0.53	0.12	46.3
9	R2	32	0.0	34	0.0	0.054	5.6	LOS A	0.2	1.3	0.12	0.53	0.12	46.2
Approach		62	0.0	65	0.0	0.054	5.2	LOS A	0.2	1.3	0.12	0.53	0.12	46.2
West: Lochside Dr (EX)														
10	L2	45	0.0	47	0.0	0.045	4.6	LOS A	0.0	0.0	0.00	0.28	0.00	47.9
11	T1	41	0.0	43	0.0	0.045	0.0	LOS A	0.0	0.0	0.00	0.28	0.00	48.4
Approach		86	0.0	91	0.0	0.045	2.4	NA	0.0	0.0	0.00	0.28	0.00	48.2
All Vehicles		354	0.0	373	0.0	0.121	3.2	NA	0.6	4.2	0.13	0.34	0.13	47.4

The SIDRA analysis indicates the new intersection based on a simple T-junction arrangement will operate efficiently, with a Degree of Saturation of less than or equal to 0.12 for both AM and PM peak periods.

The location of the access road intersection will be suitable given the existing straight alignment of Lochside Drive which provides clear sight distance in each direction, and no other intersections in close proximity on the adjacent road network.

## 6. Parking

The Planning and Design Code provides parking requirements for land divisions and specific land uses in Part 4 General Development Policies:

- Design
- Land Division
- Transport, Access and Parking

A review of these policies has not found any specific policies which would be problematic for the anticipated uses in the Affected Area. Given the size and layout of the Affected Area, it is likely that these policies can generally be satisfied with development in the Affected Area.

Parking for residential and commercial uses in the Affected Area would be assessed with any development application based on actual land use and built form layouts. The parking rates provided in the Planning & Design Code will be suitable for consideration of the anticipated uses in the Affected Area.

The location of the mixed use commercial uses adjacent Frederick Road would facilitate suitable access for higher levels of traffic and heavy vehicles associated with these uses, and minimize impacts on the adjacent residential areas.





## 7. Conclusions

Based on the analysis and discussions presented within this report, the following conclusions are made:

1. The Affected Area is located on the western side of Frederick Road to the north of Lochside Drive, in Lots 100 and 101 Frederick Road West Lakes.
2. The Code Amendment is seeking to change the existing Infrastructure zone to an Urban Renewal Neighbourhood Zone (or similar Neighbourhood Zone type) with potential for a Local Activity Centre Zone, Community Facilities Zone or a Mixed Use Subzone (pending investigations).
3. Anticipated uses will include low and medium density residential with a relatively small area of mixed use (including shop, commercial, etc).
4. New access roads are envisaged with one each on Frederick Road and Lochside Drive.
5. Traffic surveys of the existing road network and intersections indicates there is spare capacity in the road network and intersections for traffic associated with the Affected Area.
6. Both Frederick Road and Lochside Drive will increase in traffic volume but will remain within capacity for arterial road and collector roads in their current configurations. No upgrades to these roads are necessary from the impacts of the anticipated uses.
7. Based on the anticipated uses in the Affected Area, the existing Lochside Drive and Frederick Road intersection will be able to accommodate the anticipated traffic volumes based on the existing configuration. No upgrade is considered necessary from the impacts of the anticipated uses.
8. A new access road intersection on Frederick Road from the Affected Area will accommodate much of the traffic generated by the anticipated uses, with an unsignalised intersection capable of operating satisfactorily located in approximately the same location as the existing Frederick Road access point for Lot 100.
9. Other access points from the Mixed Use commercial uses fronting Frederick Road should be considered to provide flexibility for users and circulation of the commercial areas. These would be left turn entry and exit access points given the median on Frederick Road.
10. Access to the Affected Area will be suitable given the straight alignments of the fronting roads, with no impediments to sight distance for the safe operation of unsignalised intersections identified from Affected Area inspections.
11. A review of the Planning and Design Code policies relevant to the likely zoning has not found any specific policies which would be problematic for the anticipated uses in the Affected Area. Given the size and configuration of the Affected Area, it is likely that these policies can generally be satisfied with development in the Affected Area.
12. The location of the anticipated mixed use commercial uses adjacent Frederick Road would facilitate suitable access for higher levels of traffic and heavy vehicles associated with these uses, and minimize impacts on the adjacent residential areas.





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1 August 2022

Project/File: 300303510

**Zoe Garnaut**

Ekistics

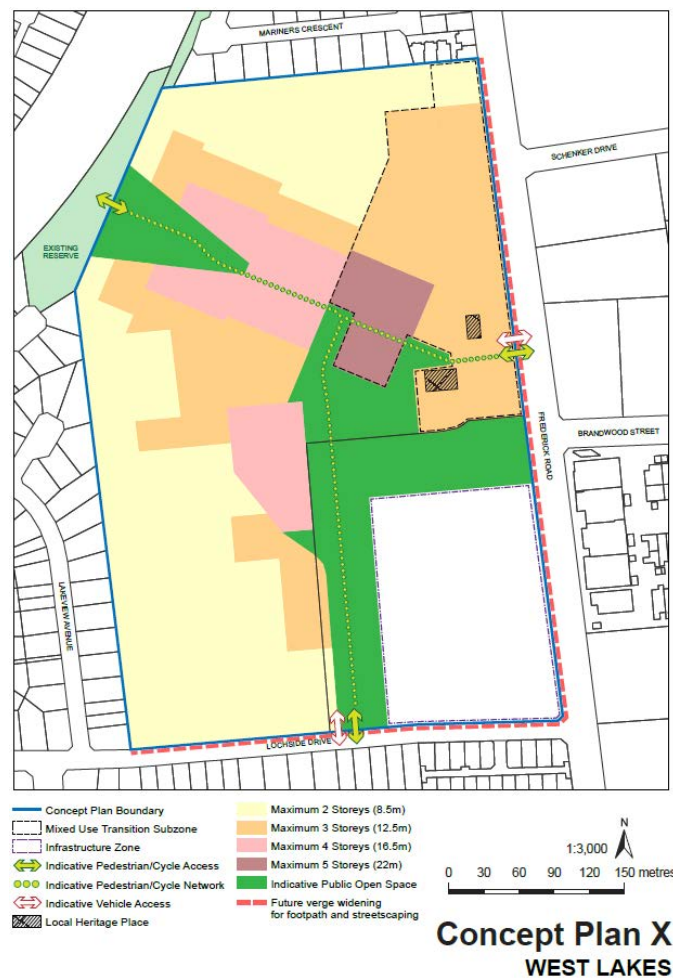
3/431 King William Street

Adelaide SA 5000

Dear Zoe,

**Reference: West Lakes Code Amendment – Concept Plan Update Traffic Review**

This letter provides advice regarding traffic management for the revised masterplan for the West Lakes Code Amendment compared to the advice provided in the Transport Impact Assessment by Stantec dated 23 May 2022, and a response to comments from Council regarding traffic management and assessment. The revised Masterplan has been prepared as a Concept Plan for the Planning and Design Code as shown below:



Reference: West Lakes Code Amendment – Concept Plan Update Traffic Review

## Revised Masterplan

It is understood that a revision to the intensity of residential development in the Masterplan has been made following consultation with City of Charles Sturt. It is understood that a reduction of medium density of 20% and increase in low density of 10% is proposed to the masterplan. Based on the Transport Impact Assessment report, this would equate to the following changes in residential development:

Type	Previous Masterplan	Change	Revised Masterplan
Dwelling Low Density	325	10% increase	358
Dwelling Medium Density	245	20% reduction	196

The revised dwelling yields have been assessed with regards to traffic generation as shown below:

PREVIOUS MASTERPLAN	Dwellings	Peak Hour Trips/Dwelling	Daily Trips /Dwelling	Peak Hour Trips	Daily Trips
Dwelling Low Density	325	0.85	9	276	2925
Dwelling Medium Density	245	0.65	6.5	159	1593
			<b>TOTAL</b>	<b>435</b>	<b>4518</b>
REVISED MASTERPLAN					
Dwelling Low Density	358	0.85	9	304	3222
Dwelling Medium Density	196	0.65	6.5	127	1274
			<b>TOTAL</b>	<b>431</b>	<b>4496</b>
			<b>DIFFERENCE</b>	<b>-4</b>	<b>-22</b>

The revised traffic generation analysis indicates the change dwelling yields would reduce traffic generate by 1 trip per hour and 22 trips per day from the volumes identified in the Transport Impact Assessment. This is an insignificant change and will not have any noticeable impact on the findings of the transport impact assessment given marginally less traffic will be generated compared to the previous assessment.

The layout shown on the revised masterplan will not change the distribution considered in the Transport Impact Assessment. There will be no change to the number of external access points to the site and the internal road network shown will not impact the assumptions for distribution in the Transport Impact Assessment.

It should be noted that the traffic generation rates used in the Transport Impact Assessment are conservative with actual traffic generation likely to be less than stated. Regardless, the Transport Impact Assessment provides a robust view of potential traffic impacts from the Code Amendment and anticipated uses within the site.

Based on the revised traffic analysis in this letter, no update to the Transport Impact Assessment is required given the minor nature of the change to traffic generation and no change to the distribution.

## SIDRA modelling

Clarifications were sought by Council on the SIDRA Intersection modelling in the Transport Impact Assessment where a Degree of Saturation was calculated for the proposed and existing intersections of greater than 1. This is correct for the initial modelling however additional modelling has been presented



**Reference: West Lakes Code Amendment – Concept Plan Update Traffic Review**

in accordance with Department for Infrastructure and Transport guidelines for better calibration and analysis of the intersection operation to match observed operating conditions on Frederick Road and Lochside Drive.

The SIDRA modelling presented in the report provides a summary of the findings from the SIDRA modelling process. As discussed in the report, SIDRA Intersection software has limitations with regards to the analysis and calibration of unsignalised intersections where there are significant gaps resulting from platooning of traffic on the main road, as occurs on Frederick Road. The modelling process always commences with a simple intersection analysis.

For this site, however, this results in SIDRA calculating unrealistic results for an unsignalised intersection where delays to right turns from a minor road will be excessive and not realistic. SIDRA uses a standard vehicle arrival algorithm which can't be calibrated sufficiently where significant gaps in traffic occur at unsignalised intersections (as observed when undertaking the traffic surveys –the operation of Frederick Road very well with Stantec staff having lived in the area for many years). This is an issue for analysis of most side streets into main roads in peak hours where there are relatively high volumes on the main road, and the platooning of traffic from nearby traffic signals can't be fully understood by the software.

As such, a more detailed process for analysis in these situations was followed where the intersection arrangement is suitable, that is there is a wide median in which vehicles can store when turning right. This enables SIDRA Intersection software to analyse each part of the right turn individually, that is gaps from the south on Frederick Road, then gaps from the north on Frederick Road. This provides a more realistic approach to determining the operation of the intersection in these situations.

Whilst the simplistic modelling indicates that the intersection will be over capacity (i.e. > 1 Degree of Saturation), the simple analysis does not consider the specific operational characteristics of the site. Hence, the staged right turn analysis has been undertaken and provides a more realistic approach to modelling the intersection. The detailed analysis has found the intersection will be operating well below capacity at less than 0.4 Degree of Saturation in the AM peak period (this is the critical peak period when most people are leaving home from a residential area).

## **Consultation with Department for Infrastructure and Transport**

A discussion with Marc Hryciuk at Department for Infrastructure and Transport on 13 May 2022 regarding the Code Amendment did not identify any specific concerns.

## **Footpaths**

The existing verge on Frederick Road is approximately about 2.5 metres in width along the whole frontage of the site. This width of verge would be suitable for a footpath of minimum 1.5m or wider up to 2.5 metres. This would be consistent with footpaths to the north and south of the site. It would also meet the guidelines for footpath widths. It is noted a wider footpath would not be available to the north and south of the site due to existing neighbouring property boundaries. Hence, the existing verge would be capable of providing a suitable width footpath consistent with existing footpaths in the area.

Similarly on Lochside Drive, the existing verge on the northern side of the road is approximately 1.5 metres wide. This would accommodate a footpath which would meet the minimum standards for a footpath. The existing boundary of the site also aligns with the existing properties to the west, in which a 1.2 metre wide footpath exists. Lochside Drive presently has a footpath on the southern side of the road which is 1.2 metres wide. The existing verge width on Lochside Drive on the northern side would be capable of providing a footpath to the same standard as the existing area to the west.

**Reference:** West Lakes Code Amendment – Concept Plan Update Traffic Review

However, the concept plan indicates verge widening to accommodate footpath and streetscaping.

I trust the above information is satisfactory. Naturally, should you have any questions or require any further information, please do not hesitate to contact me on (08) 8334 3600.

Yours sincerely,

**STANTEC AUSTRALIA PTY LTD**

A handwritten signature in black ink, appearing to read 'Paul Morris', with a stylized flourish at the end.

**Paul Morris**

Group Leader - Transportation SA  
M.Trans&Traff, MAITPM  
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DRAFT

# Frederick Road, West Lakes Code Amendment

## Heritage Impact Report

DA214082 Issue C

28.07.22

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## Preface

This Heritage Impact Report (Issue C) for the Frederick Road Code Amendment has been updated following feedback from the City of Charles Sturt, and in particular their heritage advisory Douglas Alexander.

This updated report has also been amended to accommodate some minor changes to the Code Amendment, as relevant to potential heritage impacts, including:

- Updating of diagrams, and
- Amendment to maximum building heights across the site, including a reduction from 4 storeys the 3 storeys on land containing the Local Heritage Places.

It also provides commentary to feedback regarding suggested curtilages around the affected Local Heritage Places.

## 1.0 Introduction

DASH Architects has been engaged by Potentia West lakes Pty Ltd to assess the Heritage Impacts arising from the proposed Code Amendment affecting the Local Heritage listed Port Adelaide Treatment Works located at 16 Frederick Road, West Lakes.

This report has been prepared by Jason Schulz, Director of DASH Architects. I have nearly 30 years experience as a heritage architect, with particular expertise in heritage and character assessments, heritage policy and impact assessments. I also have a detailed knowledge of the State's planning system, including relevant legislation (Planning Development and Infrastructure Act & Regs, SA Heritage Places Act & Regs and the Planning and Design Code). This collective expertise has afforded me the following past and present postings:

### Present

- Australian Institute of Architects (SA Chapter) Heritage Committee.

### Past

- State Government Heritage Reform Advisory Panel (joint AGD and DEW)
- South Australian Heritage Council (2011 to 2021)
- Local Heritage Advisory Committee (2011 through to its disbandment in 2016)

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- Deputy Presiding Member, City of Unley Development Assessment Panel
- Presiding Member, City of Adelaide Urban Design Advisory Committee
- City Centre Design Review Panel (ODASA), and
- City of Adelaide Heritage Advisor.

DASH Architects was also called upon by the Department for Infrastructure and Transport to assist in drafting the Practice Advisory Guidelines for the Planning and Design Code to assist with the designing and assessment of new development within Historic Area Overlays. I played a lead role in this process.

## 2.0 Code Amendment

The land affected by the proposed Code Amendment is identified in the below image. I understand this land parcel is recognised as Lot 100 and Lot 101, Frederick Road, West Lakes (The Affected Land). Amongst other structures, Lot 100 accommodates the Local Heritage Listed (former) Port Adelaide Treatment Works, with address known as 16 Frederick Road, West Lakes.



Figure 1: Affected Land and Affected Local Heritage Place

The Affected Land is currently located within an Infrastructure Zone, with a Local Heritage Places Overlay over both land parcels. There appears to have been a subdivision of the original land parcel in 1997, two years after the heritage survey upon which the listing is based. It was not uncommon for subdivisions post-listing to retain heritage status over the new land parcels notwithstanding some may contain no heritage places. Ideally such anomalies are corrected at the time, however such a practice was generally uncommon.

The proposed Code Amendment seeks to rezone a sizable portion to this land to an Urban Renewal Neighbourhood Zone to accommodate a broader range of uses. The south-east corner will remain an Infrastructure Zone. Land to the north-eastern corner, including that portion fronting Frederick Road and accommodating the Local Heritage Place, is also proposed as a Mixed Use Transition Subzone. Lot 100 will retain its heritage interest (and Local Heritage Place Overlay), however the Code Amendment seeks to remove the heritage status of Lot 101, and instead be subject to a Heritage Adjacency Overlay.

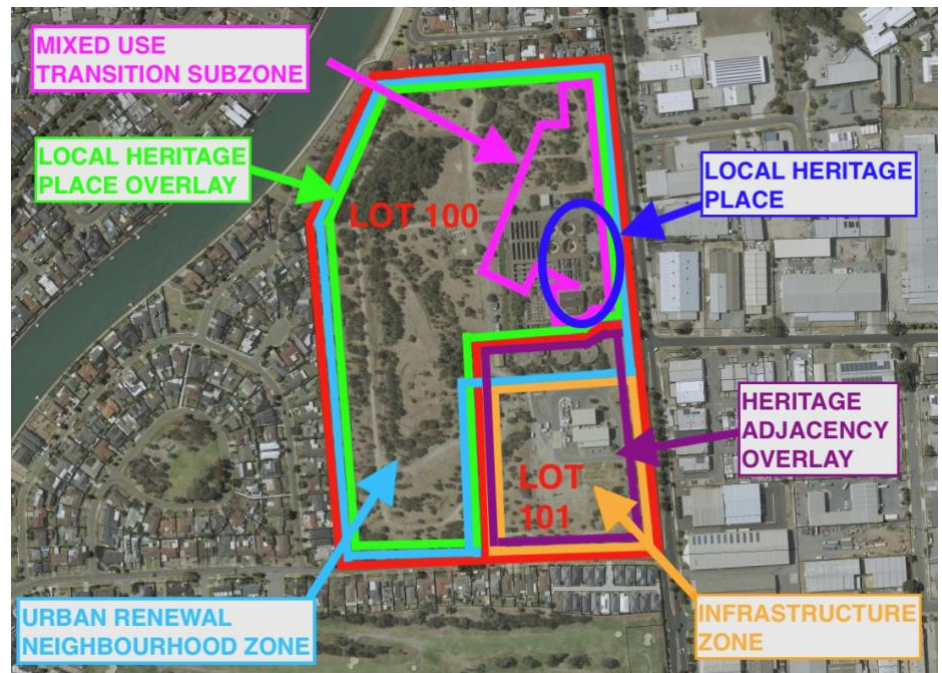


Figure 2: Proposed Zoning of Affected Land

## 3.0 Heritage Status

### 3.1 Local Heritage Listing

Part 11 of the Planning and Design Code identifies the following Local Heritage Place on the Affected Land:

16 Frederick Road, West Lakes

*Port Adelaide Treatment Works; The original form of the administration building, main plant building and the garden area located between the original administration building and Frederick Road for a distance of 50 metres to the north and south of the original administration building. Exclude sewerage ponds, all other structures and garden areas to the north, south and fronting Frederick Road.*

This Local Heritage listing was based on the assessment undertaken by Mark Butcher Architects for the then Hindmarsh and Woodville Council:

Description: An imposing and elegant sewerage treatment works complex set in a most attractive garden. Consists of a single storey administration building, a large sewerage plant building and associated sewerage ponds and water treatment area. The two buildings are constructed of red brick walls with rendered quoins, string courses and plinths and are styled in an early 1930's Inter-War Stripped Classical manner with terracotta tiled roofs. The main plant building is the most dominant and has a parapet front wall and a rendered cornice. The complex is notable for the high quality of its design and construction and its robust architectural detailing. The extensive garden is also of note, containing remnants of the original garden, including many mature palm trees.

History: The complex was erected in 1934-35, following approval by the Public Works Standing Committee in 1933 of an amended scheme for the treatment of sewerage in the Woodville and Port Adelaide areas. Marianne Hammerton reported that "it worked on the same principle as that at Glenelg but incorporated the latest pre treatment methods. This was one of the first two plants in the world to adopt pre treatment employing two stage sedimentation with natural flocculation interposed between stages." The works were enlarged in 1945

Streetscape Contribution: The complex is a major streetscape element on Frederick Road and contributes significantly to the older character of the area.

Relevant Development Act Criteria (Section 23(4)):

- (a) it displays historical economic or social themes that are of importance to the local area;
- (b) it represents customs or ways of life that are characteristic of the local area; or
- (d) it displays aesthetic merit, design characteristics or construction techniques of significance to the local area; or
- (e) it is associated with a notable local personality or event; or
- (f) it is a notable landmark in the area.

Local Heritage Significance: This property is an excellent and rare example of an Inter- War Stripped Classical sewerage works complex set in attractive gardens. The complex is of particular note for being one of the first two plants in the world to adopt pre treatment employing two stage sedimentation with natural flocculation interposed between stages. It is associated with the expansion of the sewerage system in Adelaide and with the growth and expansion of the suburbs round Port Adelaide in the 1930's. The facility is indicative of the quality of life provided in Woodville and Port Adelaide at that time. The property is an attractive and formal complex of buildings and gardens which contributes significantly to the older character of the Frederick road streetscape.

Development Implication: Retention and protection of the original form of the administration building, the main plant building, and the original



*garden setting, including all palm trees, and excluding the sewerage ponds, all other buildings and structures and newer garden areas extending to the north and south and fronting onto Frederick Road.*

My understanding is that much of the site's original treatment operations have been reduced and consolidated to the southern portion of the site, with the heritage structures now redundant and surplus to need.

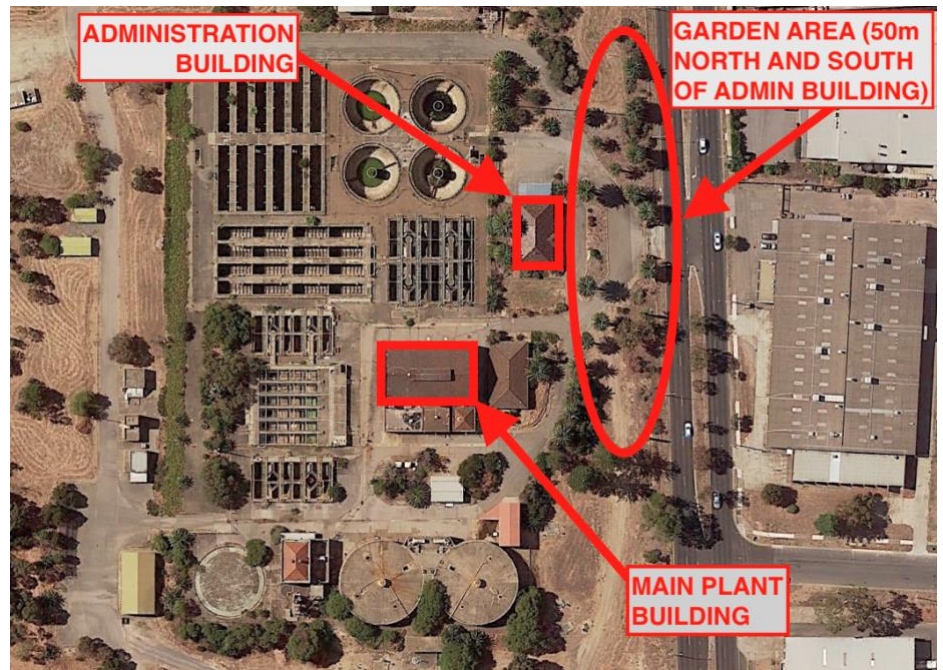


Figure 3: Local Heritage Items



Figure 4: Main Plant Building





Figure 5: Administration Building



Figure 6: Gardens

## 3.2 Observations

While it is neither the scope nor purpose of this Impact Assessment to review the current heritage listing, I make the following observations.

Figures 7-9 below are aerial photographs of the Port Adelaide Sewerage treatment works shortly after construction (1935). Figures 8 and 9 clearly show the Main Plant and Administration Buildings (noting the latter has since been extended to the north).

Clearly evident in these images is the lack of any meaningful, or ornamental landscaping. This was to be expected: given its use the site was located in an isolated location. While any landscaping in the below images would unlikely

have established at the time of the photos, it appears highly unlikely that any would have meaningfully featured given the site use and location.

Figure 10 (1959) shows subsequent landscaping to the foregrounds of the facility, with a circular driveway in front of the Administration Building, with site access radiating off. Figure 11 (1969) shows less landscaping, and most likely of a more formalised nature.

The extent to which the landscaping contributes towards the identified heritage values of the place is questionable, with the Heritage Survey appearing to include the feature in the listing as they *contribute significantly to the older character of the Frederick Road streetscape*.

For the purposes of this Heritage Impact Assessment the landscaping will be considered to be included in the Extent of Listed Place, however a more accurate understanding of which landscape features, and their relative heritage values, may be warranted in considering any future development proposal for the site.



Figure 7: Broad aerial view of Pt Adelaide Treatment works, 1935. Source: Geoscience Australia



Figure 8: Close aerial view of Pt Adelaide Treatment works, 1935. Source: Geoscience Australia

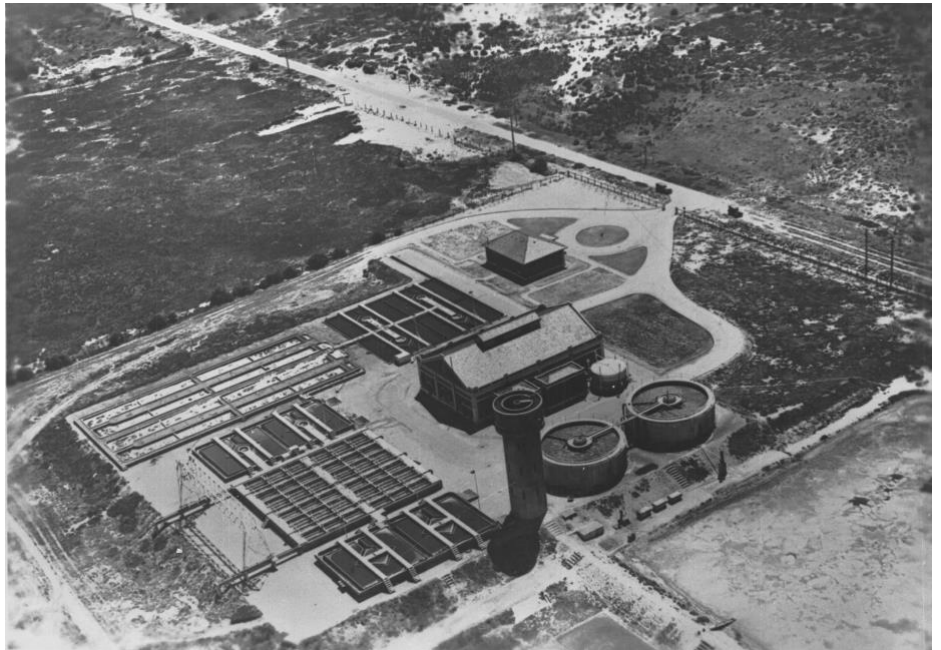


Figure 9: Aerial view of Pt Adelaide Treatment works, 1935. Source: Wikimedia Commons



Figure 10: Aerial view of Pt Adelaide Treatment works, 1959. Source: Mapland



Figure 11: Aerial view of Pt Adelaide Treatment works, 1956. Source: Mapland

## 4.0 Heritage Impact Assessment

This Heritage Impact Assessment will primarily focus on the Affected Land accommodating the Local Heritage Place. This Affected Land is sought to be rezoned from an Infrastructure Zone to an Urban Renewal Neighbourhood Zone and Mixed Use Transition Subzone.

The portion of the Affected Land that accommodates the Local Heritage Place remain within a Local Heritage Place Overlay, with the eastern land parcel amended to a Heritage Adjacency Overlay. These Overlays reflect the actual heritage status of the Affected Land, and will generally prevail where a tension in policy arise.

### 4.1 Permissible Land Uses

I understand the Main Plant and Administration Building are no longer in active use and surplus to operational needs. The Desired Outcome of the existing Infrastructure Zone notes:

*Infrastructure Zone Desired Outcome 01*

*The protection, provision, maintenance and expansion of infrastructure services and facilities that support orderly development and vehicular movements*

PO1.1 of the Infrastructure Zone seeks development typically comprising of infrastructure, namely:

- a) Electricity substation
- b) Landfill, including gas extraction plant and equipment
- c) Water treatment and supply
- d) Stormwater retention / detention basin
- e) Sewerage treatment facility
- f) Public service depot
- g) Telecommunications facility
- h) Waste transfer depot.

The Code Amendment seeks to rezone the land to expand both possible uses of the Local Heritage Places, and surrounding land. The Desired Outcome of the Urban Renewal Neighbourhood Zone notes:

*Urban Renewal Neighbourhood Zone Desired Outcome 01*

*Housing and other land uses which no longer meet community preferences are replaced with new diverse housing options. Housing density increases, taking advantage of well-located urban land. Employment and community services will improve access to jobs, goods and services without compromising residential amenity.*



PO1.1 of the Urban Renewal Neighbourhood Zone seeks a broader range of development types than otherwise permitted on the affected land, namely:

- a) Ancillary accommodation
- b) Community facility
- c) Consulting room
- d) Dwelling
- e) Educational establishment
- f) Office
- g) Place of Worship
- h) Pre-school
- i) Recreation area
- j) Residential flat building
- k) Retirement facility
- l) Shop
- m) Student accommodation
- n) Supported accommodation

The land closest to the Frederick Road frontage is also proposed to include a Mixed Use Transition Subzone, that further broadens the potential land uses to include (as outlined in PO1.1):

- a) Dwelling
- b) Entertainment venue
- c) Licenced premises
- d) Hotel
- e) Consulting room
- f) Indoor recreation facility
- g) Light industry
- h) Motor repair station
- i) Office
- j) Place of worship
- k) Research facility
- l) Retail fuel outlet
- m) Service trade premises
- n) Shop
- o) Store
- p) Tourist accommodation
- q) Training facility

Redundant industrial heritage is notoriously problematic when considering new uses, as:

- Facilities were often highly customised, and purpose specific. This can limit flexibility and economics for ongoing or alternative uses, and
- They can be located in areas (such as industrial areas) that can limit the economics or desirability of alternative uses.

Accommodating compatible uses for heritage places is often the most significant action that can be undertaken to securing their long term care and protection, and achieving the Desired Outcome of the Local Heritage Places Overlay:

*DO1: Development maintains the heritage and cultural values of Local Heritage Places through conservation, ongoing use and adaptive reuse.*

Broadening the range of permissible land uses around the site (in particular residential and commercial) will encourage an economic uplift to the locality, and assist in providing conditions that are more likely to support new investment and use in the heritage places on the Affected Land.

The inclusion of the Mixed Use Transition Subzone for the land accommodating the heritage places only further assist this, by providing increased flexibility of use, including options that appear well suited to the Main Plant buildings, such as indoor recreation facility, light industrial, motor repair station, research facility, service trade premises, store and training facility.

In summary, the proposed change in permissible land use is considered to have a positive heritage impact on the Local Heritage Places on the site, and provide greater scope to achieving the Desired Outcomes of the Local Heritage Places Overlay.

## 4.2 Change in Heritage Overlays

The Code Amendment seeks to rectify a residual heritage interest on Lot 101, that was created as a result of what appears to be a subdivision of the original land parcel in 1997. Under the proposal, Lot 101 will be subject to a Heritage Adjacency Overlay, while Lot 100 will retain the current Local Heritage Places Overlay.

The Main Plant and Administration Building are clearly located within the boundaries of Lot 100. Part 11 of the Planning and Design Code defines the extent of gardens included in this listing as being that:

*located between the original administration building and Frederick Road for a distance of 50 metres to the north and south of the original administration building*

A measurement taken from the SA Property and Planning Atlas (SAPPA) indicates that the Administration Building is located approximately 68m from the Lot 101, meaning that the listed gardens finish approximately 18m from this boundary. While SAPPA is not an accurate method of measuring distances or boundary locations, I consider this to be a sufficient buffer as to confidently conclude that the listed gardens are fully contained within Lot 100.

On this basis I consider it entirely appropriate that Lot 101 be changed from a Local Heritage Place Overlay, to a Heritage Adjacency Overlay.

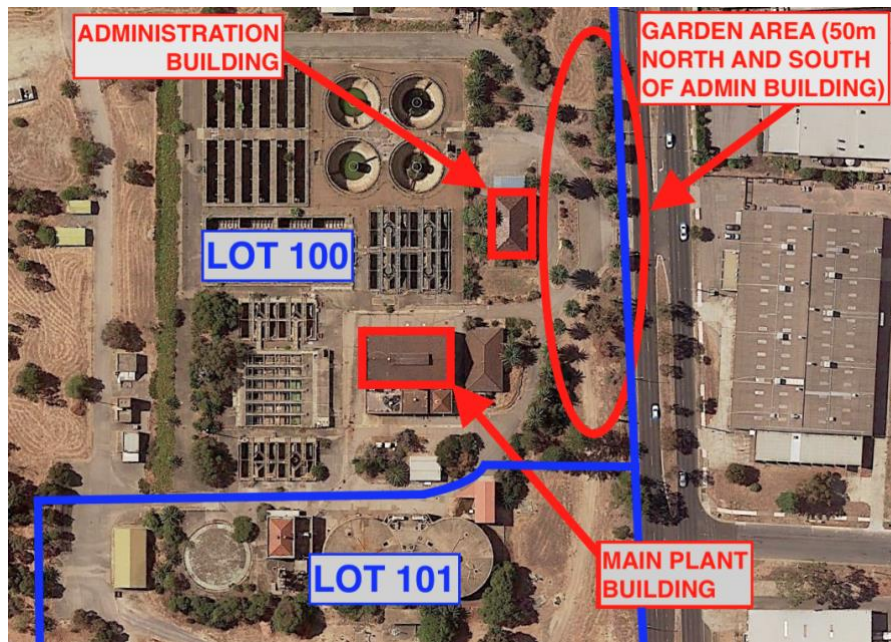


Figure 12: Location of Local Heritage Place within title boundaries.

## 4.3 Development In Proximity

Figure 12 below illustrates the maximum height limits on land surrounding the Local Heritage Place, and includes building heights of:

- 3 levels (12.5m) for the land accommodating the heritage places
- Between 2 and 5 levels (8.5m and 22m) for the remainder of the site

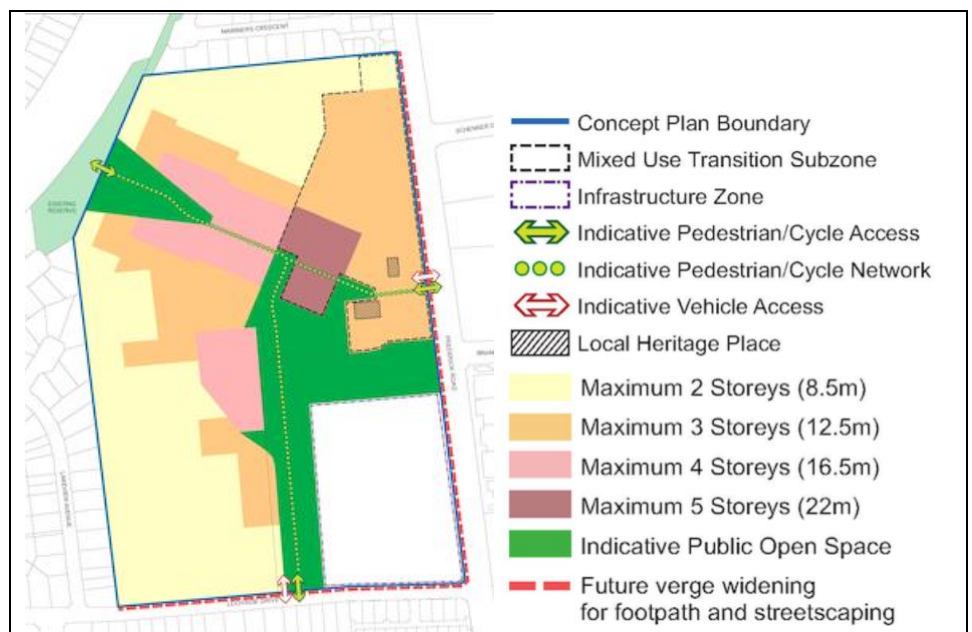


Figure 13: Concept Plan showing proposed height limits. Source: Ekistics

Feedback from the City of Charles Sturt, and their heritage advisor, had suggested the Concept Plan (Figure 13) be amended to provide a *separation between the Local Heritage Places and the maximum building heights*, as well as the *provision of greater definition of the portion of land in front and the side of each Local Heritage place where buildings cannot occur*. That is to say the Concept Plan should include prescribed curtilages around the heritage places with additional development control.

It is noted that the Concept Plan has amended the maximum building heights for land containing the Local Heritage Places from 4 storeys to 3, however the inclusion of additional curtilages around the heritage places has not.

While Zone (and Subzone) height limits inform the intended intensity and scale of development envisaged around the Local Heritage Place, any subsequent development proposals will remain subject to the provisions of the Local Heritage Places Overlay, or Heritage Adjacency Overlay. Both of these Overlays seek development that *maintains the heritage and cultural values* of the Heritage Place, and provides Performance Outcomes measures to achieve this. These are standardised planning controls for most Local Heritage Places across the State.

There does not appear to be anything particularly unique with regard to the setting of the affected Local Heritage Places to necessitate additional planning controls beyond these standard provisions. Defined curtilages to a heritage place can be a blunt measure to control the potential impacts to the setting of a heritage place arising from adjacent development. In my opinion, such measures should only be used where the setting (or views) are intrinsic to the heritage values of the place. They can also be counterproductive to the potential adaptive reuse of a heritage place, and limit the assessment of specific proposals on their individual merits.

The relevant heritage Overlays of the Code enable impacts to the setting of heritage places to be considered on their individual merits. These include:

#### Land Division of a Local Heritage Place

*PO4.1: Land division creates allotments that:*

- (a) maintain the heritage values of the Local Heritage Place, including **setting***
- (b) are of a dimension to accommodate new development that reinforces and is **compatible with the heritage values** of the Local Heritage Place*

#### Development of a Local Heritage Place

*PO1.1 The **form** of new buildings and structures maintains the heritage values of the Local Heritage Place*

*PO1.2 Massing, scale and **siting** of development maintains the heritage values of the Local Heritage Place.*

*PO1.6 New buildings and structures are **not placed or erected between the primary or secondary street boundaries** and the façade of a Local Heritage Place*

*PO2.1 Alterations and additions complement the subject building and are sited to be **unobtrusive, not conceal or obstruct heritage elements and detailing**, or dominate the Local Heritage Place or its setting.*

*Development Adjacent a Local Heritage Place*

*PO1.1 Development adjacent to a State or Local Heritage Place does not **dominate, encroach on or unduly impact on the setting** of the Place*

*Land Division Adjacent a Local Heritage Place*

*PO2.1 Land division adjacent to a State or Local Heritage Place creates allotments that are of a size and dimension that enables the siting and setbacks of new buildings from allotment boundaries so that they **do not dominate, encroach or unduly impact on the setting** of the Place.*

Given the past industrial use of the site, and the heritage values of the affected Local Heritage Places, I am satisfied that the proposed maximum height limits and the planning control of the relevant heritage Overlays will not result in development that is at odds with the heritage and cultural values of the Local Heritage Place.

## 5.0 Summary

The Affected Land consists of two allotments that originally accommodated the Port Adelaide Treatment Works, Lot 100 and 101 that appears to have been subdivided in 1997. The Local Heritage listed structures associated with the Treatment Works are located entirely within Lot 100, and stand redundant to current site operations, that have been consolidated within Lot 101. Both land parcels retain a Local Heritage interest, despite Lot 101 containing no heritage place.

The Code Amendment seeks to rezone this otherwise underutilised land, providing a greater range of permissible uses for both the heritage place, and surrounding land. This change is considered to have a positive impact on the Local Heritage Places on the site, significantly improving the likelihood of the ongoing use and care for these currently vacant and redundant facilities.

The change of Lot 101 to a Heritage Adjacency Overlay is consistent with the site conditions, namely that the heritage place is located on the adjacent site (Lot 100).

Finally, the Code Amendment's proposed uplift of maximum building heights remains consistent with the management of the heritage and cultural values of the Local Heritage place, given its former industrial use and the presence of the respective heritage overlays.



DRAFT

# NOVO

WEST LAKES

# ASPECT Studios

V1	Urban
1	Introduction
2	Site Context
3	Open Space Strategies
4	Opportunities & Constraints
5	Landscape Masterplan

# tectvs

V2	Built Form
1	Conditions
2	Concept

1

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The Planning and Design Code is subject to ongoing strategic reviews and amendments to ensure that planning trends and community issues are balanced, reflecting the desired future character for an Affected Area.

The Affected Area for this Code Amendment is an outdated and abandoned sewerage treatment facility that is anticipated to be repurposed into a thriving new residential community.

Seeking to capitalize on the site's unique location, coupled with the growing demand for infill housing within close proximity to open space and urban centres, the future Novo development seeks to reactivate existing local heritage buildings and create new destinations that connect with the existing and future fabric of the area.

By reconfiguring the land and providing a new urban framework, the anticipated redevelopment facilitated by this Code Amendment will create new opportunities for open space, tree lined streets and waterfront recreation. Future residents, and existing residents in the surrounding neighborhood, will be able to enjoy the added amenities that are anticipated in this report to reactivate this parcel of land.







# PROJECT LOCATION

The Affected Area is within the City of Charles Sturt and is bounded by Frederick Rd to the east, Delfin Island and lake to the west, West Lakes residential suburb to the north, and West Lakes Golf Club to the south. It is a 25 minutes drive to the Adelaide CBD and 5 minutes drive to the beach. It is nestled between the major coastal centres of Henley Beach and Port Adelaide.

The Affected Area is close to public transport and community reserves which serve the surrounding suburbs and regional catchment areas. Other existing assets include formal and informal recreation, community facilities such as sporting clubs, as well as industrial and commercial shopping precincts. The Affected Area is well placed directly adjacent the West Lakes shore and linear park, providing lake views and opportunities for water recreational activities.





# HISTORY & HERITAGE

The Affected Area, formerly owned by SA Water and known as the Port Adelaide Treatment Works, was originally used for sewerage treatment from early 1930's to 2004. It was one of the first two plants in the world to adopt sewerage pre-treatment process employing two stages of sedimentation. The treatment complex is a major streetscape element on Frederick Road and contributes significantly to the older character of the area. It is of local heritage significance.

Sewerage plant facilities consist of two single storey administration buildings (one is in poor condition), two red brick structures housing mechanical infrastructure, a large sewerage plant building with associated sewerage ponds and water treatment areas.

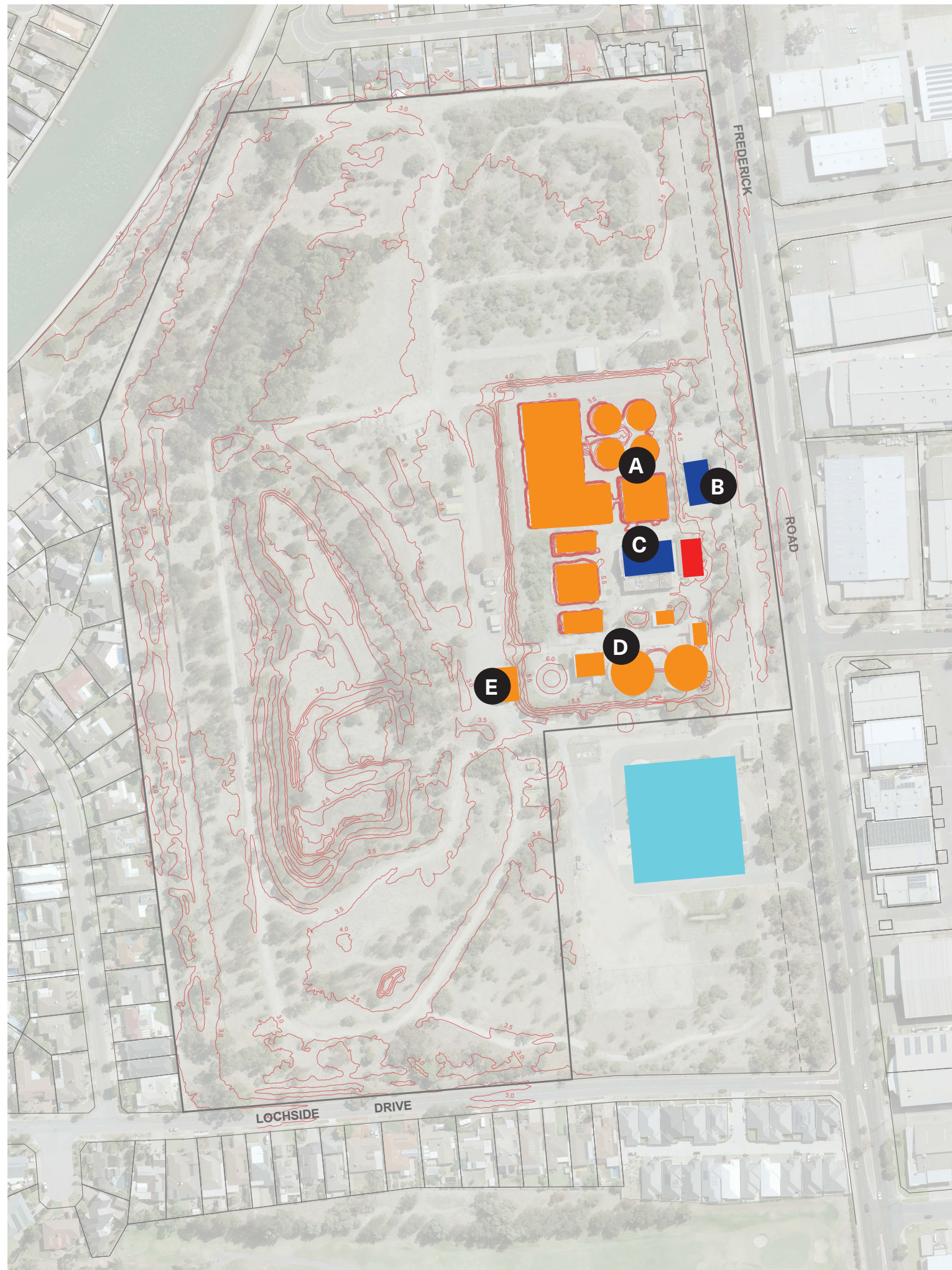
The southern portion of the Affected Area (portion of Lot 101) will be retained by SA Water where a modern pumping station will continue to operate, pumping sewage north to the Bolivar wastewater treatment plant through a 17km pipeline.

Erected in 1934-35, the two administration buildings have walls constructed of red brick with rendered quoins, string courses and plinths, and are styled in an early 1930's Inter-War Stripped Classical style with terracotta tiled roofs. The complex is noted for the high quality of its design and construction and its robust architectural detailing.

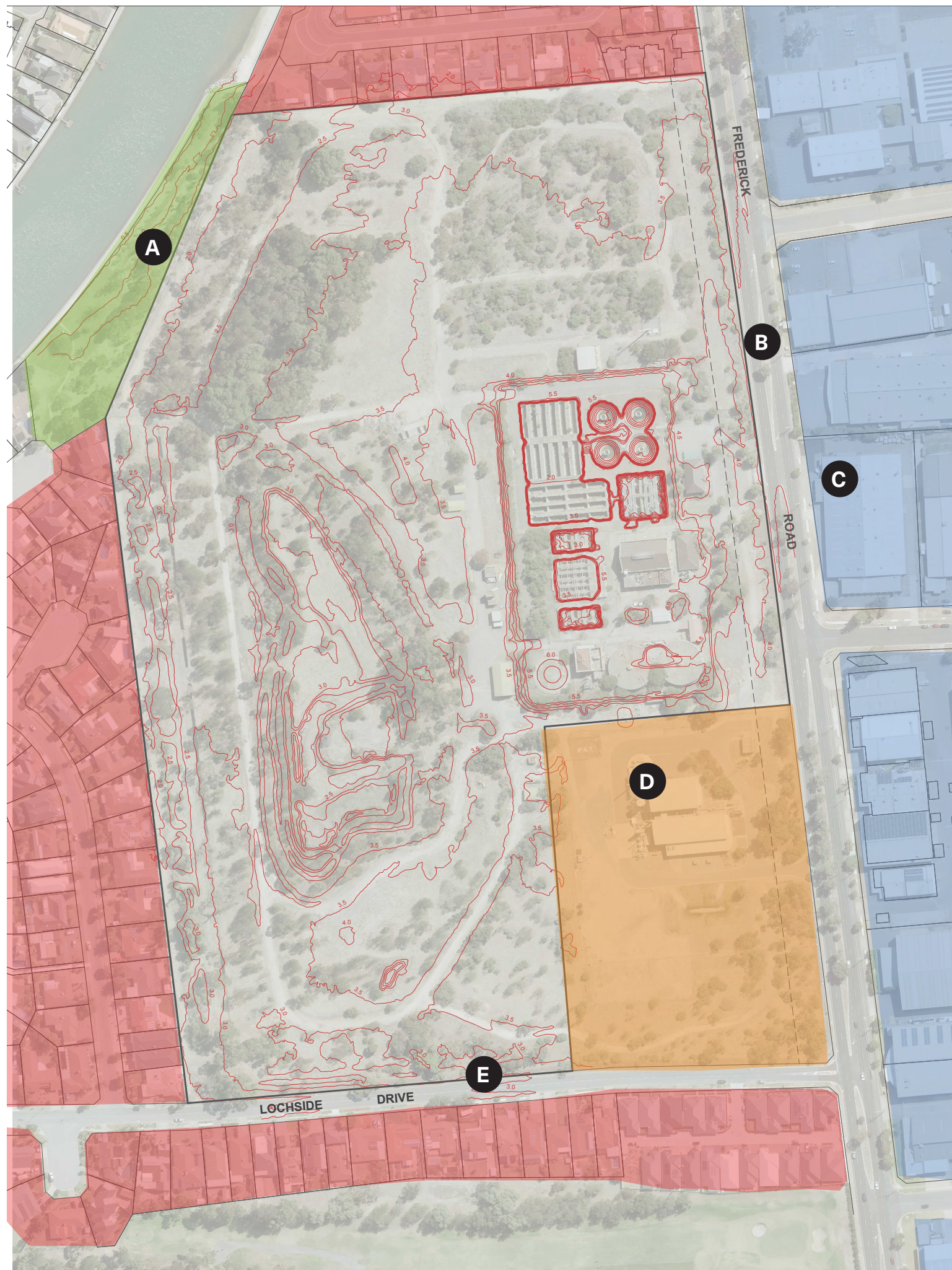
The anticipated redevelopment of this Affected Area facilitated by the Code Amendment supports the retention and protection of the administration building in good condition, the main plant building, and remnants of the original garden and associated palm trees. The sewage ponds and other miscellaneous buildings and structures would not be retained

## LEGEND

- Heritage Buildings in Good Condition
- Building in Poor Condition
- Old Sewage Treatment Plant
- Sewage Pumping Station







MARINER RESERVE



FREDERICK RD



COMMERCIAL USES



SEWAGE PUMP STATION



LOCHSIDE DR

# AFFECTED AREA

The Affected Area is adjacent a diverse set of land uses, including semi-industrial, commercial, residential, lakeshore and open space. To the east of the site fronting Frederick Road is a mix of large allotment semi-industrial and commercial businesses.

Directly to the north and south of the Affected Area are residential areas established as part of the original West Lakes development. The sites northern and a large section of the western boundary directly interface with the rear boundaries of existing residential properties. Lochside Drive provides a road reserve separation to the residential properties interfacing with the Affected Area's southern boundary.

Adjacent to the western boundary and extending north and south is the water body of West Lakes. The northern portion of the western boundary provides direct lake edge access via Mariners Reserve.

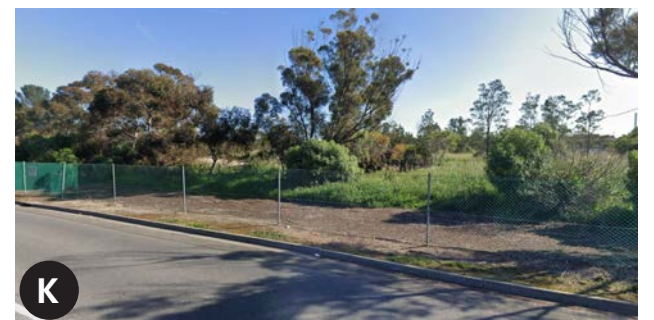
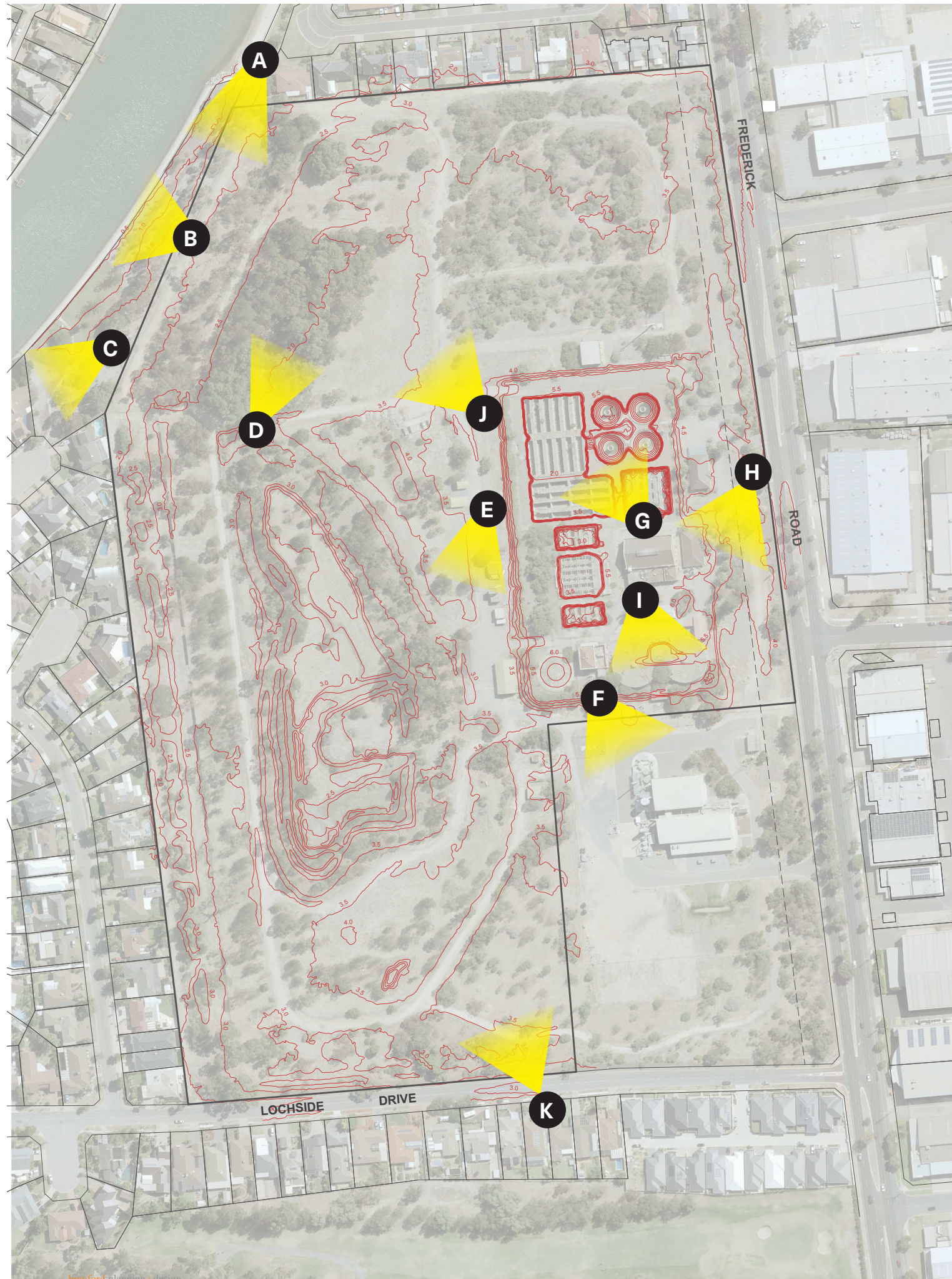
The topography of the site is generally flat with a slight rise in elevation from the lake edge to Frederick Road. There is a 5m drop from the highest point on site to the lake edge.

## LEGEND

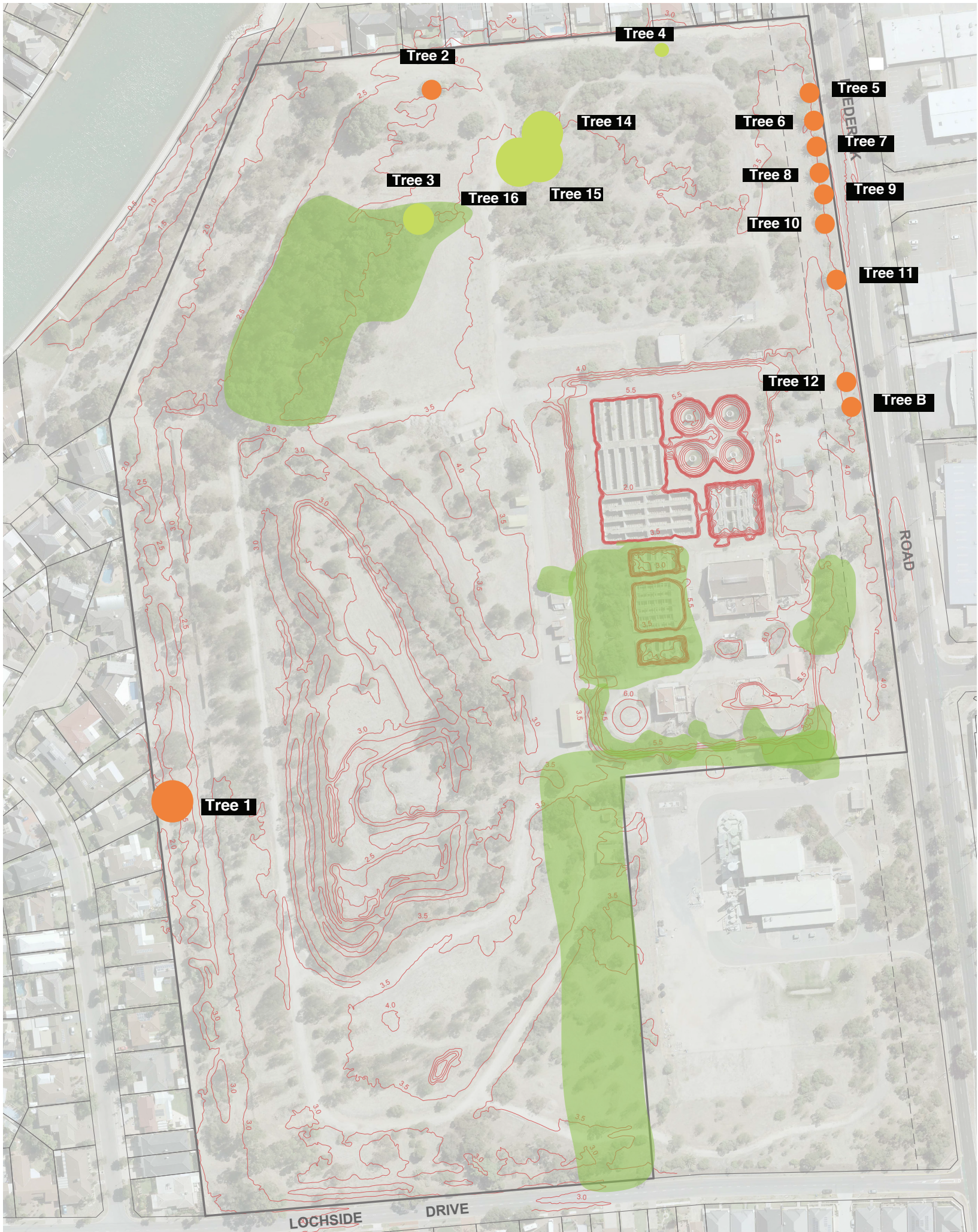
- SA Water land
- Residential Area
- Mariners Reserve
- Semi -industrial area



# AFFECTED AREA CHARACTER







TREE 1: *Corymbia citriodora*



TREE 5-13: *Phoenix canariensis*



Norfolk Island pines

### LEGEND

- Retention Rating Moderate
- Retention Rating Low
- Opportunity for retention

## VEGETATION

The Affected Area has a large number of predominantly native tree species including Eucalypts, Corymbis, Grevillea, Melaleuca, Acacia and Allocasuarina. There are also mature exotic species such as Phoenix palms and Norfolk Island Pines.

A preliminary tree assessment was carried out by Arborman Tree Solutions. Sixteen trees were identified as regulated or significant and these were evaluated to determine if they must be considered for retention and protection.

Botanic name	Common Name	Num-ber of Trees	Origin	Tree Num-ber
Agonis flex-uosa	Willow Myrtle	3	Native	14-16
Allocasuarina verticillata	Drooping Sheoak	1	Indige-nous	4
Corymbia citriodora	Lemon Scented Gum	1	Native	1
Eucalyptus botryoides	Southern Mahogany or Bangalay	1	Native	3
Phoenix canar-iensis	Canary Island Date Palm	10	Exotic	2 and 5-13

The assessment has identified Trees 14-16, are Significant Trees, and Trees 2, 3 and 5-13, are Regulated Trees as defined in the Planning, Development and Infrastructure Act 2016. The remaining trees, Trees 1 and 4, are exempt from regulation; Tree 1 is within 10 meters of a dwelling and Tree 4 is dead.

Significant and Regulated Trees should be preserved if they meet aesthetic and/or environmental criteria as described in the Planning, Development and Infrastructure (General) Regulations 2017. When assessed against the relevant 'Desired Outcomes', 'Performance Outcomes' and 'Designated Performance Features' none of the trees are considered to provide 'important' aesthetic and/or environmental benefit and as such their protection as Regulated/Significant Trees that prevents an otherwise reasonable and expected development is not warranted.

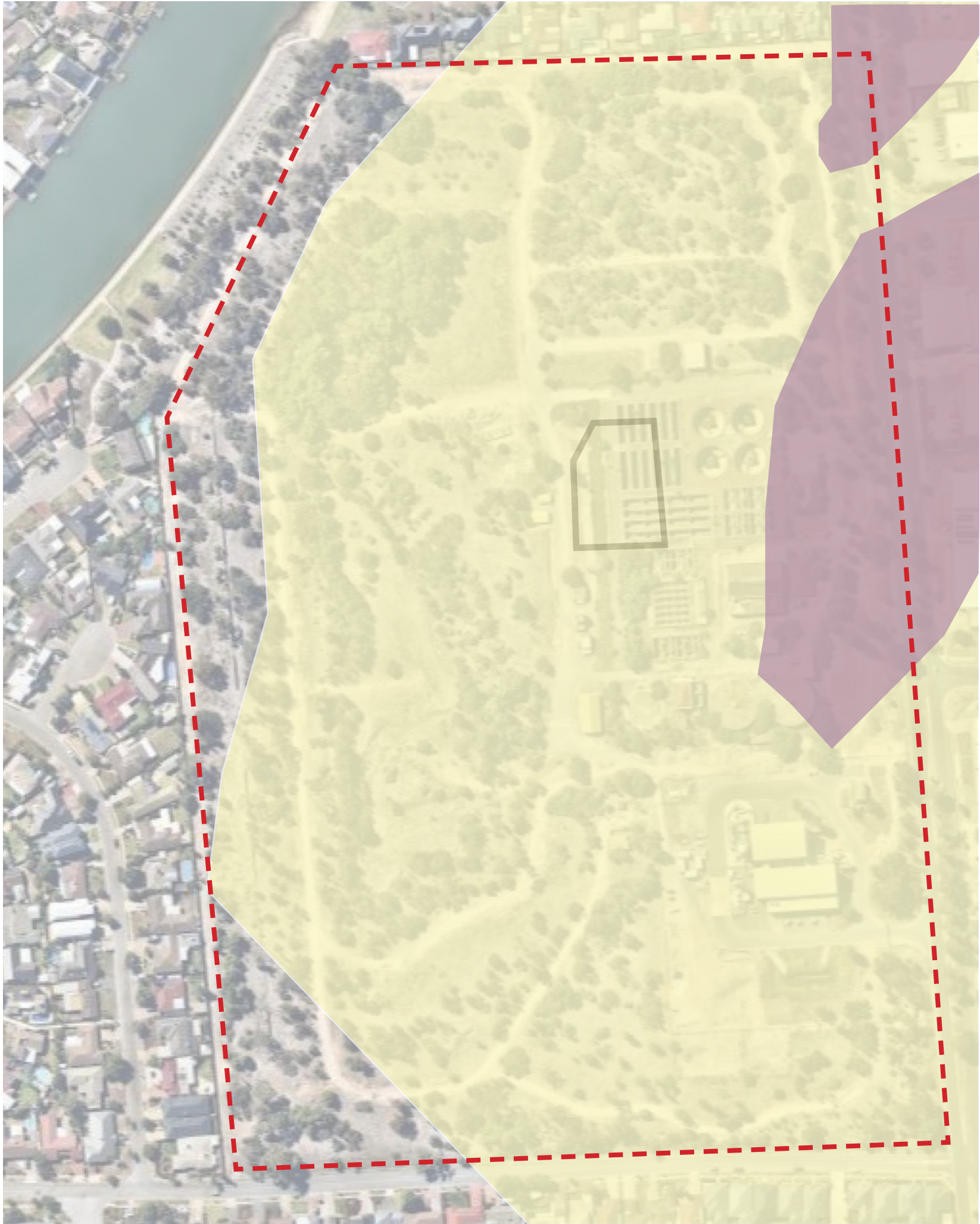
The assessment identified the following trees as having a moderate retention rating:

Tree 1: Lemon Scented Gum (*Corymbia citriodora*)

Trees 5-13: Canary Island Date Palm (*Phoenix canariensis*)

Other trees that are not regulated or significant but have a high visual amenity and are located in areas that are anticipated to become public or private open space should also be considered for retention in the concept via a future land division application wherever possible.







# SOILS AND VEGETATION

The Affected Area consists of two distinct soil groups. A large portion of the Affected Area contains red brown earth ( red brown clay to red brown sandy clay) which was originally grasslands consisting of Spear grass and Wallaby grass. Portions of the Affected Area to the east consist of old dune sand and heavy red brown clay soils ,

Theres were originally woodlands consisting of Callitris preissii, Allocasurina verticillata and Banksia marginata tree species.

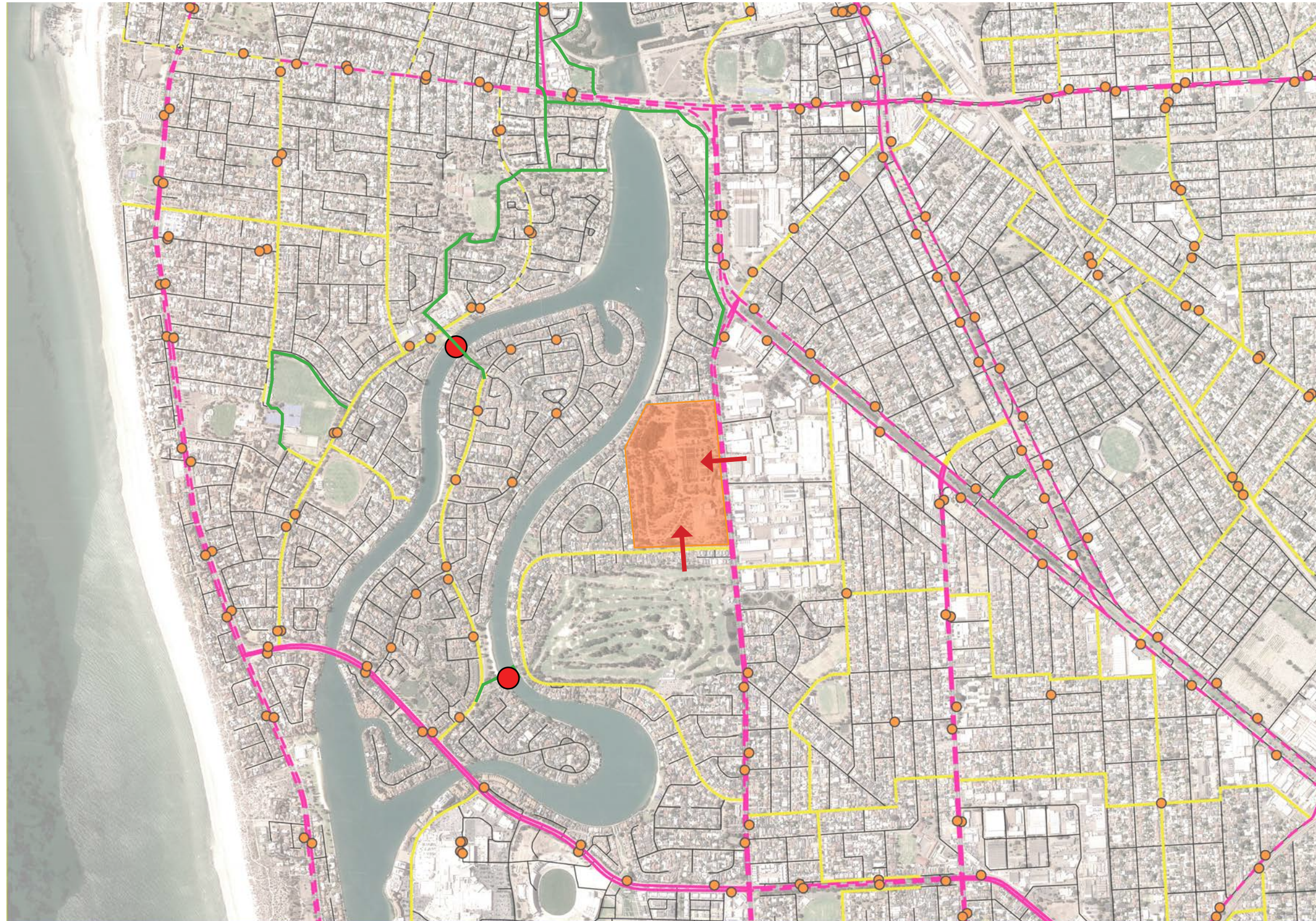
LEGEND	
	Red brown earth (Redbrown clay to red brown sandy clay)
	Old dune sand ,heavy red brown clay soils



# TRAFFIC ANALYSIS

The Affected Area is located on Frederick Road which is a State maintained road in the Greater Adelaide road network. Frederick Road is a dual carriageway road with separate bikeways .There are no bus routes that pass by the Affected Area .There is a bus stop 800 meters to the south that connects to the Seaton loop bus route.

The site is accessible from the south through Lochside Drive which is a single carriageway secondary road.



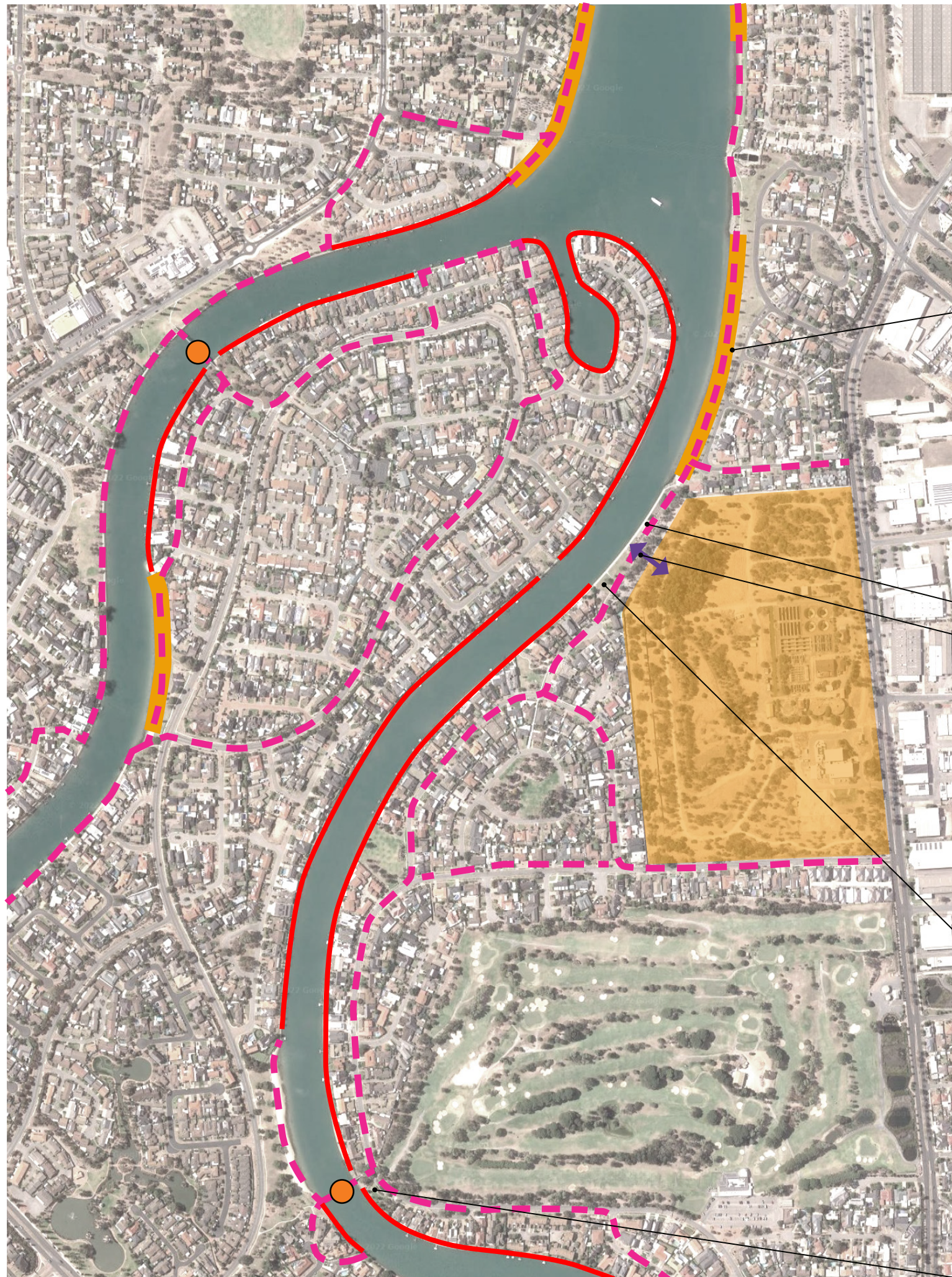
## LEGEND

<span style="color: magenta;">—</span>	State Maintained Rd
<span style="color: magenta;">- - -</span>	State Maintained Rd with Bike lane
<span style="color: yellow;">—</span>	Secondary Rd
<span style="color: yellow;">- - -</span>	Secondary Rd with Bike Lane
<span style="color: black;">—</span>	Tertiary road
<span style="color: orange;">●</span>	Bus Stop
<span style="color: red;">←</span>	Anticipated Access Points
<span style="color: red;">●</span>	Footbridge
<span style="color: green;">—</span>	Bike direct



# LAKE ACCESS & LINK ROUTE

There is an opportunity to connect the Affected Area to the water edge through Mariners Reserve. Currently the Reserve consist of scattered planting with a pathway and access steps to the lake. There is a walking path along the lake edge as you walk north which connects to Settlers Reserve . The water edge to the south of Mariners reserve consists of private frontage and the lake access walking route moves away from the water edge cutting through the residential area.



Public Lake Access Beach



Public Lake Access Steps

Opportunity for pedestrian and cyclist connection Via Mariners Reserve into broader West Lakes shore pathway network



Private Lake Frontage



Footbridge

## LEGEND

- Walkways connections to water front
- Private Frontage
- Beach
- Footbridge
- ↔ Anticipated Pedestrian connectivity to lake edge



3

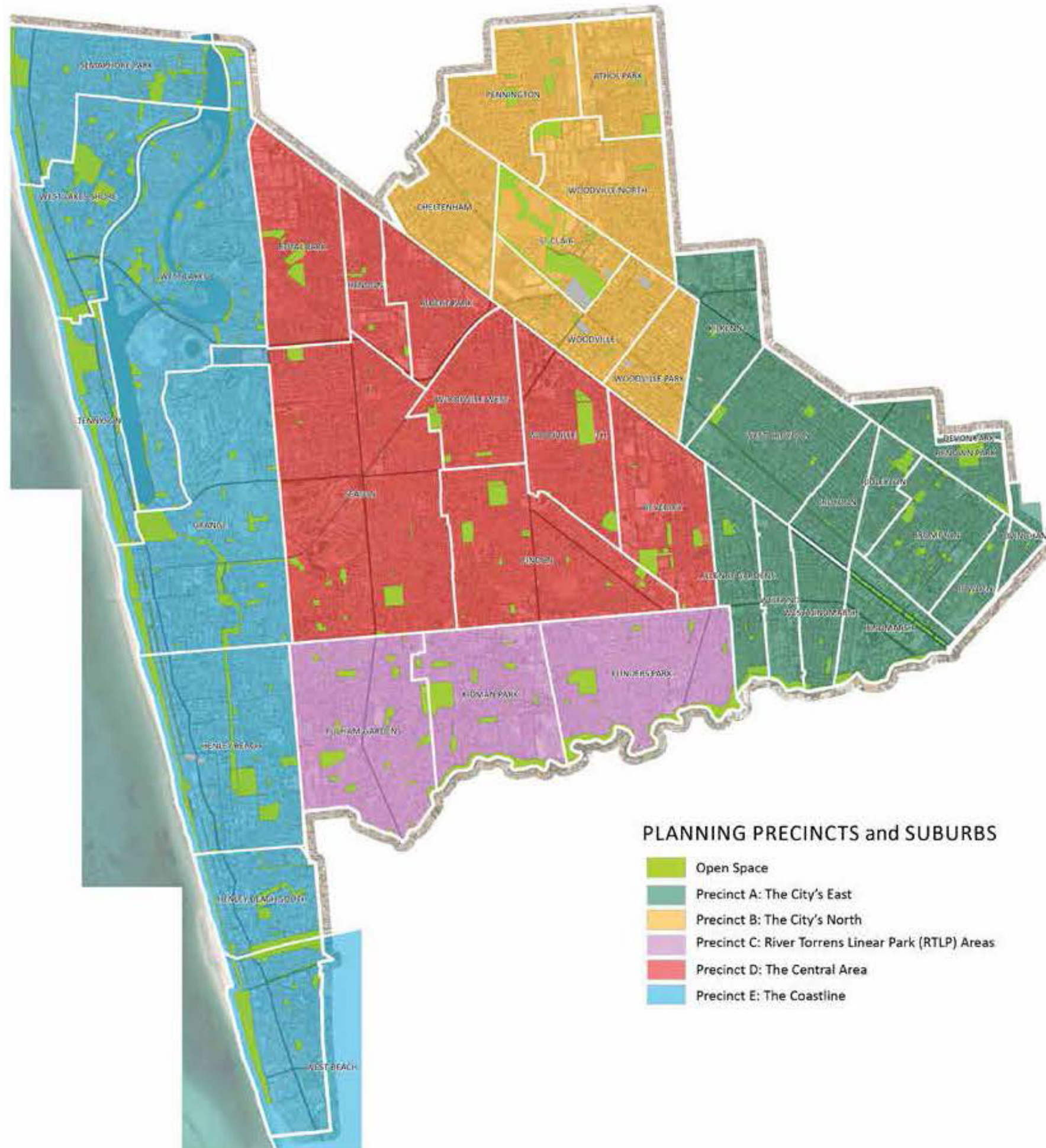
# Open Space Strategies

# OPEN SPACE STRATEGY

The City of Charles Sturt open space vision is “Enhancing Quality of life Through Open Space”. The Council’s key principles to achieve this vision are:

1. Improve the provision of open space in areas to meet around three hectares per 1,000 people and parks at least 0.2ha.
2. Provide a number of recreation destinations across the city (generally higher level regional and district waterfront reserves as well as some smaller neighborhood destinations).
3. Provide and improve sport and aquatic facilities.
4. Strengthen the ‘Walkability’ of the city through good open space connections within and beyond the city.
5. Strengthen biodiversity, ecosystems and natural settings to protecting, managing and enhancing natural areas.
6. Enhance the quality and diversity of open space through innovative landscape design including a strategic approach to landscape architecture principles and design trends.
7. Achieve sustainable landscapes, water management and climate adaptation approaches through a targeted and innovative approach to using water, designing stormwater systems, managing trees and landscapes, and designing spaces and structures.
8. Place making and place activation.
9. Achieve well managed and maintained open spaces through a coordinated and planned approach, including through a hierarchical approach to management and the potential allocation of additional people and funding resources.

These principles will be employed in the landscape design of Novo, West Lakes.





[illegible]

The City of Charles Sturt currently has 434.5 hectares of reserves and streetscape. Based on a projected future population of 125,889 in 2026, this represents 3.45 hectares per 1,000 people.

In the City of Charles Sturt, the Precinct E has a high provision of open space with 220.61ha (7.21ha/1000), this is due to the precinct including open space that has wider regional value. As this open space is likely to benefit people from across and beyond the city, a greater focus on maintaining and enhancing open space in Precinct is therefore likely to be justified.

- Demand for places for people to gather and connect
- Opportunities for active lifestyles to support younger adults including walking and bike riding
- Potential demand for family oriented opportunities

- Lake has value although limited access to the foreshore
- There is poor permeability around the streets with cul de sacs
- Lack of street trees
- Difficulty accessing beach connections by pedestrians

- Need to improve connections
- Potential to strengthen the quality and usability of open space



# OPEN SPACE DISTRIBUTION

The Affected Area is within close proximity to several existing open spaces, including Mariner Reserve on the lake front, and several Neighborhood Open Spaces. Most of the open space areas are within 10 minutes or 800 meters walk of the site. These reserves include:

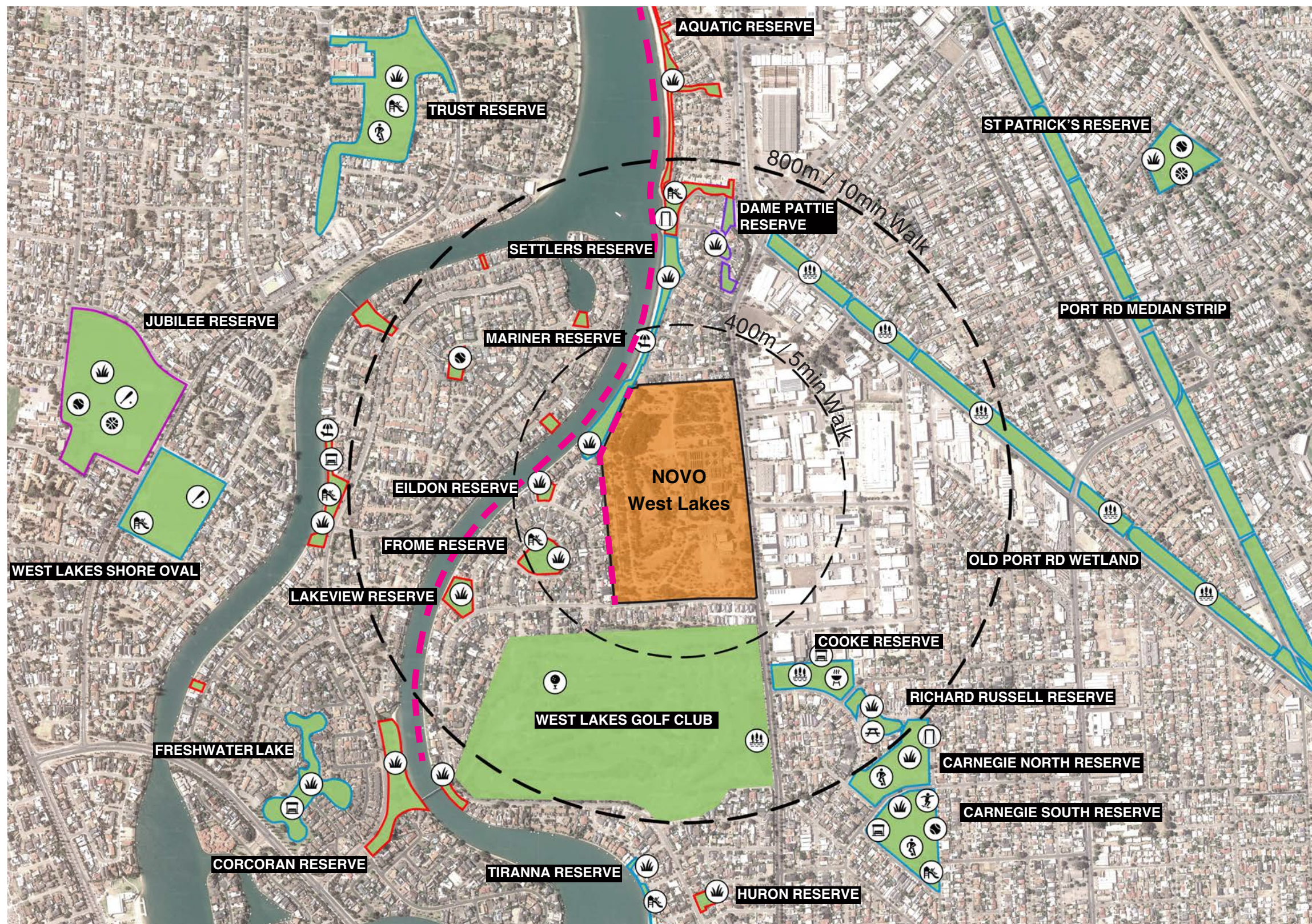
- Dame Pattie Reserve
- Settler Reserve
- Mariner Reserve
- Eildon Reserve
- Frome Reserve
- Lakeview Reserve
- Cooke Reserve
- Richard Russell Reserve

## KEY

	Beach		Golf Course
	Irrigated Lawn		Wetland
	Fitness Station		Play Facilities
	Tennis Court		Baseball Club
	Basketball Court		Shelter
	Soccer Club		Picnic Area
	BBQ Facilities		Dog Park

## LEGEND

	Regional Open Space
	District Open Space
	Neighborhood Open Space
	Local Open Space
	Barrier





# OPEN SPACE GAP ANALYSIS

A comparison between what is currently available, and the future needs of the Affected Area will help to establish the gaps in current provision or areas where there is an under or over supply of public open space and associated infrastructure.

Availability of public open space in the vicinity of this site is impeded by several barriers:

1. The State Maintained road - Frederick Road
2. Large tract of privately owned open space - West Lakes Golf Club
3. West Lakes water body
4. Industrial/commercial precinct to the east

Existing open space supply within a five-to-ten-minute walk from the centre of the site is restricted to local or neighborhood reserves. Frome Reserve has a relatively new off the shelf equipment based playspace that can be easily accessed from the Affected Area. Carnegie North and South Reserves are approximately one kilometer from the Affected Area and predominantly cater for formal sport such as soccer and are on the other side of Frederick Road making it difficult for young children to access it.

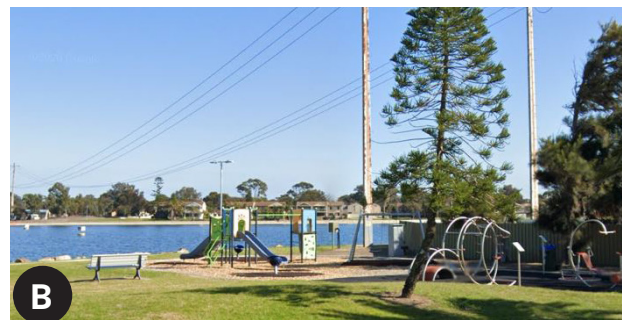
An opportunity exists to extend additional public open space within the Affected Area into the existing Mariners Reserve which is currently underutilized and has little infrastructure apart from a narrow footpath along the lakefront. The footpath comes to a dead end where private ownership of lakefront properties exists. Continuing the path network through the Affected Area will improve linkages through the Affected Area and beyond to future nodes of activation.

It is recommended that future public open space design within the anticipated development (part of a future development application) should consider the following:

1. New playspaces with nature play elements
2. New BBQ and shelter facilities
3. Fitness equipment at stations spaced throughout the Affected Area
4. Linear parks that encourage walkability
5. Opportunities for informal sport such as half court basketball
6. Dedicated dog park



PORT RD MEDIAN STRIP



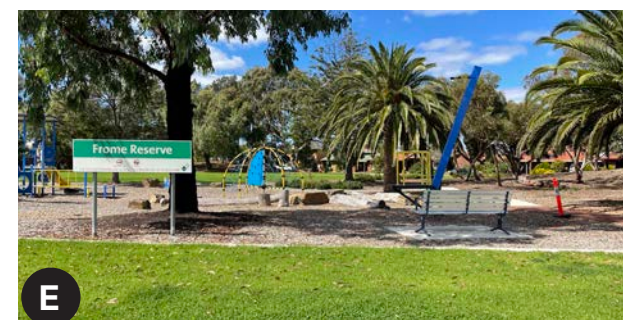
SETTLERS RESERVE



MARINERS RESERVE



EILDON RESERVE



FROME RESERVE



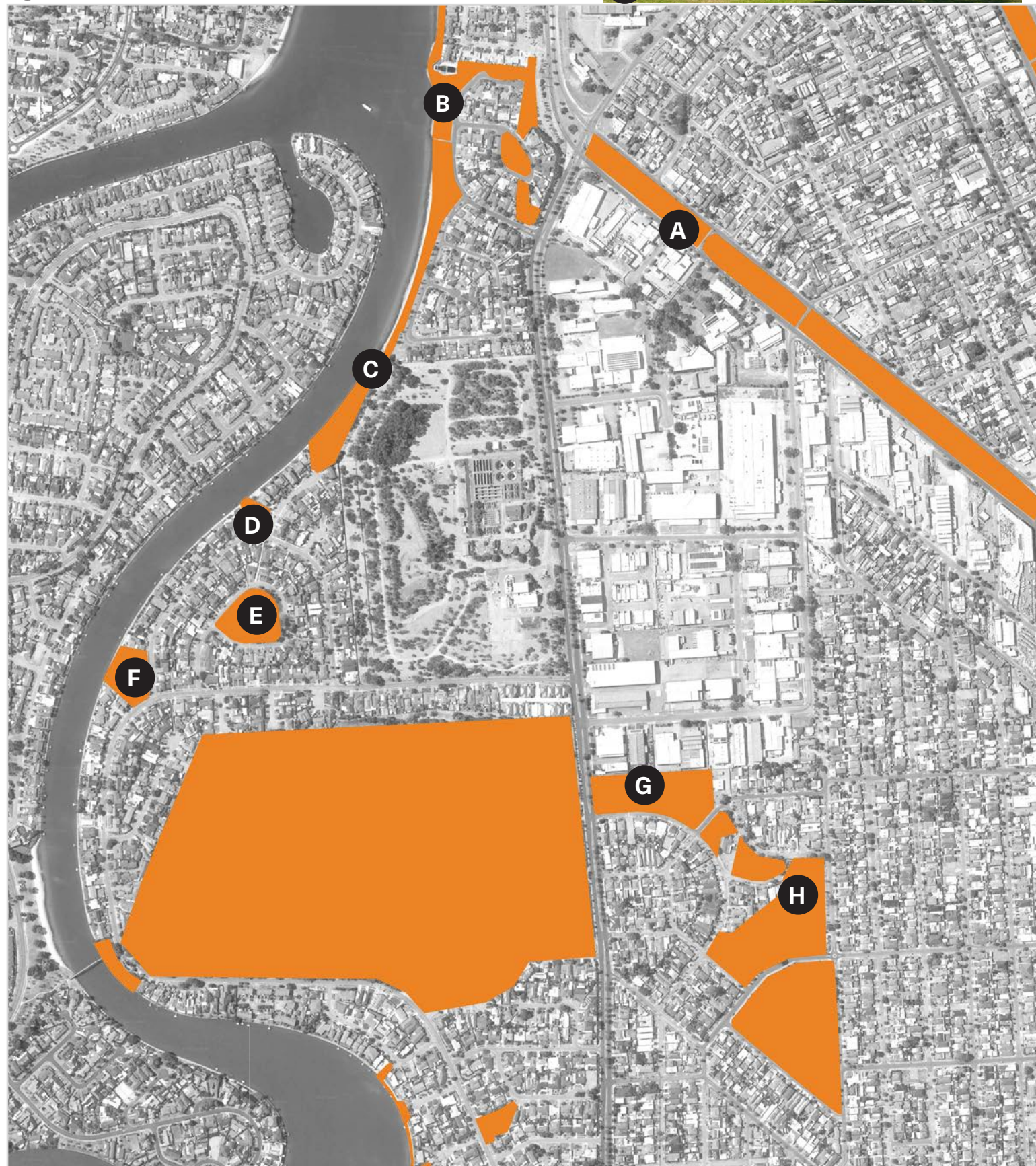
LAKEVIEW RESERVE



COOKE RESERVE



CARNEGIE NORTH RESERVE





4

# Opportunities & Constraints

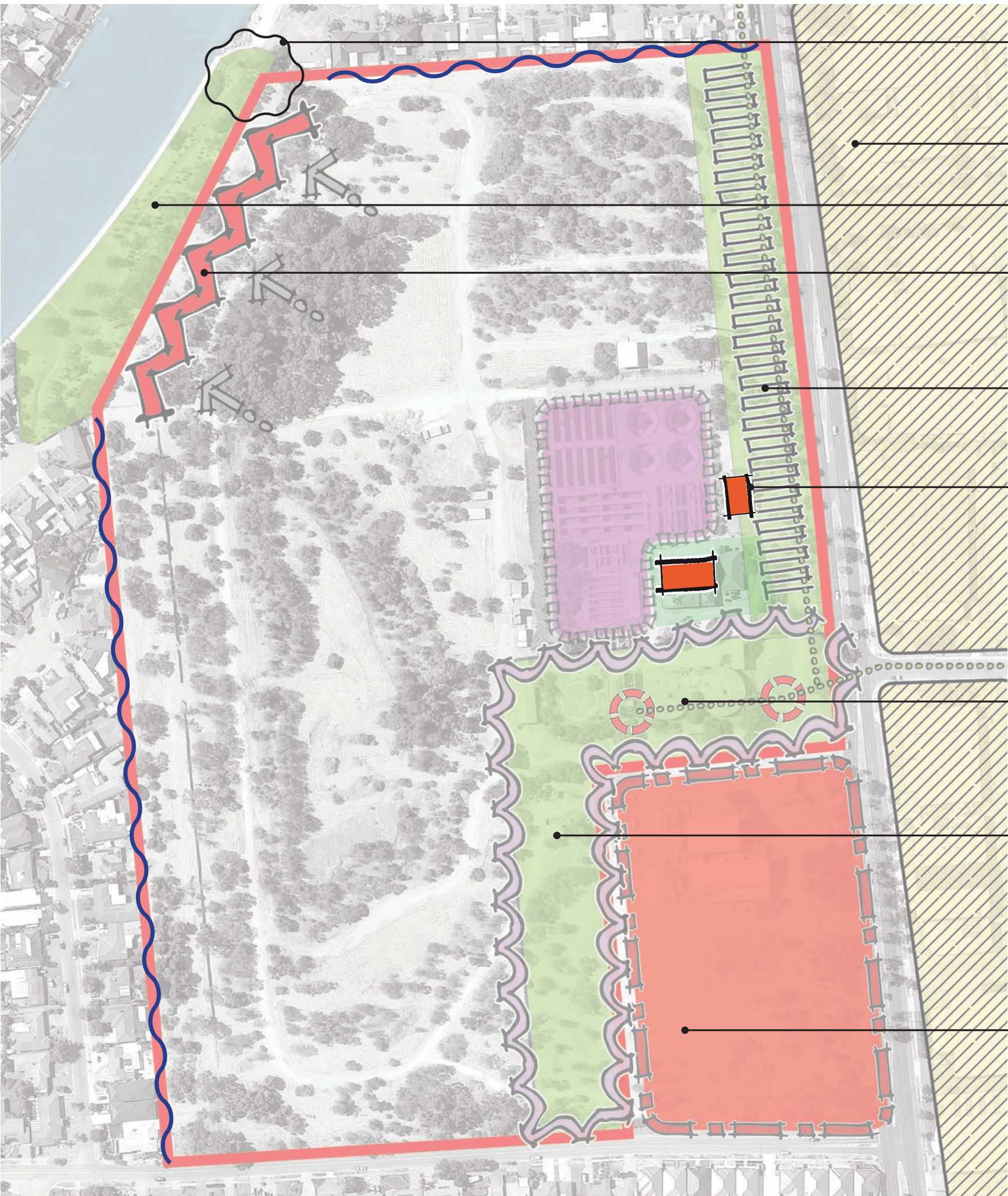


# OPPORTUNITIES



- LAKE VIEW
- ACTIVATE WATERFRONT
- CONNECT MARINER RESERVE TO THE AFFECTED AREA TO ENCOURAGE WALKING AND CYCLING
- POTENTIAL TO RETAIN EXISTING TREES
- OPPORTUNITY FOR TREE LINED BOULEVARD USING SALVAGED PHOENIX PALMS
- ENTRANCE + HERITAGE BUILDING
- OPPORTUNITY FOR LANDSCAPE ENTRY STATEMENT
- HIGH POINT WITH POTENTIAL VISUAL CONNECTION TO THE LAKE
- OPPORTUNITY TO CREATE DESTINATION NODE EG. CAFE/MARKET
- EXISTING STRUCTURES COULD BE REPURPOSED AS LANDSCAPE ELEMENTS - OPPORTUNITY TO SCREEN SA WATER TO THE SOUTH
- 50m BUFFER ZONE COULD BE CONVERTED INTO RESERVE WITH VEGETATION SCREENING SEWAGE PUMPING STATION
- OPPORTUNITY TO CREATE WALKING /CYCLING ROUTES TO DESTINATION NODES
- OPPORTUNITY TO CREATE WALKING /RUNNING LOOP WITHIN PUBLIC OPEN SPACE
- OPPORTUNITY FOR LANDSCAPE ENTRY STATEMENT





## CONSTRICTED ACCESS POINT

INDUSTRIAL / LARGE COMMERCIAL  
WITH POOR STREET PRESENTATION

PUBLIC OPEN SPACE DESIGN ARRANGED  
TO SCREEN VIEWS INTO SITE

EXISTING FENCE AND SCREENING  
VEGETATION BLOCKING VIEW TO LAKE

## EASEMENT ALONG BOUNDARY FOR SA WATER UNDERGROUND SERVICES

HERITAGE BUILDINGS AND HERITAGE  
LANDSCAPE TO BE RETAINED

## LIVE SA WATER UNDERGROUND SERVICES RESTRICTING TREE PLANTING

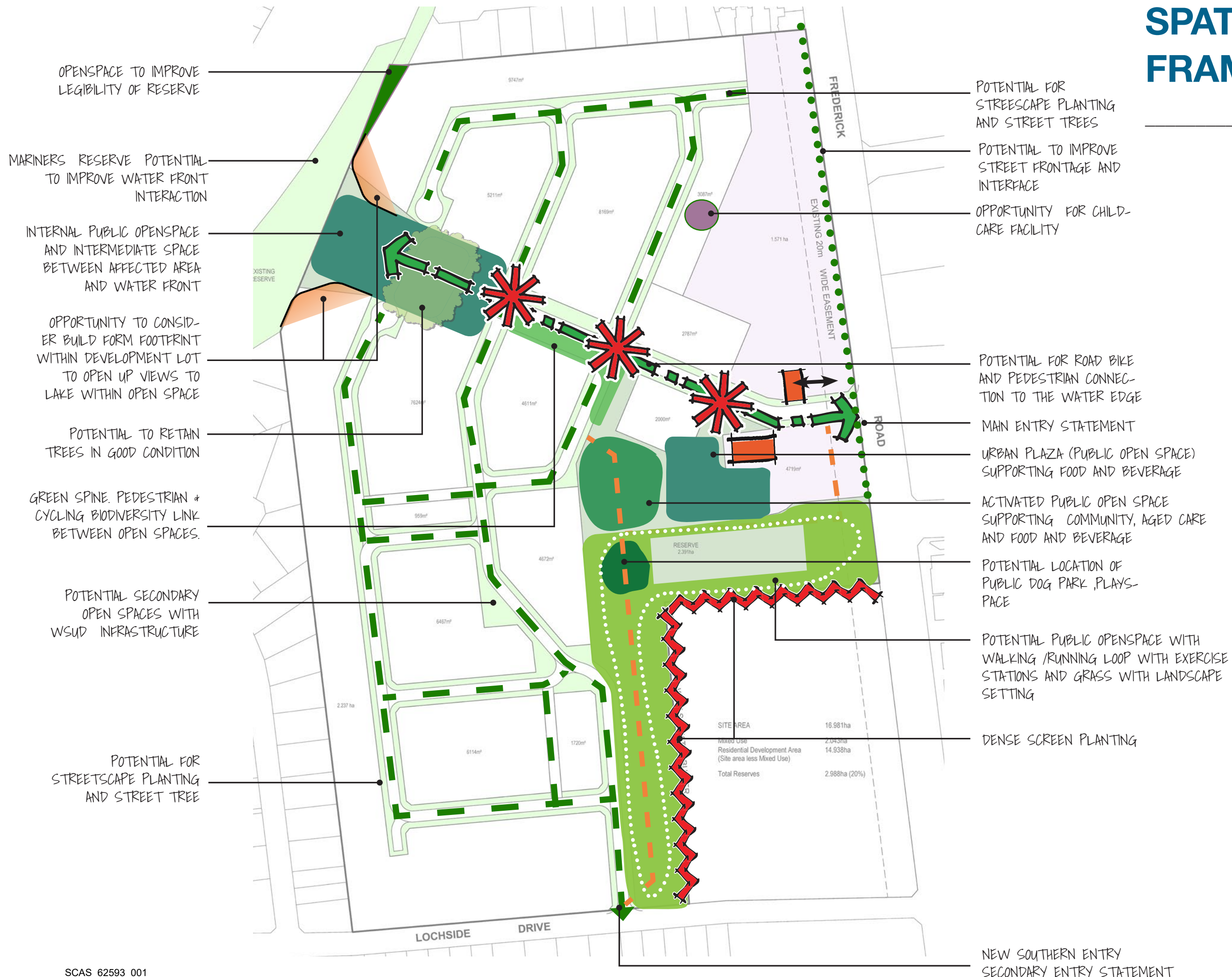
50M BUFFER ZONE (NO RESIDENTIAL DEVELOPMENT)

SA WATER PUMPING STATION  
- POOR STREET PRESENTATION TO  
FREDERICK ROAD AND LOCHSIDE DRIVE  
- PERMEABLE CHAIN LINK FENCE  
UNDESIRABLE VIEWS INTO PUMP  
STATION



5

# SPATIAL FRAMEWORK





# OPEN SPACE CONCEPT





# PRECEDENT

## ENTRY STATEMENTS

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# PRECEDENT

## LANDSCAPE BOULEVARD

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# PRECEDENT

## ACTIVATED OPENSOURCE

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# PRECEDENT

## PASSIVE OPEN SPACE

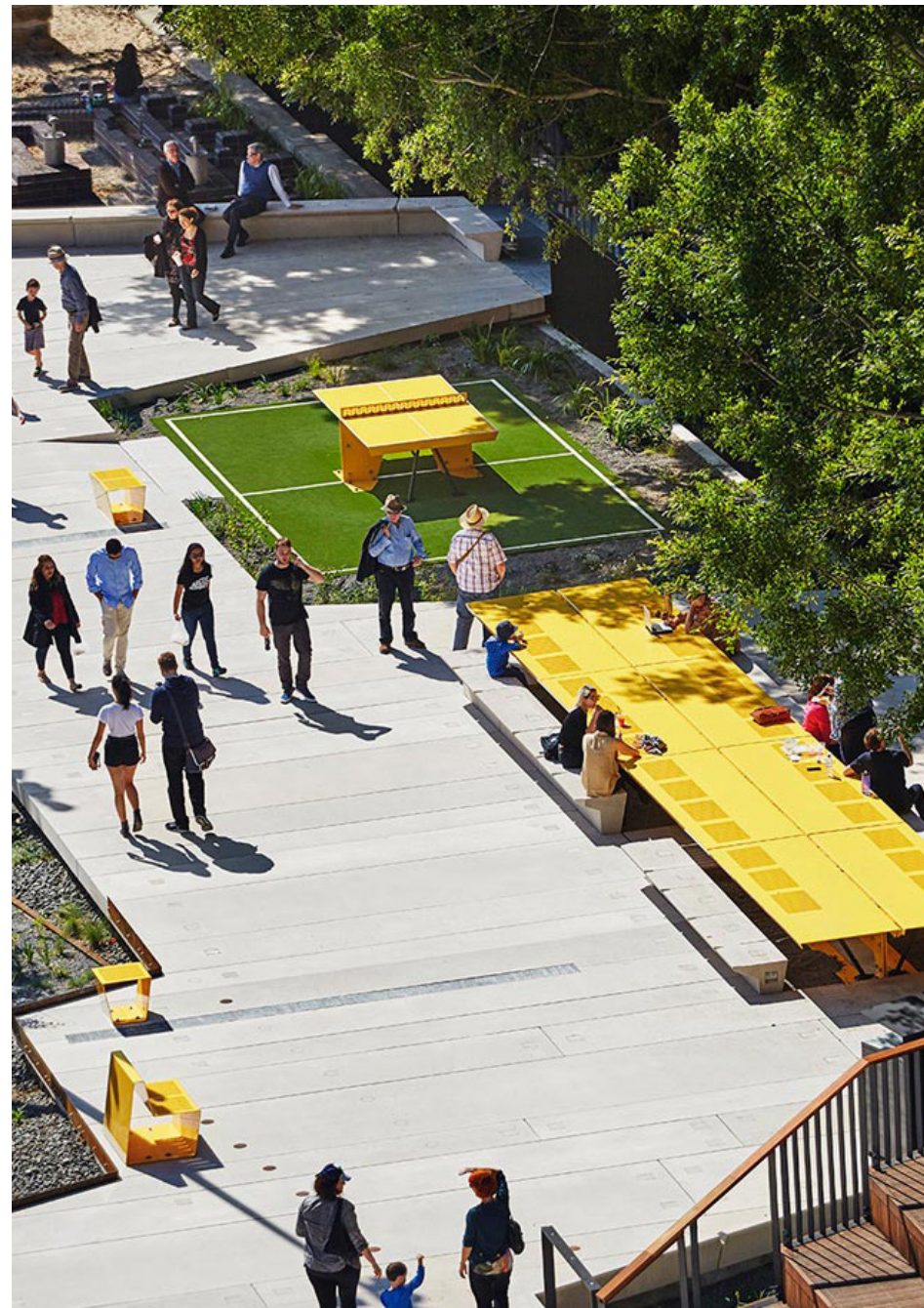
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# PRECEDENT

## URBAN PLAZA

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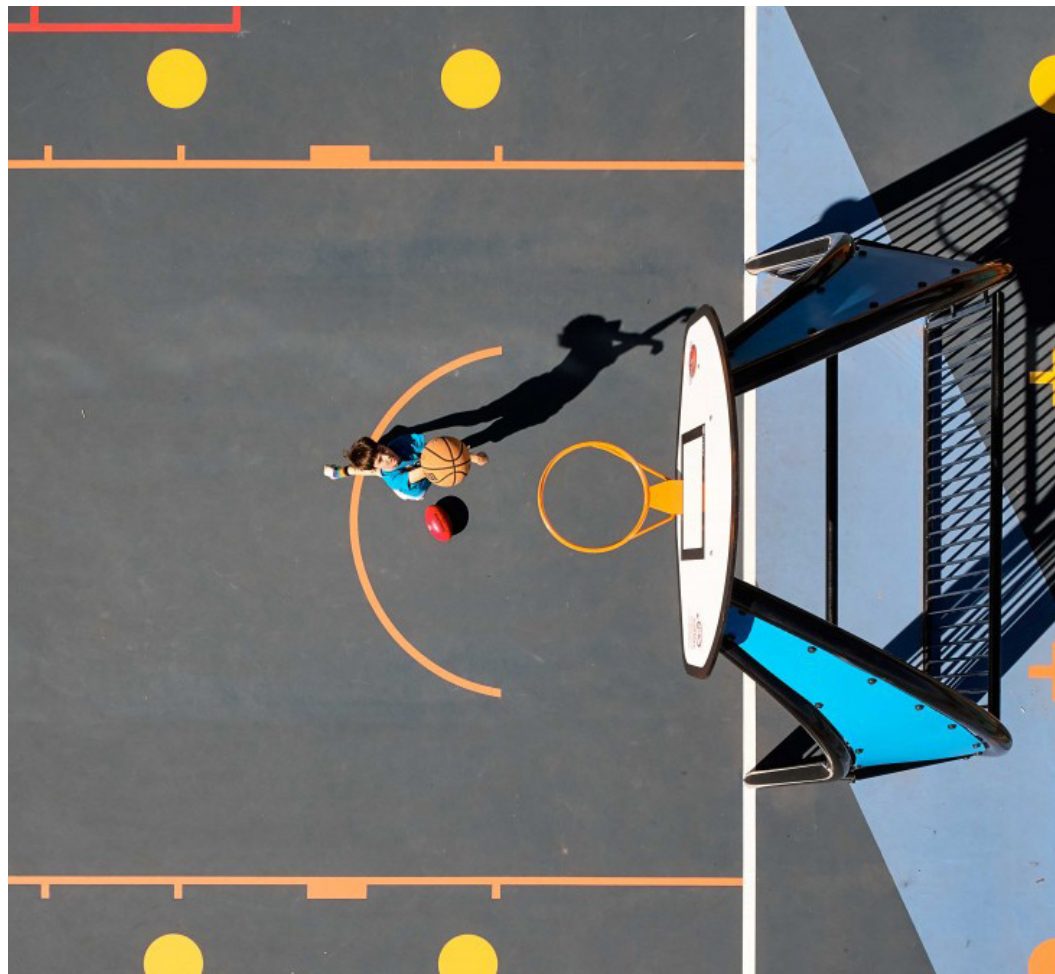




# PRECEDENT

## PLAY SPACE

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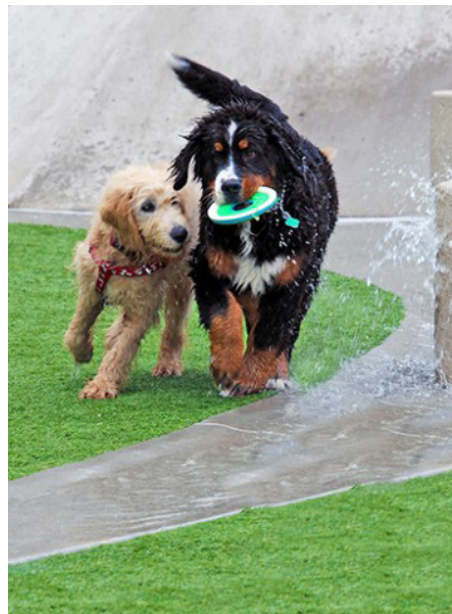
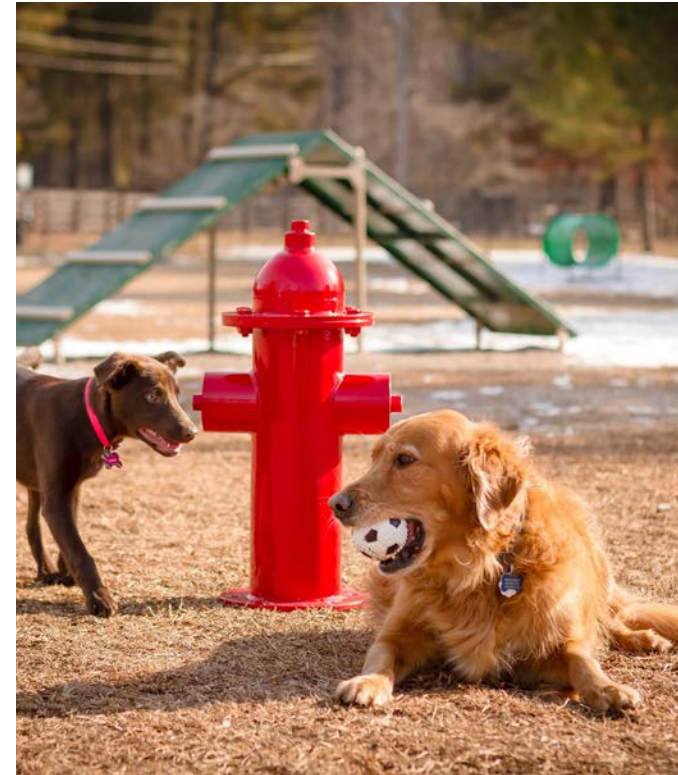




# PRECEDENT

## DOG PARK

---





# NOVO

WEST LAKES

# ASPECT Studios

V1	Urban
1	Introduction
2	Site Context
3	Open Space Strategies
4	Opportunities & Constraints
5	Landscape Masterplan

# tectvs

V2	Built Form
1	Conditions
2	Concept





# West Lakes



1



# Introduction

This report has been prepared to help inform the Code Amendment proposed at the old SA Water site on Frederick Road, West Lakes.

The intent is to demonstrate how this Affected Area may be developed in the future, using a variety of successful typologies that may be appropriate for the area. These typologies are distributed throughout the area, responding to the prevailing built form that can be currently found surrounding the Affected Area.

This prevailing built form is primarily two storey, but the capacity exists to increase this height as development moves away from the edges and reaching up to five storey central within the Affected Area.

Proposed future development in the Affected Area also foresees the adaptive re-use of the existing Local Heritage Places (offices and pump station). It should be noted that the pump station facing Frederick Road is in the order of three to four storeys in height.





# Urban Context



Affected Area

SA Water Buffer to be purchased by Potentia  
(Public open space)

SA Water Waste Water Pump Station



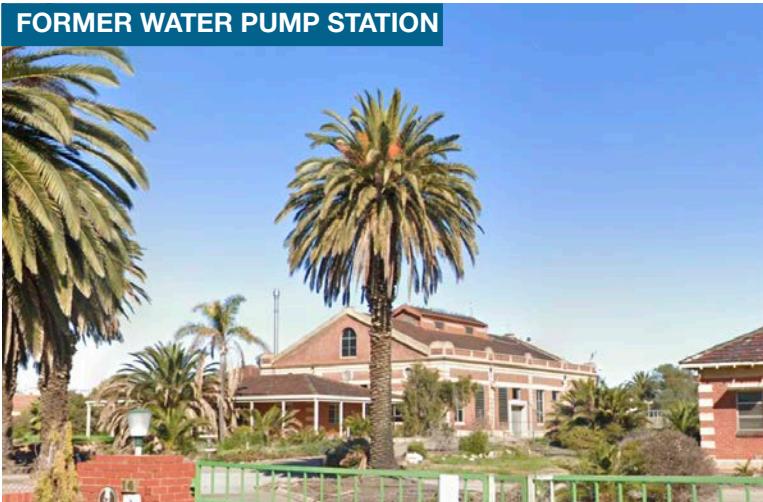
# Existing Conditions

SA Water Existing Conditions

FORMER PUMP FACILITIES



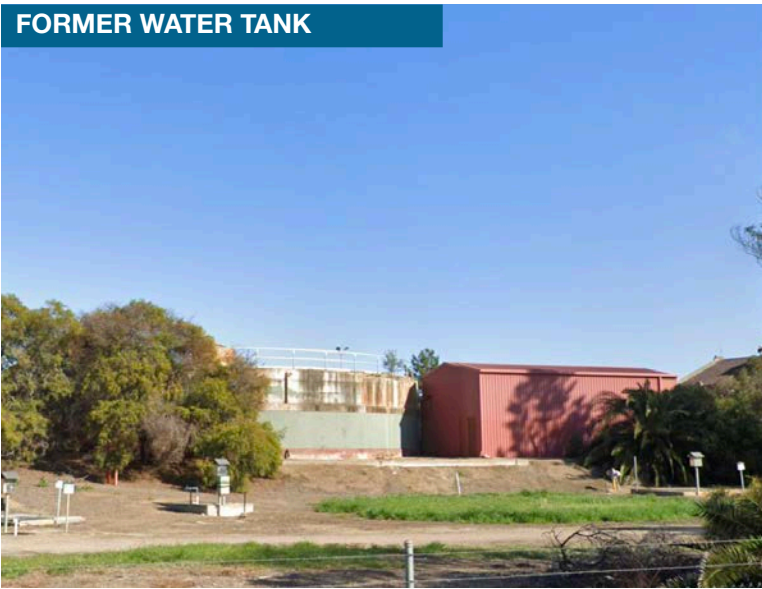
FORMER WATER PUMP STATION



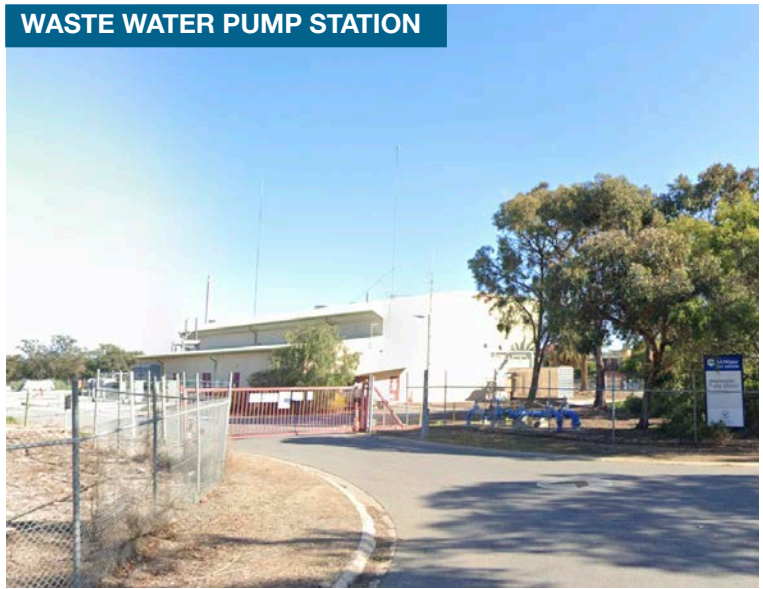
FORMER OFFICE



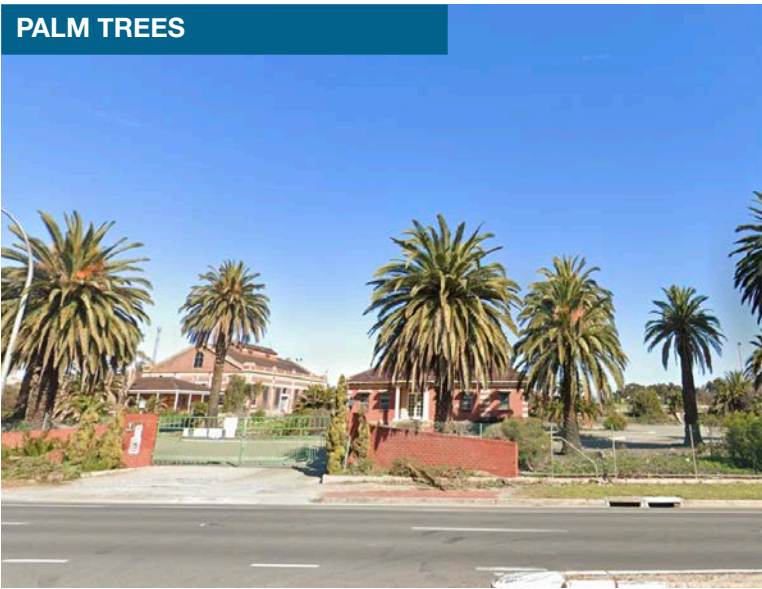
FORMER WATER TANK



WASTE WATER PUMP STATION



PALM TREES





# Built Character

## Surrounding Built Character

Images of various built character along the South and East edges of the affected area.

FREDERICK ROAD



LOCHSIDE DRIVE





# 2

# Vision

The vision for the future development over the Affected Area is an integrated community with a range of local services, housing typologies and amenity.

This integration extends beyond the boundaries of the Affected Area, integrating with the wider West Lakes community.

Intimate well landscaped public realm adds amenity aiding environmentally and ecologically.

Street trees add value and shade to roads.

Co-ordinated development that steps into the streetscape and away from the prevailing edges.

A mixture of product with equitable access to green space and marketplace.

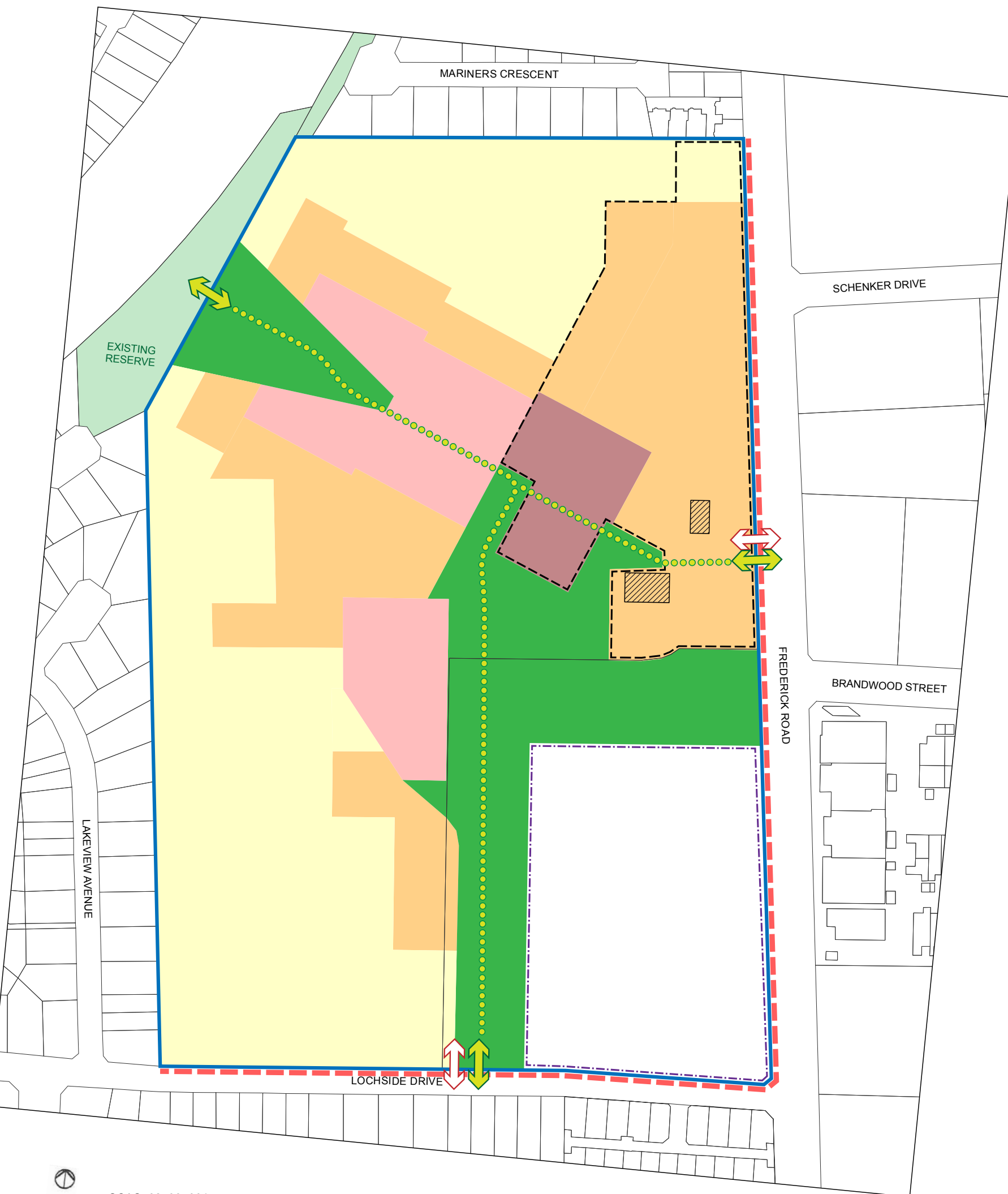
A place for everyone and not just a privileged few.

1. Norwood Green, South Australia.
2. Luminare, South Australia.
3. Norwood Green, South Australia.
4. Depot Halifax, South Australia.
5. Artisan, South Australia.





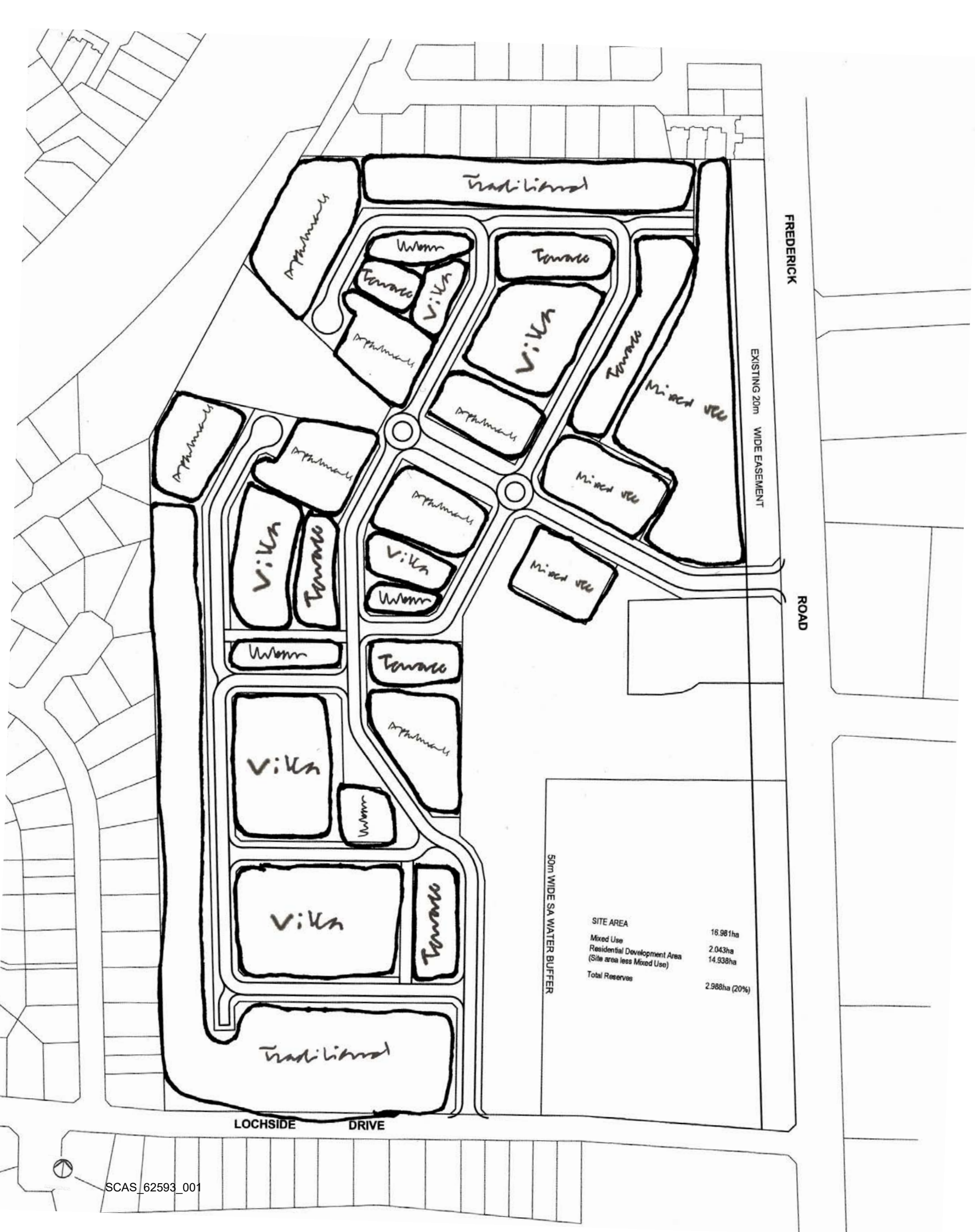
# Master Plan



- Concept Plan Boundary
- - - Mixed Use Transition Subzone
- - - Infrastructure Zone
- ↔ Indicative Pedestrian/Cycle Access
- ... Indicative Pedestrian/Cycle Network
- ↔ Indicative Vehicle Access
- ▨ Local Heritage Place
- Maximum 2 Storeys (8.5m)
- Maximum 3 Storeys (12.5m)
- Maximum 4 Storeys (16.5m)
- Maximum 5 Storeys (22m)
- Indicative Public Open Space
- - - Future verge widening for footpath and streetscaping



# Master Plan

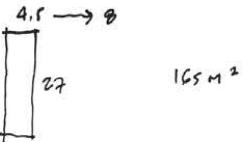


## Typologies

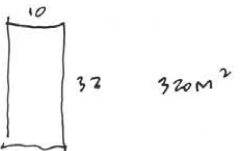
Urban Studio



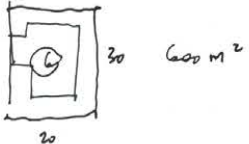
Townhouse



Villa



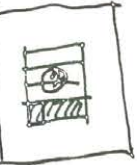
Traditional



Apartment



Mixed Use



## Allotments

tbc

(Excluding MD, MU & APT)

## Affected Area

16.981ha

Mixed Use  
Residential Area  
Reserves  
(20%)

2.043 ha  
14.93 ha  
2.988 ha

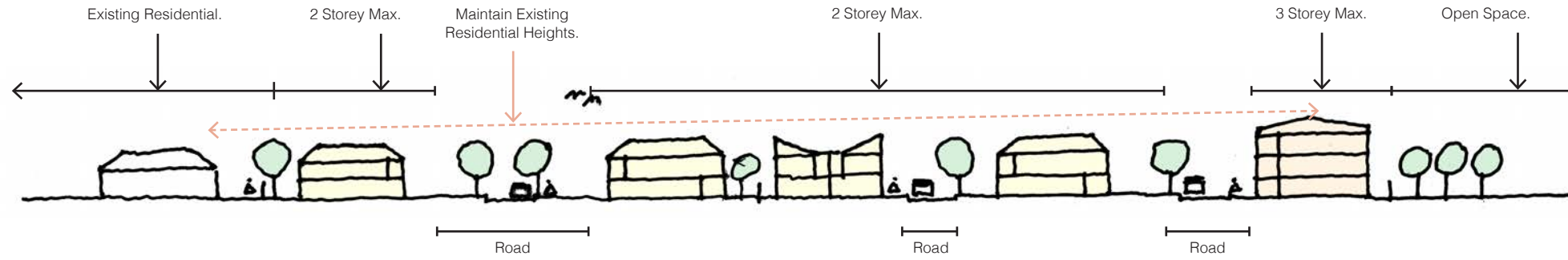


# Master Plan

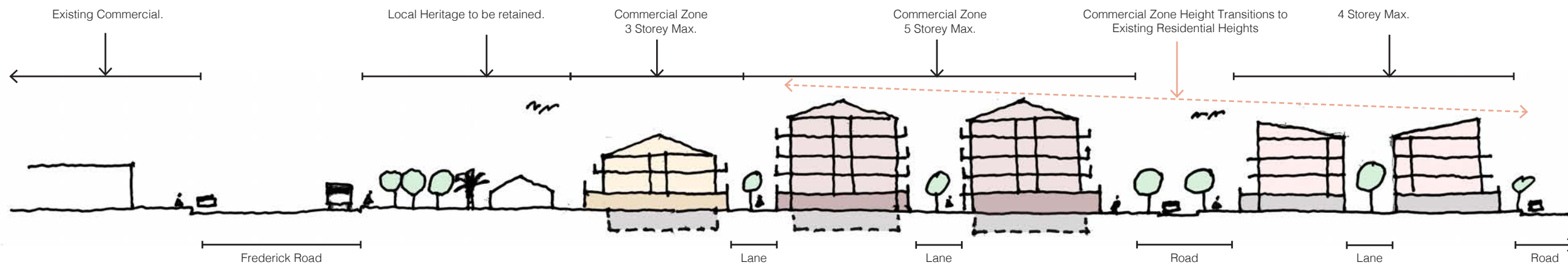


Typologies	Subtypes	Allotments (Excluding MD, MU & APT)	tbc
Urban Studio	<div><div></div><div></div><div></div><div></div><div></div></div>	<b>Affected Area</b>	<b>16.981ha</b>
		Mixed Use	2.043 ha
		Residential Area	14.93 ha
		Reserves	2.988 ha (20%)
Towato	<div><div></div><div></div><div></div><div></div><div></div></div>		
V:K'n	<div><div></div><div></div><div></div><div></div><div></div></div>		
Traditional	<div><div></div><div></div><div></div><div></div><div></div></div>		
Apartment	<div><div></div><div></div><div></div><div></div><div></div></div>		
Mixed Use	<div><div></div><div></div><div></div><div></div><div></div></div>		

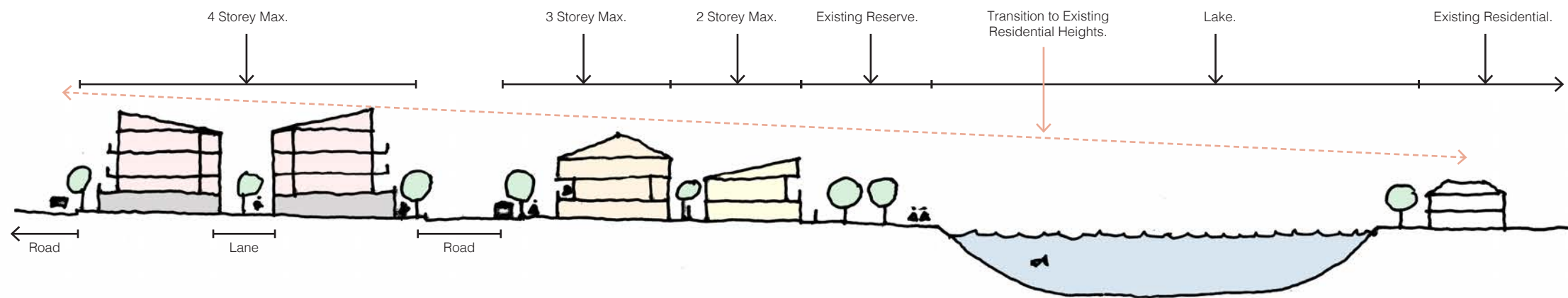
# Sections



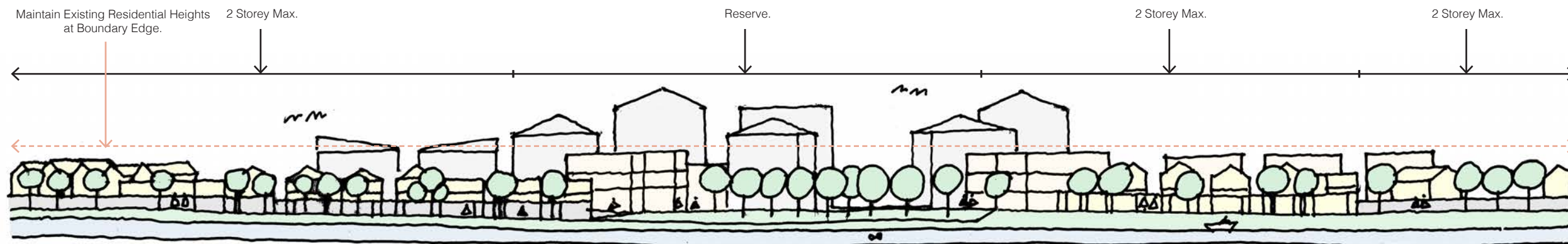
Section A - Residential Side



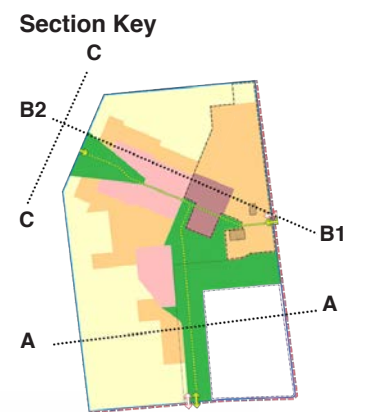
Section B1 - Lake Side



Section B2 - Lake Side



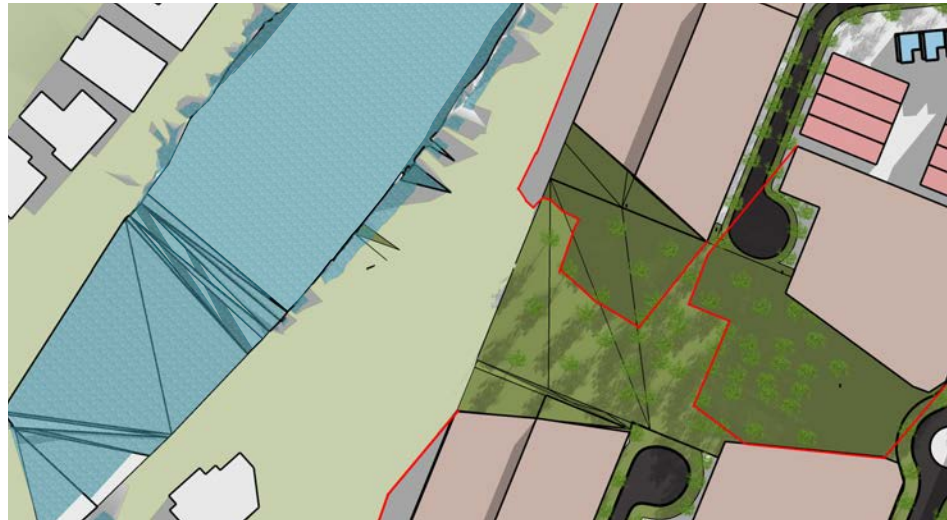
Section C - Lake Side  
SCAS\_62593\_001





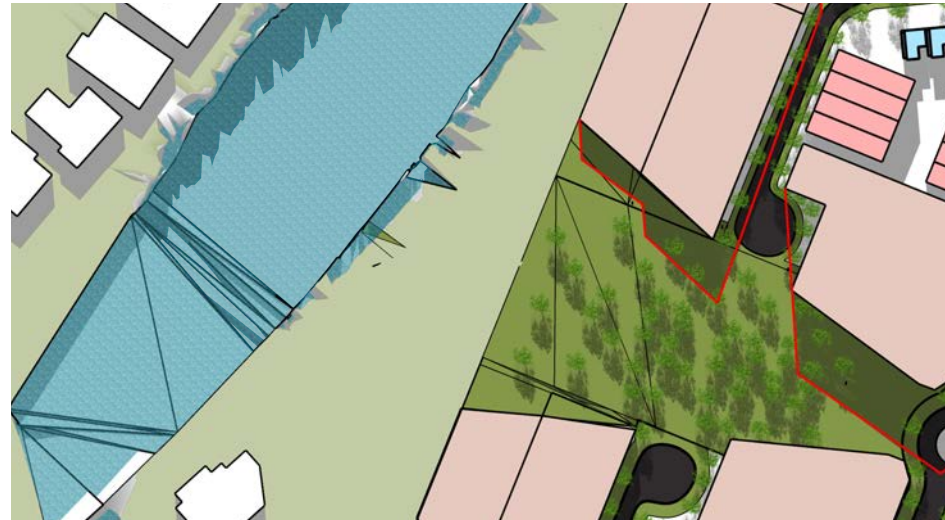
# Sun Study

Shadow analysis of internal public open space.

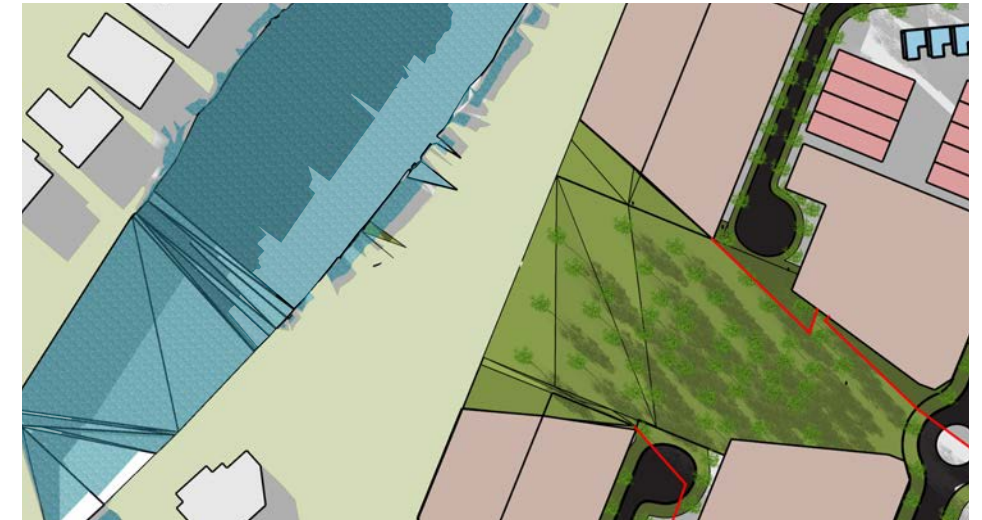


## Winter Solstice

June 21  
9am



June 21  
12pm

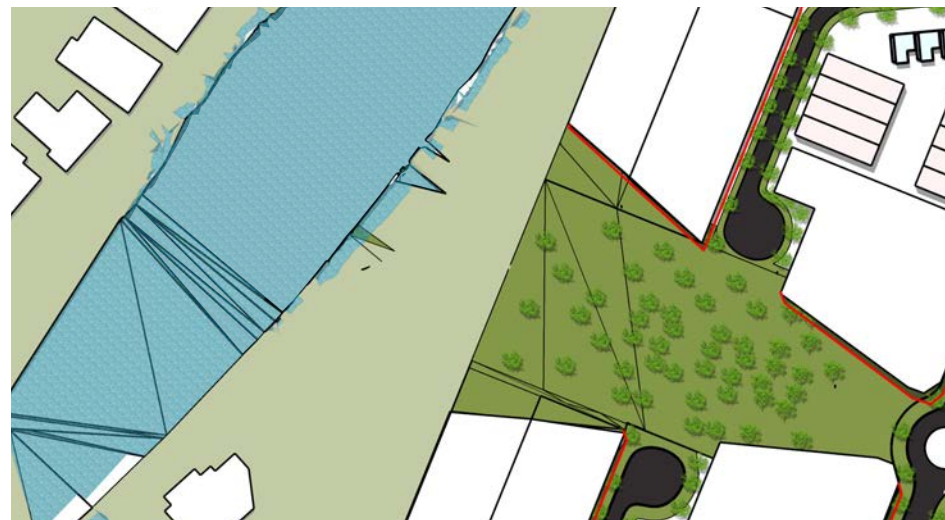


June 21  
3pm

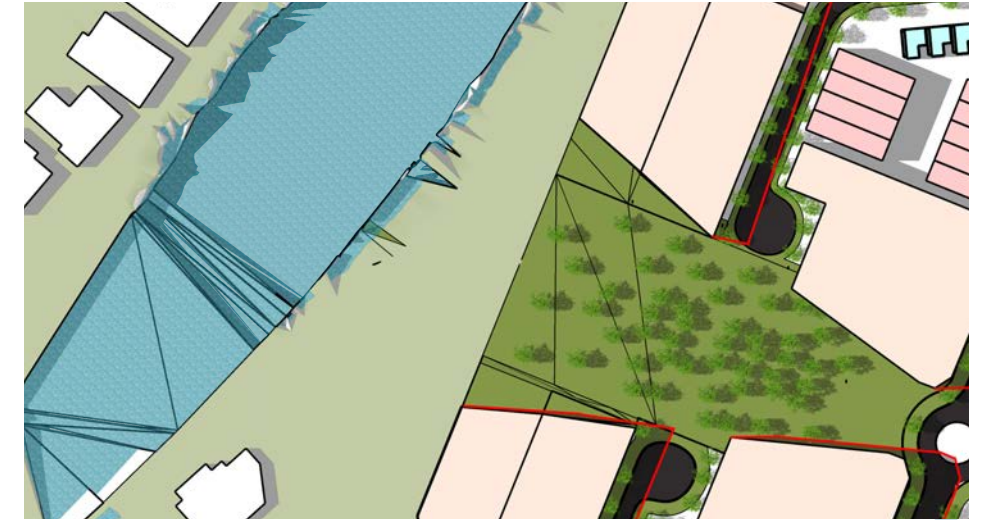


## Summer Solstice

December 21  
9am



December 21  
12pm



December 21  
3pm

# NOVO

WEST LAKES

ASPECT Studios

tectvs



DRAFT

# Preliminary Infrastructure Assessment

**16 Frederick Road, West Lakes**

<b>JOB NUMBER:</b>	<b>S57708 - 280408</b>
<b>CLIENT:</b>	<b>Potentia West Lakes Pty Ltd</b>
<b>SITE:</b>	<b>16 Frederick Road, WEST LAKES, SA 5021</b>
<b>DATE:</b>	<b>12/07/2022</b>
<b>REVISION:</b>	<b>C</b>



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## Document Status

REV NO.	STATUS	AUTHOR	REVIEWER		APPROVED FOR ISSUE	
			Name	Date	Name	Date
A	Preliminary	Jordan Colbert	Jeff Zanker	28.04.2022	Jordan Colbert	28.04.2022
B	Preliminary	Jordan Colbert	Steve Smith	17.05.2022	Jordan Colbert	17.05.2022
C	Additional Stormwater Commentary	Jordan Colbert	Steve Smith	12.07.2022	Jordan Colbert	12.07.2022

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# Introduction

FMG Engineering has been engaged by Potentia West Lakes to undertake a preliminary, high level services infrastructure assessment of the existing infrastructure in the area to support a proposed Code Amendment.

The subject site is located at 16 (Lot 100 and Lot 101) Frederick Road, West Lakes, and covers an area of approximately 19.8ha. The site was previously utilised as an SA Water facility (former Port Adelaide WWTP), and a portion of Lot 101 will remain as a SA Water facility (Port Adelaide Relift pump station). Currently the land features a number of small structures (settling ponds, single storey structures) however the majority of the site is relatively undeveloped with light to medium vegetation growth.

The proposed Code Amendment is nominated in support of a future residential subdivision consisting of low and medium density housing outcomes, including apartments and townhouses. Final plans of division will form part of a separate Development Application, but current concepts indicate approximately 570 dwelling units, inclusive of 200-250 apartment units. Some mixed use and commercial development may occur along the frontage to Frederick Road.

To inform this report, FMG Engineering has reviewed publicly available infrastructure databases, undertaken Dial Before You Dig (DBYD) queries and contacted key service authorities to confirm their ability to service the proposal, or notify any augmentation required to facilitate the works. This review included;

- Stormwater, Recycled Water
- Electricity
- Water, Sewer
- Gas
- Communications
- City of Charles Sturt (CoCS / Council)
- SA Power Networks (SAPN)
- SA Water (SAW)
- Australian Gas Infrastructure Group (AGIG)
- NBN

FMG Engineering has also reviewed reporting prepared by others on Geotechnical investigations, environmental contamination and site servicing which has informed the feasibility assessment of this Affected Area.

The purpose of our investigation is to provide a desktop assessment of the infrastructure currently available to the Affected Area and to assess the current capacity of the existing infrastructure. We note that some authorities have not provided detailed feedback, and in these instances we have utilised our engineering judgement and relevant previous experience to provide context where appropriate.

# Affected Area Understanding

The Affected Area is located within West Lakes and is bound to the north and west by existing residential dwelling allotments, bound to the east and south by Frederick Road and Lochside Drive respectively. Commercial / light industrial allotments are located opposite the Affected Area on Frederick Road. A roughly 190m frontage to the Mariners Reserve (and associated water body beyond) is observed along the north western boundary of the Affected Area.

A review of available LiDAR data suggests localised undulations between 2mAHD and 3.5mAHD exist throughout, however overall site levels trends towards the Lake in the north western corner of the site at roughly 1%. The existing SA Water infrastructure to the east of the site is located on a plateau at roughly 5.5mAHD, with existing levels along the north-western boundary at 1.5-2mAHD.

Geotechnically, the Affected Area is quite complex. Reporting prepared by Douglas Partners (Rev 0 – 21 March 2021) outlines varying conditions across the Affected Area, with a typical depth of uncontrolled fill varying from 1m to 2.5m across much of the Affected Area. This coincides in some locations with the groundwater depth which is typically 2.15-3.37m below the existing surface levels (approximately -0.5mAHD to -1mAHD). The fill layer is typical of the West Lakes region, somewhat unique to the Affected Area however is the presence of a 200-1200mm thick sludge layer within the fill.

Reviews into the most viable construction methodologies to improve the geotechnical properties of the ground are underway as an exercise separate to this report, however preliminary findings suggest several viable options are present including excavation and replacement, preloading and stabilisation via the use of rock.



Figure 1 - Locality plan (boundary of Affected Area shown indicatively), inset - location compared to CBD



# Services Assessment

This report has reviewed current concept plans for the proposed Code Amendment and assumed the following design parameters to determine services demand for the Affected Area;

<b>Total Dwellings</b>	<b>570</b>	
<b>Consisting of;</b>		
- <b>Torrens Titled</b>	325	
- <b>Apartment</b>	245	
<b>Mixed Use Development</b>	2.285Ha	Assuming 50% of this may be developed floor space, with the remainder as landscaping, parking etc.
<b>Electrical Demands</b>	100VA/m <sup>2</sup> for mixed use 3-4kVA per apartment dwelling 6kVA per Torrens Titled Dwelling	Note; FMG does not have electrical engineers in house but the adjacent figures are industry guidelines on typical usage.
<b>Staging</b>	<p>Stage 1 – Approximately 12 allotments with a frontage to Lochside Drive</p> <p>Stage 2 – Approximately 32 allotments north of Stage 1</p> <p>Stage 3 – Approximately 55 allotments plus apartments</p> <p>Stage 4 – Approximately 60 allotments plus apartments, Mixed use, Reserve, Frederick Road and West Lakes frontage</p> <p>Stage 5 – Approximately 70 allotments plus apartments, retail and West lakes frontage</p> <p>Stage 6 – Mixed Use &amp; Apartments fronting Frederick Road</p>	The staging plan is indicative in nature and outlines an indicative yield. Formal land division application to be a separate application

On the basis of the above assumptions, the following guidance is provided for future potential to service this site should it be developed;

## Gas

Australian Gas Infrastructure Group (AGIG) was contacted (16 March 2022) and a preliminary response and DBYD has been provided (included in Appendix B) and FMG has summarised the findings as follows;

A 110mm diameter medium pressure gas line is located along the eastern, southbound, traffic lane of Frederick road. This extends from the northern extent of the site, terminating approximately 100m north of Brandwood street.

South of Brandwood street a separate 63mm medium pressure line is located on the same alignment, extending south – and currently connecting to the SA Water Relift Pump Station. This gas feed supplies the gas powered backup generator for the site. This 63mm main also extends west along Lochside drive.

AGIG is currently undertaking further capacity reporting for the area to determine any augmentation requirements, however has indicated that in the first instance servicing of Stage 1 will be feasible without augmentation, serviced off of the existing 63mm main in Lochside drive.

It is feasible that gas supply to service the entire Affected Area will be achievable, with minor augmentation to potentially connect the 110mm diameter service through to the 63mm main in Frederick road.

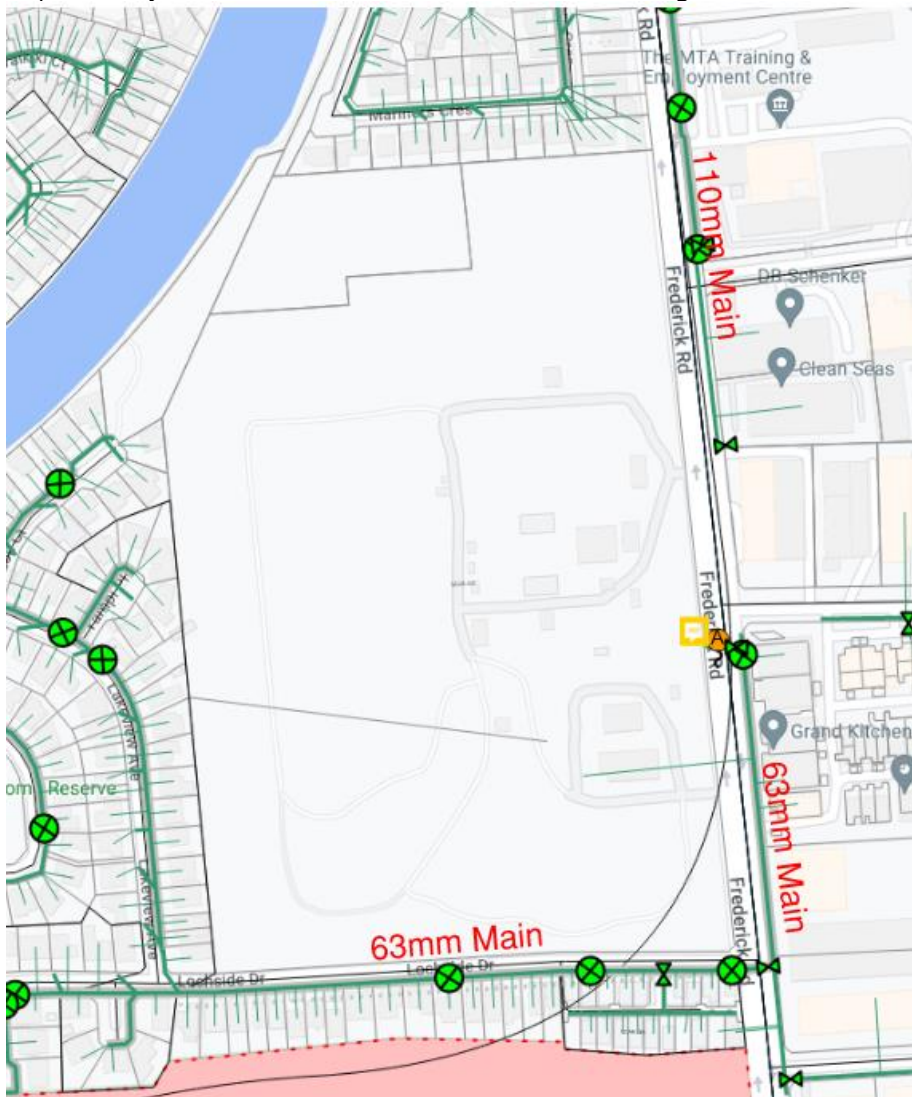


Figure 2 - Existing Gas mains (DBYD)



## Potable Water Supply

SA Water (SAW) was contacted in mid March 2022, and a meeting was held on the 18<sup>th</sup> of March 2022 with representatives of SAW, FMG and the Potential West Lakes present (Meeting minutes provided in Appendix C). DBYD investigations were also undertaken and provided in Appendix C.

Existing potable water service lines are present along the eastern and southern frontages of Frederick Road and Lochside Drive, consisting of a 200 Cast Iron Concrete Lined (CICL) main, and 150mm AC main on each road respectively.

SAW advised that previous infrastructure assessments had been undertaken for the Affected Area in 2017 and provided this information for review. The conclusion of this review summarised that the network has sufficient capacity to support the (at the time) nominated 1,095 dwellings (noting current yield of dwelling units substantially less). These plans suggested the construction of a DN150mm potable water supply within the proposed new road reserves, and a series of external augmentations would be required, including;

- Construction of 2 x new DN200/150 branch mains off the Ex.200 CICL main in Frederick Road, Shown at C and D on Figure 1.
- Construction of a new DN150/150 branch main off the Ex.150 AC main in Lochside Drive, shown at B on Figure 1.
- Proposed DN150 internal mains to interlink between Frederick Road and Lochside Drive where possible.
- Proposed DN150 branches off Frederick Road will require being dog-legged beneath the Ex.650 MSCL main on the western side before entering the affected site, shown at C and D on Figure 1.
- Traditional Housing allotments fronting Lochside Drive will require direct servicing off Ex.150 AC main

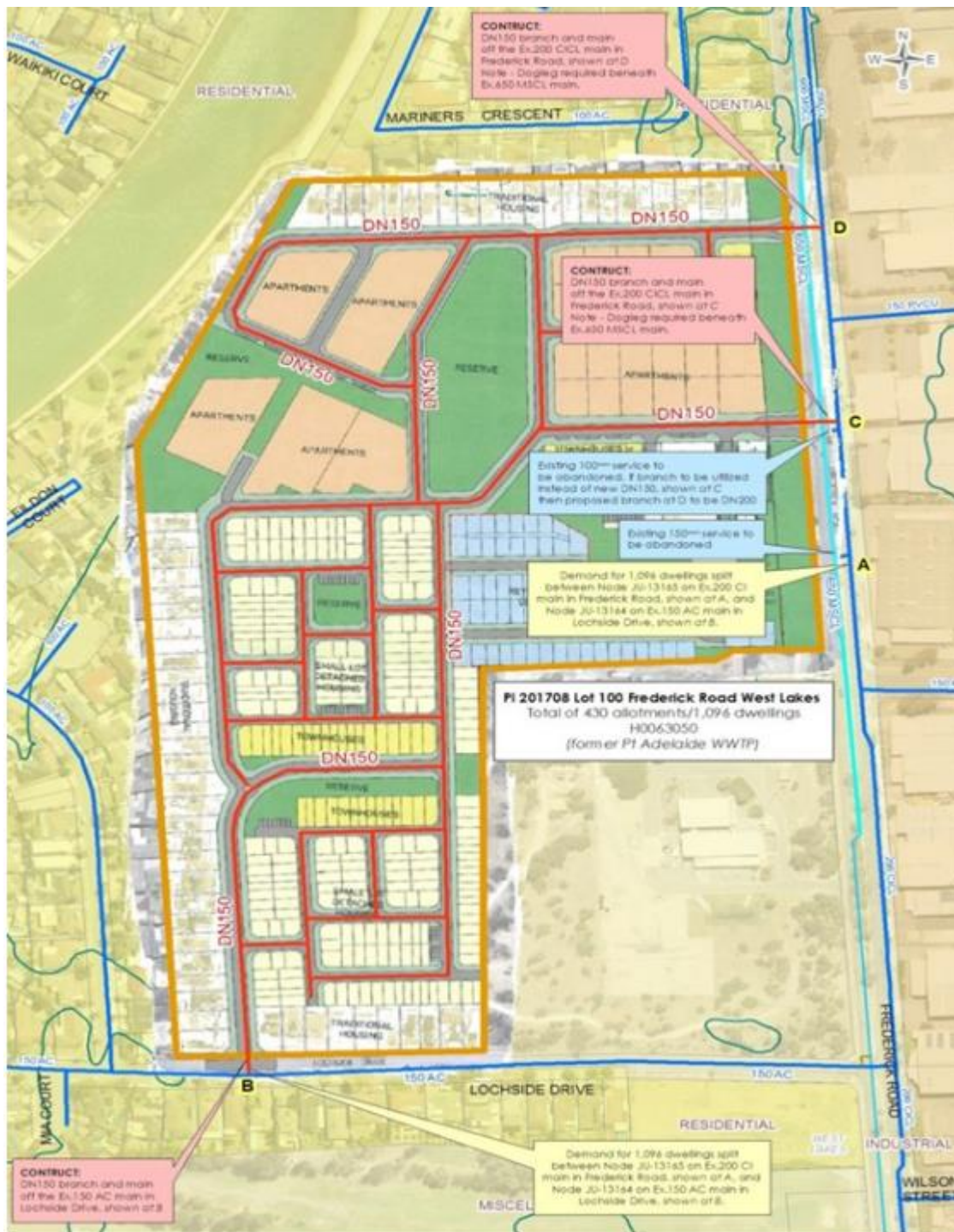
Whilst the proposed concept plan has varied slightly, in particular the number of dwellings totalled 1,100 compared to the current Code Amendment proposal of approximately 570 dwellings, we feel this information remains relevant to demonstrate there is sufficient capacity within the network to support the proposed Code Amendment.

We note that some of the above augmentations may not be required given the reduction in anticipated dwelling unit numbers, and are awaiting feedback from SA Water's infrastructure assessment team to confirm this, along with timing of each augmentation in relation to the nominated stages shown on the concept plan.

## Integrated Water Management Opportunities

Potentia West Lakes and SA Water have had further discussions around implementing clever technologies and practices to reduce the environmental impact of future development of the Affected Area and add community value. This could include, but is not limited to;

- Wall mounted smart meters
- Dual Reticulation (potable and recycled water)
- Recycled smart irrigation for public open space





## Waste Water Services

Waste Water servicing of this Affected Area requires careful consideration, given the presence of shallow groundwater, proximity to the existing sewer Relift pump station and lack of suitable existing gravity sewer to connect the whole of the Affected Area into.

Sewer in the greater West Lakes area is diverted to the adjacent SA Water facility (Port Adelaide Wastewater Treatment Plant - PAWTP) via a number of pumping mains in Frederick road to the north and south. Waste from the PAWTP is pumped north via the Bolivar High Salinity Pumping Main. It is noted that this pumping main is located within the Affected Area's boundary and a 20m easement is located over this land. The presence of salinity within the wastewater is a result of the shallow groundwater levels in the region, and the resulting outcome of many gravity sewer systems being located in or close to the highly saline groundwater.

FMG discussed waste water servicing with SA Water (SAW) during the same meeting held on the 18<sup>th</sup> of March 2022 and reference should be made to email and minutes provided in Appendix C. A copy of DBYD plans relevant to waste water are supplied in Appendix D. Information has previously been provided on the servicing requirements for this area (2017) for a different concept, summarised below;

- Connection of 12 allotments with frontage to Lochside drive (referred to as Stage 1 within this report) into the existing 150mm gravity main beneath Lochside drive
- Diversion of existing DN100 pumping main from Eldon Court into the affected area.
- Construction of internal gravity mains varying between 150mm – 225mm diameter.
- Construction of a new pump station within the affected area
- Construction of a new rising main from within the affected area, directly into the Port Adelaide Relift pump station.

FMG has reviewed the above proposal and agree this is a feasible methodology to provide waste water services to the Affected Area and satisfies the requirements of this Code Amendment investigation, noting the requirements for pump station capacities and flow rates would need to be reviewed to consider the reduction to 570 dwellings from the 1,100 stated in 2017. It is unclear the driving factor or cost sharing agreements discussed around the diversion of Eldon Court sewer into the Affected Area, and this would be reviewed further with SA Water during detailed design of future development applications.



**Figure 4 - SA Water waste water - markup supplied in 2017 for previous development concept plan (approximately 1,100 dwellings compared to current proposal of 570)**

Further to the above, there may be more economically viable solutions to providing waste water servicing to the Affected Area and these have been investigated and briefly discussed below. All of the below options are feasible methods to meet the requirements of the Code Amendment, and would be explored during detailed design of a future development application.

### Existing groundwater and Salinity

It is likely that internal reticulation of waste water via a single gravity network would result in sections of the network at or below observed groundwater levels. This may affect the feasible trenching depth at which portions of gravity sewer can be constructed, and could dictate the need for piled support of the sewer system – both can be feasibly mitigated, however do add costs to the construction.

SA Water has noted the proximity of the site to the Relift station, and commented on a desirable outcome for the sewer generated from the Affected Area to keep waste water above the groundwater line to mitigate potential infiltration of saline water. If this outcome can be achieved, SAW may be able to treat this water to a level suitable for reuse in the area and this has associated economic and environmental benefits to SAW.

### Connection location

Upgrades made to the Relift station by SA Water (completed by construction firm Waterniche) have identified feasible connections from the anticipated future development by either direct connection into the base of the pump chamber within the lifting station, or connection into the existing rising main in Frederick Road.

### Alternative Waste Water network solutions

FMG has reviewed available industry solutions and precedence within other similar projects in South Australia to determine alternatives which may be considered in detailed design of a future development application in an effort to comply with SA Water's desire to reduce salinity in waste produced by the Affected Area, and reduce construction costs. The alternatives are summarised below;

#### Low pressure sewer network

SA Water allows the construction of low pressure sewer networks in locations where access to standard gravity fed systems are not feasible. These systems usually consist of a small tank and pump located on each property which then connects into a pressurised main within the road reserve via a small pressure valve on the boundary, commonly known as a boundary kit.

These systems are designed in accordance with the WSAA Pressure Sewer Code of Australia (WSA 07) and can be approved for use (schemes are currently in use in Osborne, Crafers, Stirling etc.) provided a number of key parameters around the viability of the network are agreed to with SA Water. This includes (but not limited to) 25 year NPV comparison of capital and operational costs, land zonings, site topographic information and estimate of pump head requirements at each dwelling.

This system would meet the requirements of maintaining non-saline waste water and we recommend this option be explored further during detailed design of a future development application.

#### Vacuum Sewer Network

Similar to low pressure sewer, Vacuum sewer systems are approvable under discretion by SA Water under the WSAA Vacuum Sewer Code of Australia (recently installed at Buckland Park, SA). These networks operate from a dwelling level, similar to a regular gravity connection in the road, at which point dwellings are linked into small groups (5-10 dwellings) and connected into the vacuum sewer system via a valve box in the road reserve. This system removes the need for ownership and location of tanks and pumps on private property.



### **Network of pumped sewer systems**

As per the 2017 network, however revised to a series of shallower lift pumps to avoid interface with groundwater.

### **Communications**

A review of DBYD infrastructure shows the presence of Telstra, Vocus, Optus and TPG communications infrastructure in Lochside Drive and Frederick Road, these plans have been provided in Appendix E. Of particular note is an existing Optus fibre connection to the site from Frederick Road, just south of Schenker Drive.

This review suggests sufficient infrastructure is already present in close proximity to the Affected Area which is likely to be able to support the Code Amendment, or support with minor external augmentation.

### **Electrical**

SAPN has been contacted for comment on the required infrastructure to support this proposed Code Amendment. A copy of this correspondence and DBYD investigations has been provided in Appendix F. In principal, SAPN confirmed the development can be serviced via existing electrical infrastructure, however no formal assessment was undertaken on capacity of the network.

A review of existing electrical infrastructure shown on the DBYD plans shows existing 11kV high voltage cabling present along the western verge of Frederick Road, and northern verge of Lochside Drive (underground - no stobie poles observed on site). Existing high voltage connections to the SA Water Relift pump station are present on the plans. SAPN confirmed this HV & LV infrastructure are the most suitable locations for a connection.

Whilst confirmation of exact site requirements to facilitate the Code Amendment concept would be determined by SAPN at a later date, presence of high voltage power to the full extent of the Lochside Drive and Frederick Road frontages suggests the network will be able to provide sufficient service, with some further augmentation if required. This may include some HV line extensions to reduce the risk of extended outages (i.e. looped HV network).

SAPN have indicated the number and location of transformer's (TF) would be determined once final road and allotment layouts are confirmed. An indicative figure of 315kVA or 500kVA standard TF size has been suggested by SAPN, which would result in the order of 5-10 TF's for the Code Amendment concept.

### **Battery Storage and Alternative Energy supply**

The client and adjacent parties (SA Water) have discussed at a high level the integration of novel technologies for the generation and harvesting of power (for example solar, hydrogen and associated battery storage of electricity). Whilst details of these initiatives would require negotiation and approval by SAPN, these elements would further increase the viability of the Code Amendment through a reduced reliance on the existing electrical grid network supply if proceeded with.

## Stormwater

### Existing site conditions

City of Charles Sturt (CCS) was contacted in late March 2022, and a meeting was held on the 5th of April 2022 with representatives of CCS, FMG and Potentia West Lakes (Meeting minutes provided in Appendix G). DBYD investigations were also undertaken and provided in Appendix C. Verbal approval / dispensation was provided on some items as noted in the meeting minutes, with a formal written response from Council outstanding.

Whilst some minor drainage is available in Lochside Drive and Frederick Road, it is well documented by Council and industry that the greater Charles Sturt stormwater network is overcapacity and significant works are currently underway to better manage the existing runoff collected by the road reserves. No flooding has been identified within the Affected Area for all storm events.

A review of site conditions shows no formalized drainage structures on site, with LiDAR levels suggesting current site conditions (pre-development) consists of undulating sandy ground conditions which would generate negligible volumes of runoff during frequent (i.e. 1 each year or 1EY) storm events. During large storm events, overall site grading and levels would divert the majority of runoff towards the West Lakes water body (West Lakes) to the north west.

### Council Requirements

With the above context, Council have advise a direct connection to West Lakes is the preferred legal point of stormwater discharge for the Affected Area. As this direct connection would not have any impact on downstream drainage networks (immeasurably small impact on the lake volume and level), Council have verbally granted dispensation on stormwater detention requirements for the site.

One requirement noted by Council was the need for stringent water quality improvement in accordance with the EPA water quality target, and in fact exceeding these targets for the 1EY storm event by targeting negligible runoff leaving the site during this storm event. Typically this would be difficult to achieve in Adelaide, however this site features silty sand soils which have a high capacity for infiltration, and the concept plan shown in the Code Amendment shows a large opportunity for site greening, infiltration and other WSUD elements which will significantly reduce rainfall runoff – mimicking pre-development conditions. Council has a strong preference for in-situ WSUD elements within the urban landscape rather than proprietary treatment devices (i.e. GPT's).

### Proposed Stormwater Management Plan

Runoff generated by anticipated future development facilitated by the Code Amendment will be collected within the road reserves, and conveyed through WSUD treatments within the Affected Area, and discharged directly to the West Lakes water body. Detailed design of drainage networks during a future development application will ensure negligible runoff leaves the site during the 1EY storm event, and safely convey all flows to West Lakes during the 1% AEP flood event, ensuring no increased risk to existing adjacent properties, and adequate freeboard to all future dwellings created as part of the Code Amendment. It is anticipated that site levels will need to be lifted (nominally 0-2m as a gradual grade, not at boundaries) at some locations to facilitate drainage of surfaces and provide cover for underground pipework.

It is noted some indicative allotments have a frontage to Lochside Drive (Stage 1 – ~4,500m<sup>2</sup>). It is most appropriate for Stage 1 to drain directly to Lochside Drive via kerb outlets, with rainwater tanks to be nominated either in accordance with the deemed to comply requirements of the Planning and Design Code, or Council's 1% AEP post-development back to 0.2EY pre-development requirements.



## West Lake water levels, Future sea level rise and resulting tailwater levels

Site levels and drainage infrastructure will need to be designed in consideration of downstream tailwaters within West Lakes. The water level in the lake is influenced by tidal levels, with inlet ducts from the ocean at the southern end of the waterbody, and similar outlet ducts at the northern end, draining West Lakes into the Port River to manage lake levels to a desired target level set by the Department for Infrastructure and Transport. This arrangement protects West Lakes from storm surges and tidal events, however, as the inlet and outlet of the West Lakes system is largely controlled by gravity draining tidal levels into and out of the system, future forecast sea level rises will be carried over into the West Lakes system.

Council has advised that the forecast high water mark for 2070 are estimated to be 0.23mAHD and 0.89mAHD for the 20% and 1% AEP events respectively, noting this is higher than typical target lake levels in 2022.

As briefly mentioned earlier in this report, existing site levels vary between approximately 1.5-1.8mAHD along the north-western frontage to West Lakes, increasing in elevation to typically 2.5-3.5mAHD throughout the majority of the site, with a high level plateau of 5mAHD observed at the original SA Water infrastructure. This aligns with finished surface levels of roughly 3mAHD along Frederick Road and Lochside Drive

It is anticipated that the majority of the site would require imported fill to create longitudinal grade along proposed roadways, drainage pipes and associated cover. A high level review at minimum pipe grades suggests in the order of 0.5 to 2.5m of fill may be adopted across the site to achieve gravity drainage to West Lakes, however pumped solutions may also be explored to reduce the need to import larger volumes of fill.

Concluding the above, existing site levels of 1.5mAHD to 3.5mAHD and greater will achieve well in excess of 600mm freeboard to proposed future sea level rise induced West Lakes water levels. Detailed design of stormwater infrastructure for Future development would need to consider 0.23mAHD and 0.89mAHD receiving tailwaters for discharge of site generated stormwater during the 20% and 1% AEP storm events respectively. It is likely that additional fill will be required to create longitudinal grade, cover and hydraulic grade between the subject area and West Lakes to ensure best practice stormwater levels of service are achieved. Discharge to the West Lakes waterbody may be achieved through either gravity, or pumped solutions as necessary to achieve appropriate integration with adjacent land.



Figure 5 - Existing site levels in mAHD (LiDAR)

## Water Sensitive Design Elements (WSUD)

As mentioned, all parties are very keen to implement a wide range of WSUD elements to support anticipated future development. Given the highly impervious nature of the sandy soils at the subject site, this lends itself greatly to the full gamut of WSUD elements, including;

- Permeable paving throughout carparking, driveways.
- Slotted kerbing along roadways into landscaped grassed and or planted infiltration swales.
- TREENET or similar infiltration pits for passive irrigation of street trees, landscaping and verges while achieving the zero runoff flow target for the 1EY storm event.
- Above ground detention storage in carparking areas during major storm events.
- Increased tree canopy to meet Council canopy targets and reduce the effects of the urban heat island. Successful implementation of this tree canopy roadside through stratacell, structural soils or other similar engineered soil volume solutions.
- Consideration of green roofs and green walls to reduce heat within dwellings (apartments / high density).

## Groundwater

As discussed, groundwater is quite shallow at this site (roughly 2-3m below existing ground level) and this was tabled with Council to confirm dispensation would be granted for the construction of stormwater drainage within this saline groundwater which was accepted verbally by Council.

## Outfall to West lakes location

An existing mass concrete stepped embankment is present along the West Lakes shore at the 16 Frederick Road frontage / boundary and would need to be modified and reconstructed as part of a direct connection to West Lakes stormwater outlet (blue). This is owned and operated by DIT, and Council noted anecdotally have historically been reasonably hesitant in the past to modify this structure.

Should this not be feasible, an alternative alignment (red) via the adjacent Council reserve and discharging to the rock / beach West Lakes bank was supported by Council.



Figure 6 - Outfall to West Lakes alignment



# Affected Area Understanding

This report has been prepared to support a Code Amendment of the Affected Area. FMG Engineering has assessed the services currently available to the Affected Area and confirmed feasible paths towards servicing anticipated future development (through augmentation in some circumstances).

Specifically, FMG confirms the following;

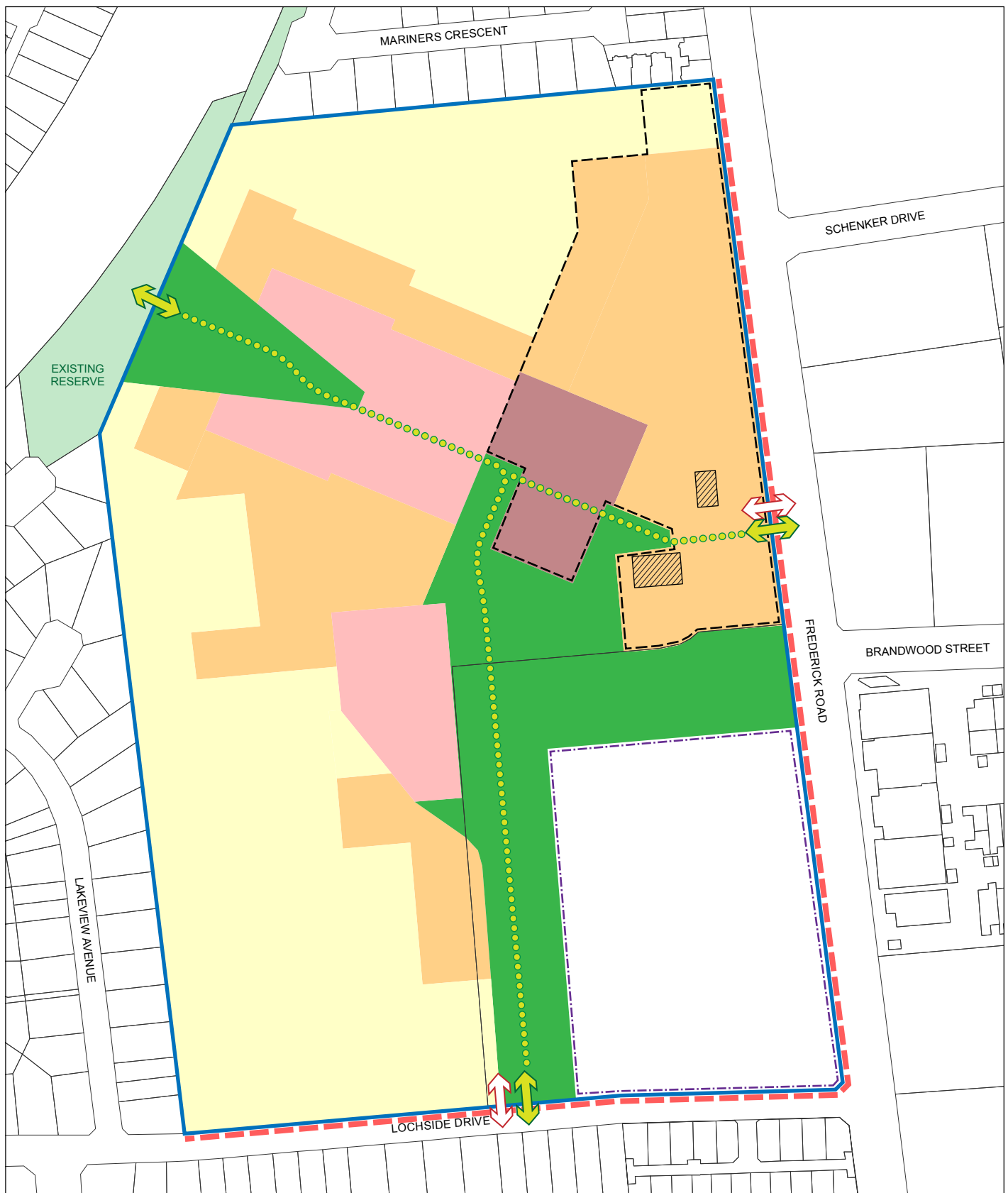
Capacity of existing stormwater system and future stormwater management requirements including WSUD, to accommodate anticipated future development.	Stormwater can be retained and infiltrated on site through WSUD measures for all events up to and including the 1EY storm event, inherently meeting EPA water quality targets. 1% AEP storm event major storm flows will be safely conveyed directly into the West Lake system, without detention requirements without any noticeable effect on existing downstream stormwater networks.
Review impacts and implication of potential site flooding (refer to 'Hazards (Flooding) General' Overlay of the P&D Code below) and required finished ground and floor levels).	<p>No flooding has been observed on flood mapping in this area. Council has forecast future sea rise scenario water levels within West Lake of 0.23mAHD and 0.89mAHD during the 20% and 1% AEP storm event respectively.</p> <p>Existing site levels vary between ~1.8mAHD and 5.5mAHD within the subject area, which provides greater than 900mm of freeboard to forecast sea level rise levels. It is anticipated that site levels would be raised further through importing of fill to achieve longitudinal grade requirements and ensure adequate hydraulic grade line drainage to West Lakes.</p> <p>Detailed design of finished site levels and stormwater drainage shall ensure suitable freeboard of proposed dwellings to 1% AEP storm levels when considering the 0.23mAHD and 0.89mAHD downstream tailwater levels in West Lakes during the 20% and 1% AEP storm event respectively.</p>
<p>Liaise with the City of Charles Sturt and relevant Service providers in order to determine the capacity of existing utility infrastructure (i.e. water, sewer, electricity &amp; gas) and the need for any upgrades;</p> <p>Demonstrated that future anticipated development on in the Affected Area can be adequately serviced, Confirm suitability of general Code Policy framework to ensure effective management of services in the 'Affected Area' including: 'Electricity Infrastructure and Battery Storage Facilities', 'Telecommunication Facilities', 'Water Supply' 'Waste Water Services'.</p>	Detailed review of DBYD plans and correspondence with Service Authorities has been sought and received in some instances. All anticipated future dwellings can be feasibly serviced either by existing services or with minor augmentation pending final confirmation from providers.
An assessment of existing easements on the Affected Area and consideration of any impacts on the proposed rezoning.	Existing easements along the Frederick Road frontage will have no effect on the proposed Code Amendment of residential outcomes. Mixed use proposals for this area will be designed to accommodate the requirements of these easements.



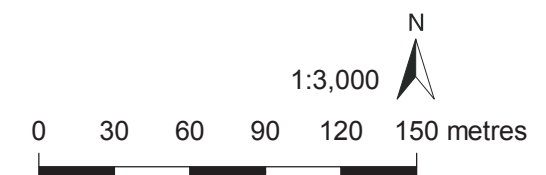
# **Appendix A**

Concept Plan & Staging





- |  |                                     |  |  |
|--|-------------------------------------|--|--|
|  | Concept Plan Boundary               |  | Maximum 2 Storeys (8.5m)                             |
|  | Mixed Use Transition Subzone        |  | Maximum 3 Storeys (12.5m)                            |
|  | Infrastructure Zone                 |  | Maximum 4 Storeys (16.5m)                            |
|  | Indicative Pedestrian/Cycle Access  |  | Maximum 5 Storeys (22m)                              |
|  | Indicative Pedestrian/Cycle Network |  | Indicative Public Open Space                         |
|  | Indicative Vehicle Access           |  | Future verge widening for footpath and streetscaping |
|  | Local Heritage Place                |  |  |



# Concept Plan X

## WEST LAKES



## **Appendix B**

Gas Service DBYD & Correspondence



## Jordan Colbert

---

**From:** greg.taylor@agig.com.au  
**Sent:** Tuesday, 26 April 2022 3:14 PM  
**To:** Jordan Colbert  
**Subject:** RE: [EXTERNAL] FW: West lakes - Frederick Road Subdivision  
**Attachments:** Mains location.pdf

Hi Jordan,

Apologies for the delay but I am awaiting a capacity report for the area involved which I will chase up this afternoon. I believe the SA Water site has a large gas fired generator which requires us to reserve some of the capacity in this region.

Stage 1 shouldn't be an issue as we have a 63mm medium pressure gas main running along Lochside Drive (see attached)

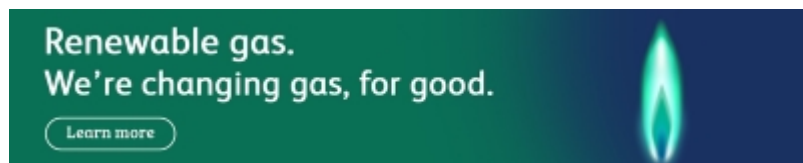
Regards

**Greg Taylor**  
**Business Development Representative SA**

**M** +61 427 432 410 **T** +61 8 8418 1197

**E** [greg.taylor@agig.com.au](mailto:greg.taylor@agig.com.au)

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L6, 400 King William Street, Adelaide, SA 5000  
PO Box 6468, Halifax St, SA, 5000 Australia

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**From:** Jordan Colbert <jordan.colbert@fmgengineering.com.au>  
**Sent:** Tuesday, 26 April 2022 1:59 PM  
**To:** Greg Taylor <greg.taylor@agig.com.au>  
**Subject:** RE: [EXTERNAL] FW: West lakes - Frederick Road Subdivision

**WARNING:** This is an email from an external source. Think before you click.

Hi Greg,

Requesting a follow up on the below at your soonest convenience please.

Regards,

**Jordan Colbert**

BEng (Civil & Struct)

Civil Team Leader (SA)



## Engineering your success

Adelaide | Melbourne | Sydney

**P** 08 8132 6600

**D** 08 8132 6661

**M** 0424 464 274

67 Greenhill Rd Wayville SA 5034

[jordan.colbert@fmgengineering.com.au](mailto:jordan.colbert@fmgengineering.com.au)

[fmgengineering.com.au](http://fmgengineering.com.au)

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**From:** Jordan Colbert

**Sent:** Monday, 11 April 2022 2:38 PM

**To:** [greg.taylor@agig.com.au](mailto:greg.taylor@agig.com.au)

**Subject:** RE: [EXTERNAL] FW: West lakes - Frederick Road Subdivision

Hi Greg,

Apologies – please see attached markup of staging to assist.

Regards,

**Jordan Colbert**

BEng (Civil & Struct)

Civil Team Leader (SA)



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**M** 0424 464 274

67 Greenhill Rd Wayville SA 5034

[jordan.colbert@fmgengineering.com.au](mailto:jordan.colbert@fmgengineering.com.au)

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**From:** Jordan Colbert <[jordan.colbert@fmgengineering.com.au](mailto:jordan.colbert@fmgengineering.com.au)>  
**Sent:** Thursday, 7 April 2022 4:20 PM  
**To:** [greg.taylor@agig.com.au](mailto:greg.taylor@agig.com.au)  
**Subject:** Re: [EXTERNAL] FW: West lakes - Frederick Road Subdivision

Hi Greg,

Thanks for getting in touch - yield plan concept attached and some discussion below;

The site plan is currently being finalised with feasibility inputs, currently looking at approximately;

- Approximately 550-600 residential outcomes
  - Torrens Titled dwellings of ~300-350 dwellings (range of densities), and;
  - Community Titled dwellings of ~10
  - Apartments of 200-250 outcomes
- Mixed use / Commercial space fronting Frederick drive (1.8ha)

Two main accesses will be formed off of Frederick Road, Lochside drive which can be used for servicing requirements.

Regards, Jordan

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---

**From:** [greg.taylor@agig.com.au](mailto:greg.taylor@agig.com.au) <[greg.taylor@agig.com.au](mailto:greg.taylor@agig.com.au)>  
**Sent:** Thursday, April 7, 2022 3:35:31 PM  
**To:** Jordan Colbert <[jordan.colbert@fmgengineering.com.au](mailto:jordan.colbert@fmgengineering.com.au)>  
**Subject:** FW: [EXTERNAL] FW: West lakes - Frederick Road Subdivision

Hi Jordan,

Apologies if you haven't had a response to your enquiry.  
Just left a message on your mobile and I'll give you a call in the morning.

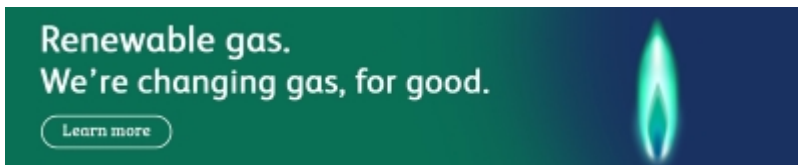
Regards

**Greg Taylor**  
**Business Development Representative**  
**M** +61 427 432 410 **T** 08 8418 1197  
**E** [Greg.Taylor@agig.com.au](mailto:Greg.Taylor@agig.com.au)

**Greg Taylor**  
**Business Development Representative SA**  
**M** +61 427 432 410 **T** +61 8 8418 1197  
**E** [greg.taylor@agig.com.au](mailto:greg.taylor@agig.com.au)

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**From:** Jordan Colbert <[jordan.colbert@fmengineering.com.au](mailto:jordan.colbert@fmengineering.com.au)>  
**Sent:** Thursday, 31 March 2022 8:55 AM  
**To:** Connections SA <[connectionssa@apa.com.au](mailto:connectionssa@apa.com.au)>  
**Subject:** RE: West lakes - Frederick Road Subdivision

Hi – Could I please request a follow up to the below query on Gas supply for a residential development? Thankyou

--

**Jordan Colbert**  
BEng (Civil & Struct)  
Civil Team Leader (SA)



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**D** 08 8132 6661

**M** 0424 464 274

67 Greenhill Rd Wayville SA 5034

[jordan.colbert@fmengineering.com.au](mailto:jordan.colbert@fmengineering.com.au)

[fmengineering.com.au](http://fmengineering.com.au)

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**From:** Jordan Colbert  
**Sent:** Wednesday, 16 March 2022 9:09 AM  
**To:** [connectionssa@apa.com.au](mailto:connectionssa@apa.com.au)  
**Subject:** West lakes - Frederick Road Subdivision

Hi,

FMG is working on a proposed development at 16 Frederick Road, West Lakes on the behalf of a private developer who is currently seeking a code amendment on the land with support from Council.



The site plan is currently being finalised with feasibility inputs, currently looking at approximately;

- Approximately 550-600 residential outcomes
  - Torrens Titled dwellings of 350-400 dwellings (range of densities), and;
  - Apartments of 200-250
- Mixed use / Commercial space fronting Frederick drive (1.8ha)

Two main accesses will be formed off of Frederick Road, Lochside drive which can be used for servicing requirements.

Can you please advise if this subdivision will be serviced by APA Gas and advise of any requirements for consideration (i.e. all feeds will be from



Regards,

**Jordan Colbert**

BEng (Civil & Struct)

Civil Team Leader (SA)



**Engineering your success**

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P 08 8132 6600

D 08 8132 6661

M 0424 464 274

APA Group  
PO Box 6014 Halifax Street  
South Australia 5000



**For your immediate information THERE IS A GAS DISTRIBUTION PIPELINE AND/OR ASSOCIATED INFRASTRUCTURE in the area of your works.**

17/03/2022

Company: FMG Engineering  
Kylie Raine  
67 Greenhill Road  
Wayville  
SA 5034

kylie.raine@fmgengineering.com.au

Dear Kylie Raine

**Sequence Number:** 209292571  
**Worksite Address:** 16 Frederick Road  
West Lakes  
SA 5021

You are hereby notified that the attached Duty of Care requirements apply to any activity in the vicinity of Gas Assets operated by APA, please ensure you read and comply with all the relevant requirements.

Should you have any questions with regards to the attached information please contact our Dial Before You Dig officer - 1800 085 628.

**Caution - Damage to gas assets could result in possible explosion and fire with the risk of personal injury.**

**For Gas Emergencies please call 1800 GAS LEAK (1800 427 532).**

Please find enclosed the following information:

- APA's Duty of Care, If you are unclear of your obligations under these requirements please contact the APA Representative listed above immediately
- An overview map with your requested area highlighted to assist in identifying the location of APA's Gas Assets
- A map(s) showing APA's Gas Assets in the requested area, this information is valid for 30 days from the date of this response, **please check this represents the area you requested**, if it does not, please contact the APA Representative listed above immediately

**Please Note:** For some DBYD enquiries, you might receive 2 responses from the APA Group. Please read both responses carefully as they will relate to different assets. It is your responsibility to action all requirements set out in APA Group responses.

Please take some time to review the entire response document and check the information supplied and please let us have any feedback by sending an email to [DBYDNetworksAPA@apa.com.au](mailto:DBYDNetworksAPA@apa.com.au) or contacting us direct on 1800 085 628.

Yours Faithfully,

**Dial Before You Dig Officer**  
**APA Group**  
**Email: DBYDNetworksAPA@apa.com.au**



## Duty of Care - Working Around Gas Assets

### General Conditions

- This location enquiry is valid for 30 days from the date of this response
- Expired locations, i.e., over 30 days from the date of this response, require a new Dial Before You Dig request to validate location information
- The location information supplied in this document shall be used as a guide only. APA Group shall not be liable or responsible for the accuracy of any such information supplied pursuant to this request
- It is the responsibility of the excavator to expose all Gas Assets, including Gas Service pipes (see below), **by hand**. Gas Asset depths may vary according to ground conditions
- Gas Service (inlet service) connecting Gas Assets in the street to the gas meter on the property are typically **not** marked on the map
- Generally, a map of the inlet service connection installation may be found inside the gas meter box
- The use of Non Destructive Digging (hydro-excavation) is permitted only if the following are adhered to:
  - a) maximum water pressure of 1000psi
  - b) impacting the gas asset must be prevented at all times
  - c) vertical movements in the vicinity of the gas asset such as pushing the pressure wand nozzle or vacuum tube into the soil to break it up is prohibited
  - d) the use of root cutting heads/turbo nozzles is prohibited at all times
  - e) a minimum distance of 100mm shall be maintained between the end of the pressure wand nozzle and the gas asset. Aiming directly at the gas asset shall be avoided at all times
  - f) a dead man trigger or similar, shall be installed on the wand
  - g) once a gas asset has been exposed via hydro-excavation methods, a visual check must be undertaken to ensure no damage has occurred to the pipe or it's coating
- This information has been generated by an automated system based on the area highlighted in your DBYD request and has not been independently verified. **It is your responsibility** to ensure that the information supplied in this response matches the dig site you defined when submitting your Dial Before You Dig enquiry. If the information does not match the dig site or you have any question, please contact APA immediately using the details listed on the first page and / or please resubmit your enquiry
- For **Gas Emergencies** please call 1800 GAS LEAK (1800 427 532).

## APA CHANGE NOTIFICATION

**The map below may have different symbols to those you are familiar with.**

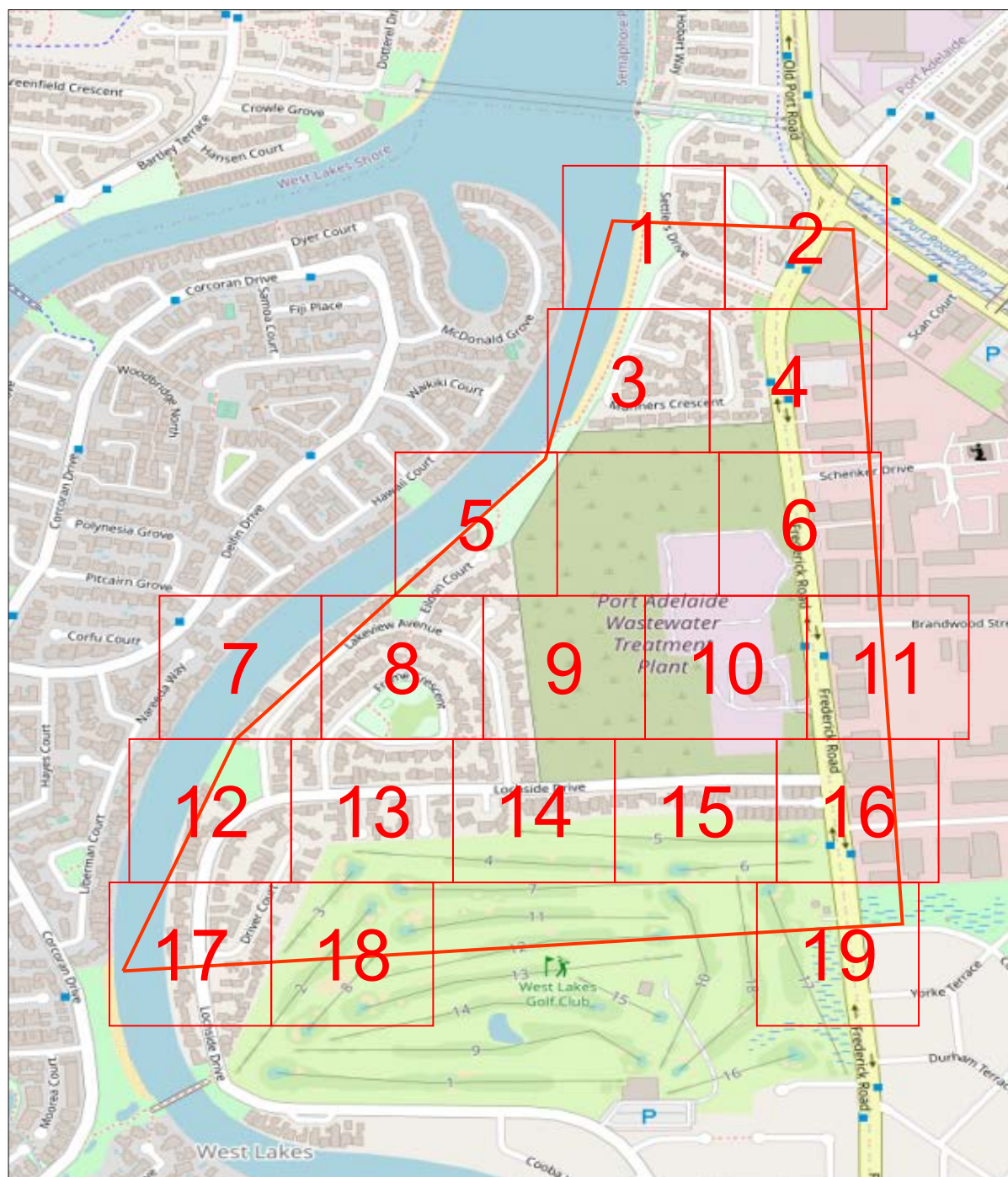
APA recently upgraded the asset mapping software utilised for Dial Before You Dig requests.

To avoid confusion, please carefully review the legend along with the map.

Please direct any questions to [DBYDNetworksAPA@apa.com.au](mailto:DBYDNetworksAPA@apa.com.au)



<b>Site Address</b>	16 Frederick Road West Lakes 5021	<b>Sequence No</b>	209292571
<b>Name</b>	Kylie Raine		
<b>Email</b>	kylie.raine@fmgengineering.com.au		



Scale 1: 7500		Enquiry Area  Map Key Area
---------------	--	----------------------------

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Site Address	16 Frederick Road West Lakes 5021	Sequence No	209292571
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LEGEND			Map Key	
PIPE AND BOUNDARIES		PIPE CODE / MATERIALS	OBJECTS or TERMS	
LOW PRESSURES		C# (e.g. C2) Cast Iron	VALVES	
MEDIUM PRESSURES		CU Copper	BURIED VALVES	
HIGH PRESSURES		N2 Nylon	REGULATORS	
TRANSMISSION PRESSURES		P# (e.g. P6) Polyethylene (PE)	GAS SUPPLIED = YES	
PRIORITY MAIN (BEHIND PIPE)		P6,P7,P9-P12 Medium Density PE	CP RECTIFIER UNIT	
PROPOSED (COLOUR BY PRESSURE)		P2,P4,P8 High Density PE	CP TEST POINT/ ANODE	
LPG (COLOUR BY PRESSURE)		S# (e.g. S8) Steel	SYPHON	
ABANDONED		W2 Wrought Galv. Iron	TRACE WIRE POINT	
IDLE		W3 Poly Coat Wrought Galv. Iron	PIPELINE MARKER	
SLEEVE		Pipe diameter in millimetres is shown before pipe code e.g. 40P6 = 40mm nominal diameter		
CASING / SPLIT (BEHIND PIPE)			NOT TIED IN	N.T.I.
EASEMENT/ JURISDICTION			DEPTH OF COVER	C
EXAMPLES		40mm High Pressure Medium Density Polyethylene in an 80mm Cast Iron Casing	BACK / FRONT OF KERB	Bok Fok
		63mm Medium Pressure Steel		
Line / Polygon Request			This map is created in colour and shall be printed in colour	

Scale 1:700

0 0.008km

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Site Address	16 Frederick Road West Lakes 5021	Sequence No	209292571
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**LEGEND**

PIPE AND BOUNDARIES	PIPE CODE / MATERIALS	OBJECTS or TERMS
LOW PRESSURES	C# (e.g. C2) Cast Iron	VALVES
MEDIUM PRESSURES	CU Copper	BURIED VALVES
HIGH PRESSURES	N2 Nylon	REGULATORS
TRANSMISSION PRESSURES	P# (e.g. P6) Polyethylene (PE)	GAS SUPPLIED = YES
PRIORITY MAIN (BEHIND PIPE)	P6,P7,P9-P12 Medium Density PE	CP RECTIFIER UNIT
PROPOSED (COLOUR BY PRESSURE)	P2,P4,P8 High Density PE	CP TEST POINT/ ANODE
LPG (COLOUR BY PRESSURE)	S# (e.g. S8) Steel	SYPHON
ABANDONED	W2 Wrought Galv. Iron	TRACE WIRE POINT
IDLE	W3 Poly Coat Wrought Galv. Iron	PIPELINE MARKER
SLEEVE	Pipe diameter in millimetres is shown before pipe code	NOT TIED IN
CASING / SPLIT (BEHIND PIPE)	e.g. 40P6 = 40mm nominal diameter	DEPTH OF COVER
EASEMENT/ JURISDICTION		BACK / FRONT OF KERB

**EXAMPLES**

40P6 in 80C2	40mm High Pressure Medium Density Polyethylene in an 80mm Cast Iron Casing
63S8	63mm Medium Pressure Steel

Line / Polygon Request

**Map Key**

This map is created in colour and shall be printed in colour

Scale 1:700

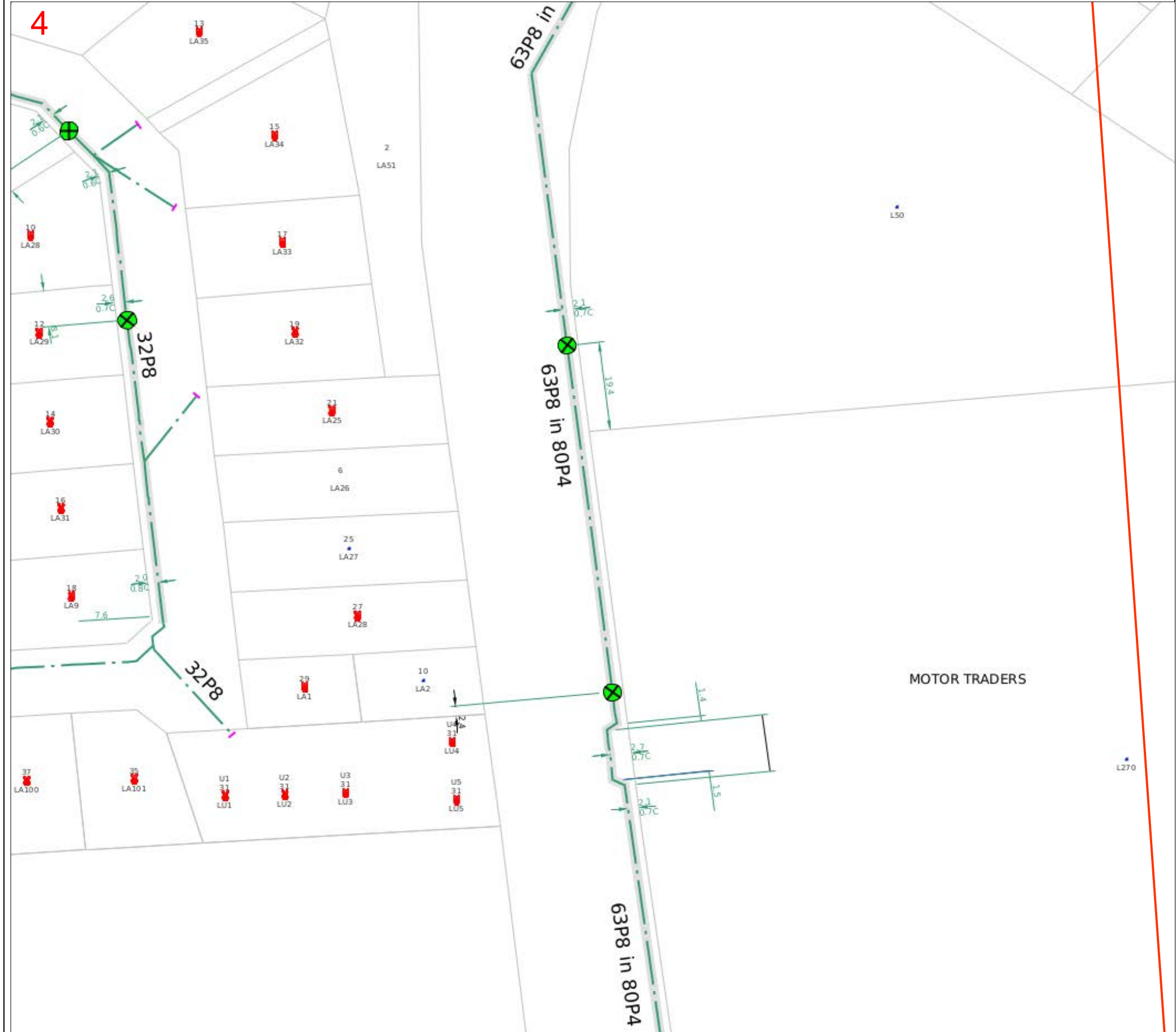
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Scale 1:700

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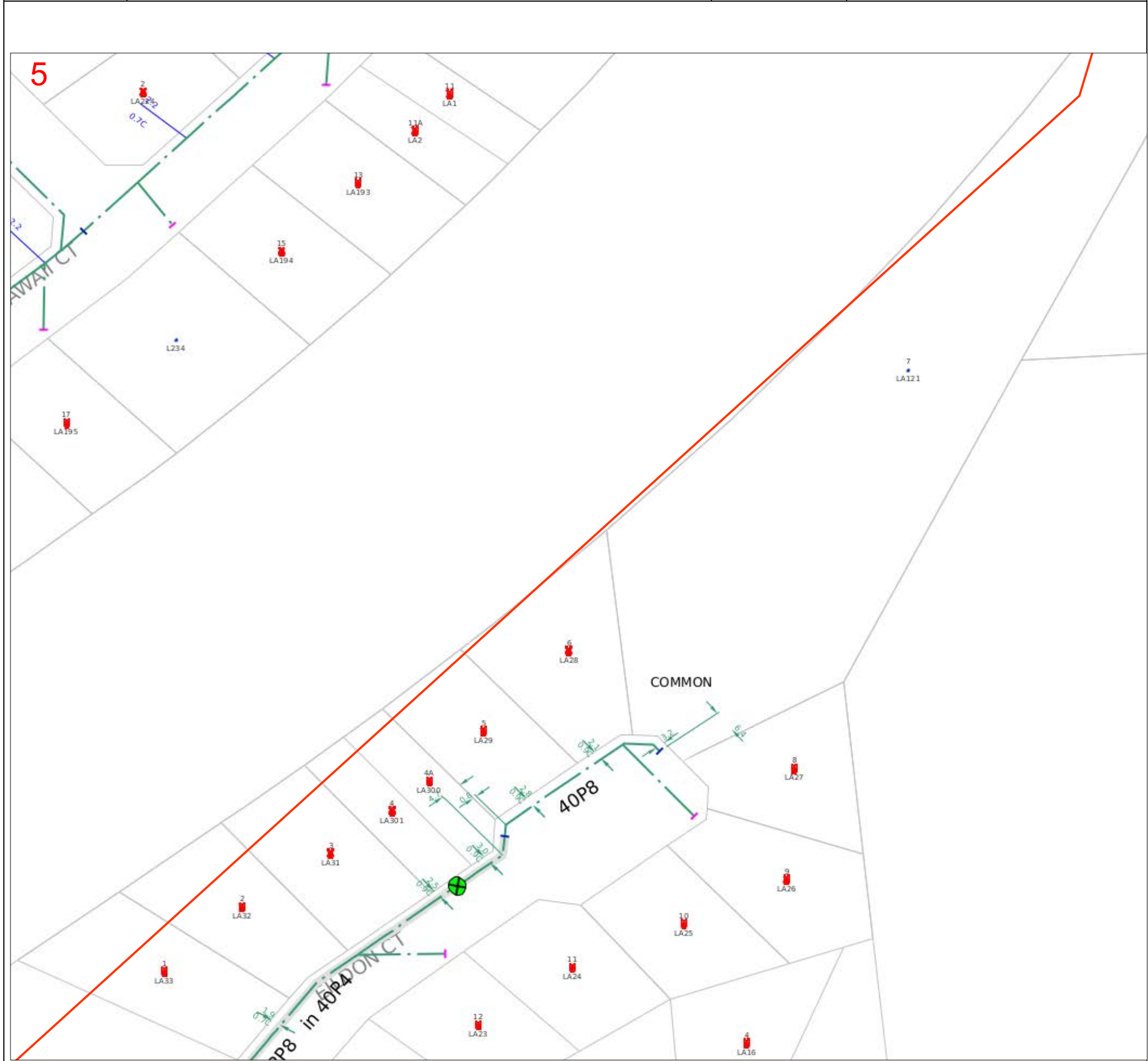
Site Address	16 Frederick Road West Lakes 5021	Sequence No	209292571
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LEGEND			Map Key																																																			
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Site Address	16 Frederick Road West Lakes 5021	Sequence No	209292571
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**LEGEND**

PIPE AND BOUNDARIES	PIPE CODE / MATERIALS	OBJECTS or TERMS
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EASEMENT/ JURISDICTION		BACK / FRONT OF KERB

**EXAMPLES**

40P6 in 80C2	40mm High Pressure Medium Density Polyethylene in an 80mm Cast Iron Casing
63S8	63mm Medium Pressure Steel

Line / Polygon Request

**Map Key**

Scale 1:700

0 0.008km

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**EXAMPLES**

40P6 in 80C2	40mm High Pressure Medium Density Polyethylene in an 80mm Cast Iron Casing
63S8	63mm Medium Pressure Steel

Line / Polygon Request

**Map Key**

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Scale 1:700

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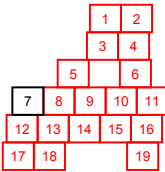
Site Address	16 Frederick Road West Lakes 5021	Sequence No	209292571
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EASEMENT/ JURISDICTION		BACK / FRONT OF KERB
<b>EXAMPLES</b>		
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**Map Key**



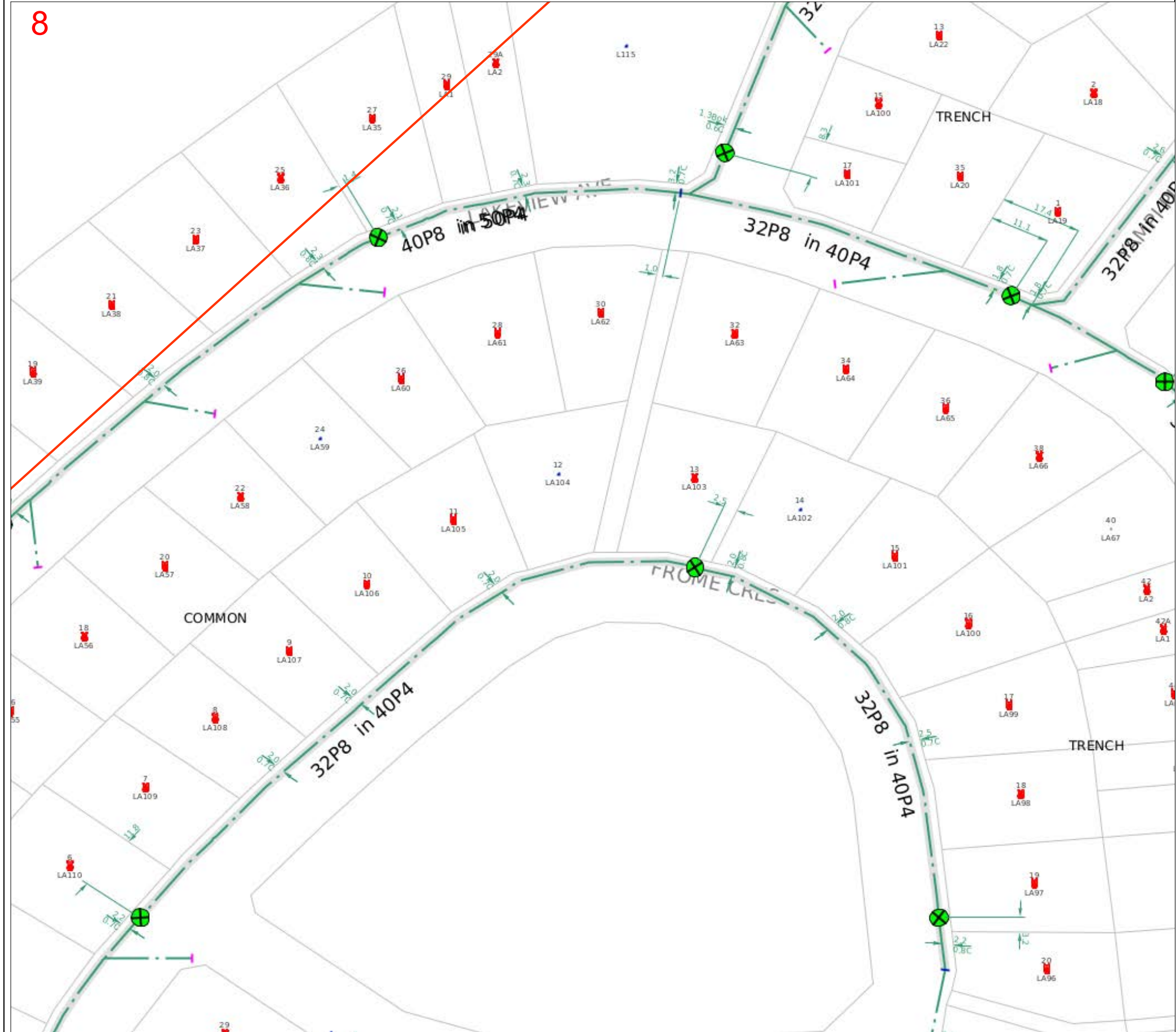
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Scale 1:700	0 0.008km	
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 Line / Polygon Request

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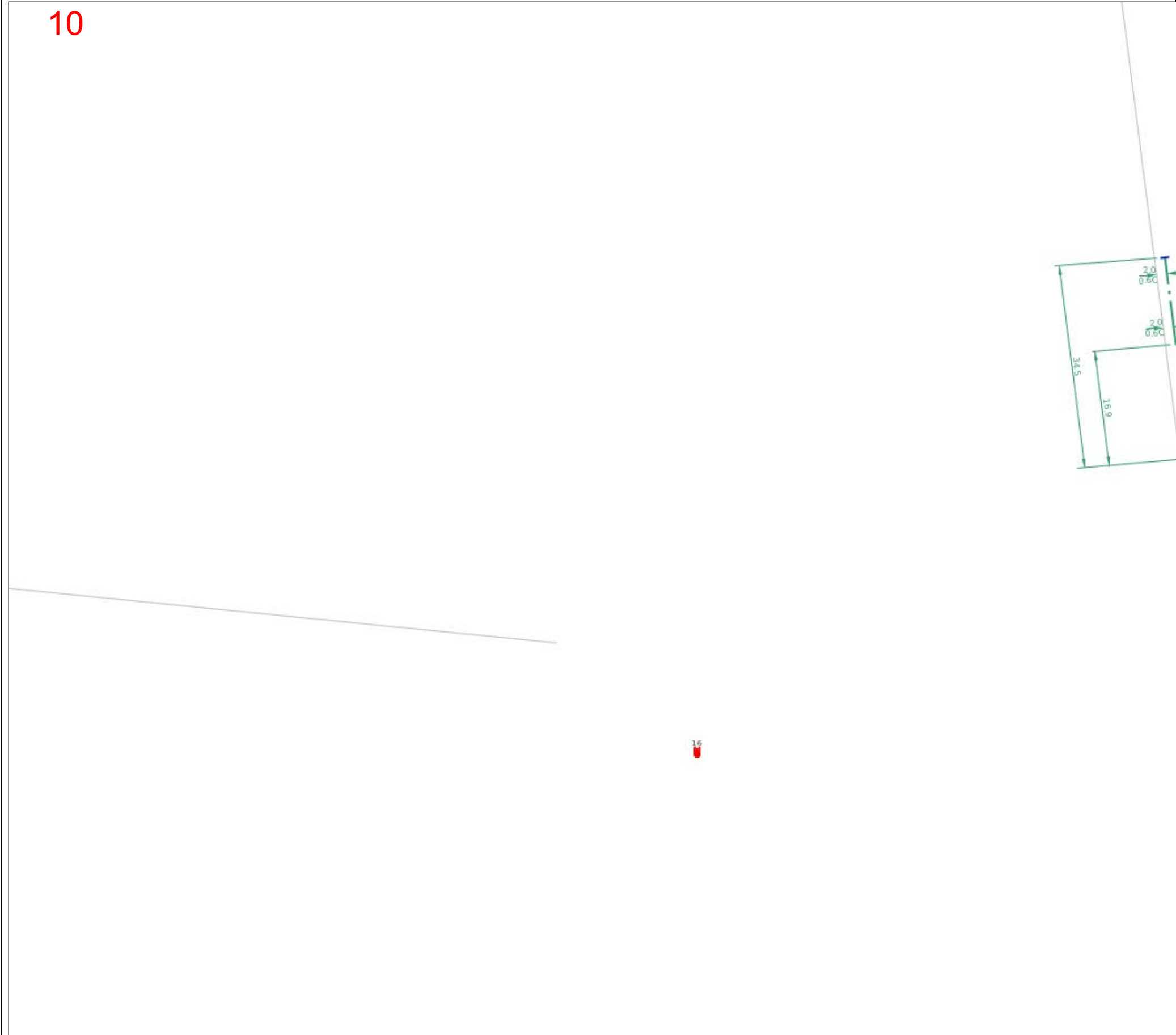
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MEDIUM PRESSURES		CU	Copper	BURIED VALVES	
HIGH PRESSURES		N2	Nylon	REGULATORS	
TRANSMISSION PRESSURES		P# (e.g. P6)	Polyethylene (PE)	GAS SUPPLIED = YES	
PRIORITY MAIN (BEHIND PIPE)		P6,P7,P9-P12	Medium Density PE	CP RECTIFIER UNIT	
PROPOSED (COLOUR BY PRESSURE)		P2,P4,P8	High Density PE	CP TEST POINT/ ANODE	
LPG (COLOUR BY PRESSURE)		S# (e.g. S8)	Steel	SYPHON	
ABANDONED		W2	Wrought Galv. Iron	TRACE WIRE POINT	
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**EXAMPLES**  
 40P6 in 80C2 40mm High Pressure Medium Density Polyethylene in an 80mm Cast Iron Casing  
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Line / Polygon Request

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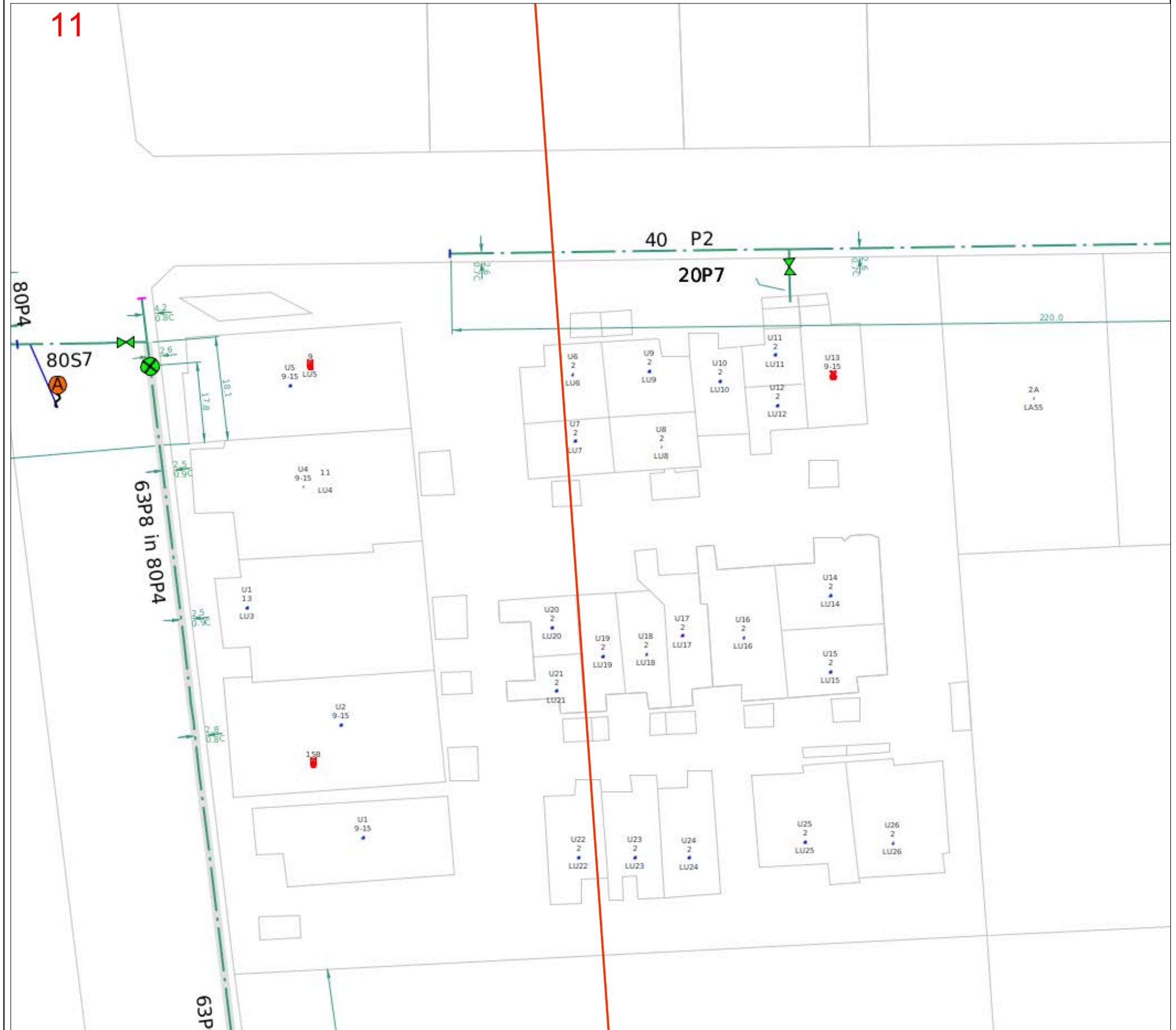
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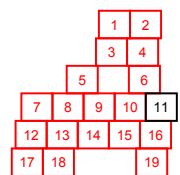
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<b>EXAMPLES</b>		
40P6 in 80C2	40mm High Pressure Medium Density Polyethylene in an 80mm Cast Iron Casing	
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Line / Polygon Request

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Scale 1:700

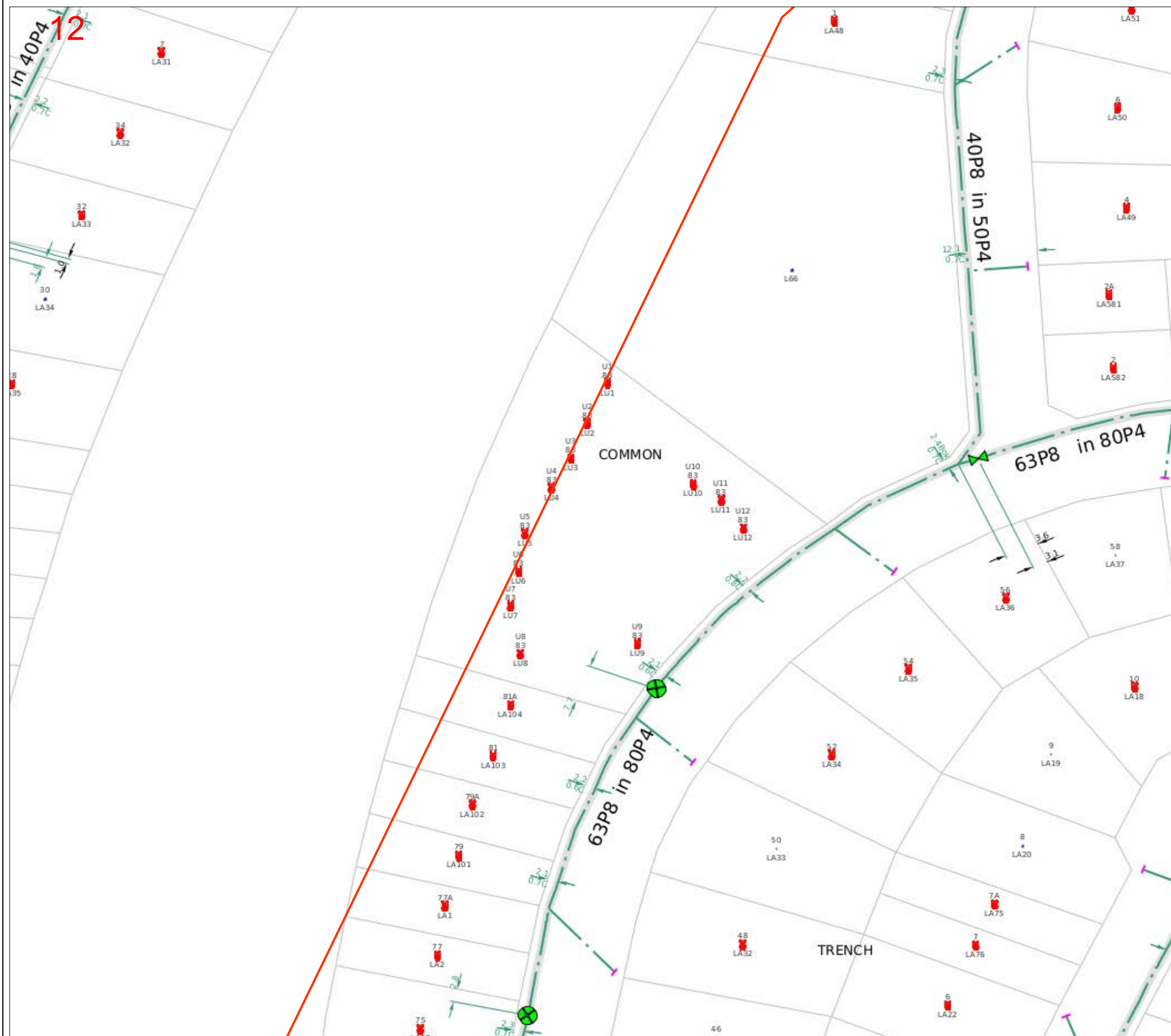
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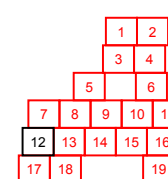
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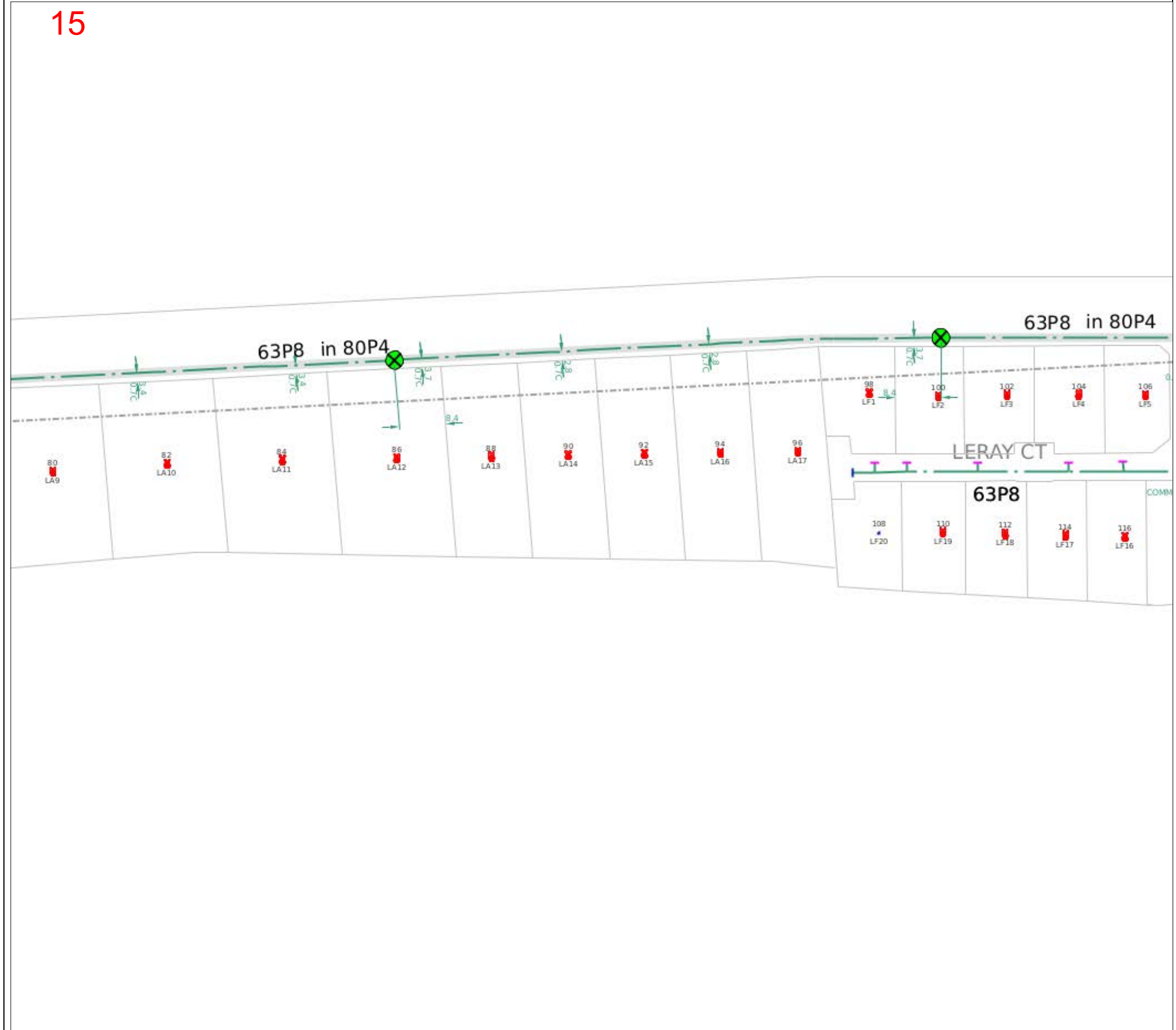
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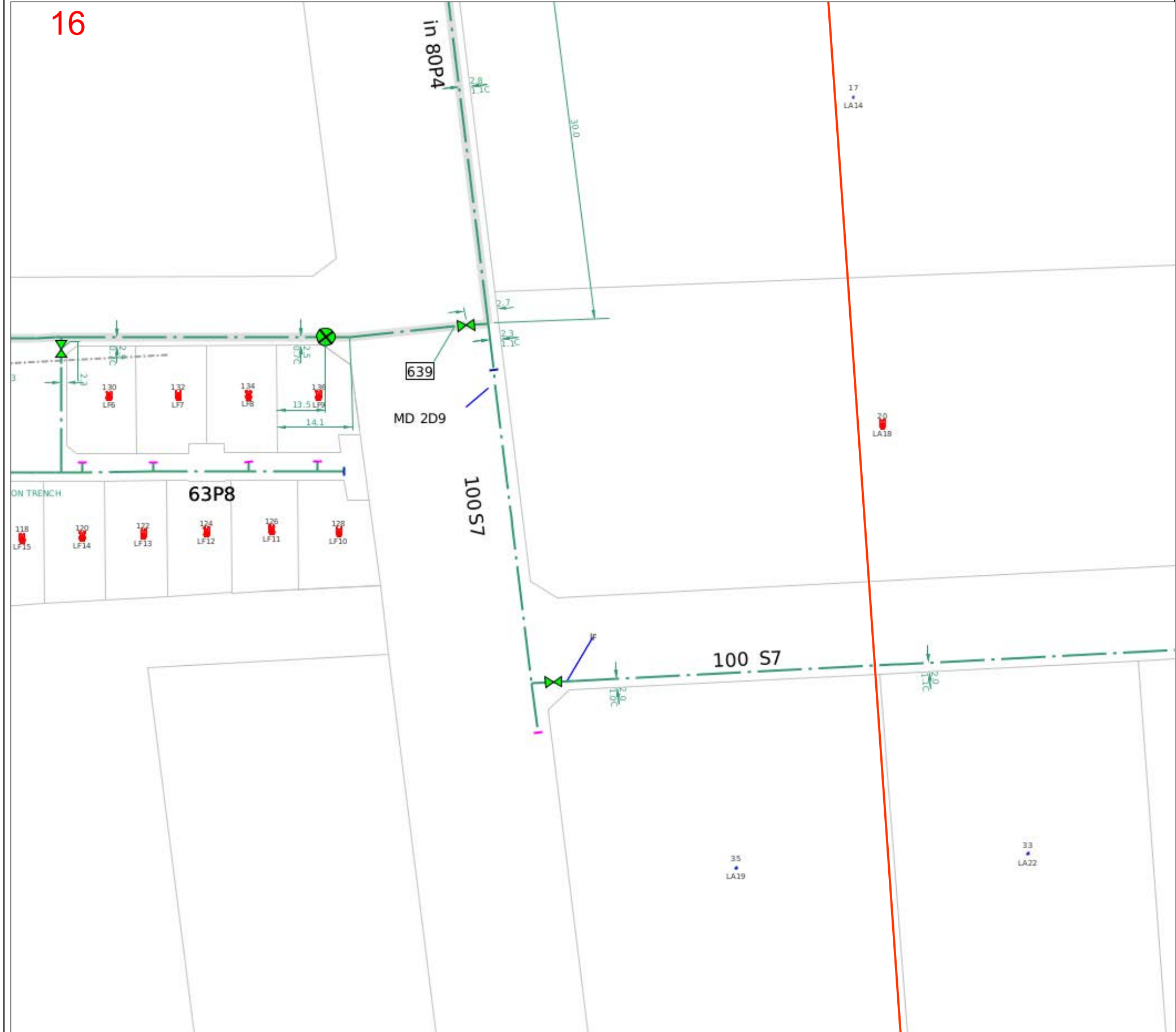


<b>LEGEND</b>			<b>Map Key</b> 
<b>PIPE AND BOUNDARIES</b>	<b>PIPE CODE / MATERIALS</b>	<b>OBJECTS or TERMS</b>	
LOW PRESSURES MEDIUM PRESSURES HIGH PRESSURES TRANSMISSION PRESSURES PRIORITY MAIN (BEHIND PIPE) PROPOSED (COLOUR BY PRESSURE) LPG (COLOUR BY PRESSURE) ABANDONED IDLE SLEEVE CASING / SPLIT (BEHIND PIPE) EASEMENT/ JURISDICTION	C# (e.g. C2) Cast Iron CU Copper N2 Nylon P# (e.g. P6) Polyethylene (PE) P6,P7,P9-P12 Medium Density PE P2,P4,P8 High Density PE S# (e.g. S8) Steel W2 Wrought Galv. Iron W3 Poly Coat Wrought Galv. Iron  Pipe diameter in millimetres is shown before pipe code e.g. 40P6 = 40mm nominal diameter	VALVES BURIED VALVES REGULATORS GAS SUPPLIED = YES CP RECTIFIER UNIT CP TEST POINT/ ANODE SYPHON TRACE WIRE POINT PIPELINE MARKER NOT TIED IN DEPTH OF COVER BACK / FRONT OF KERB	
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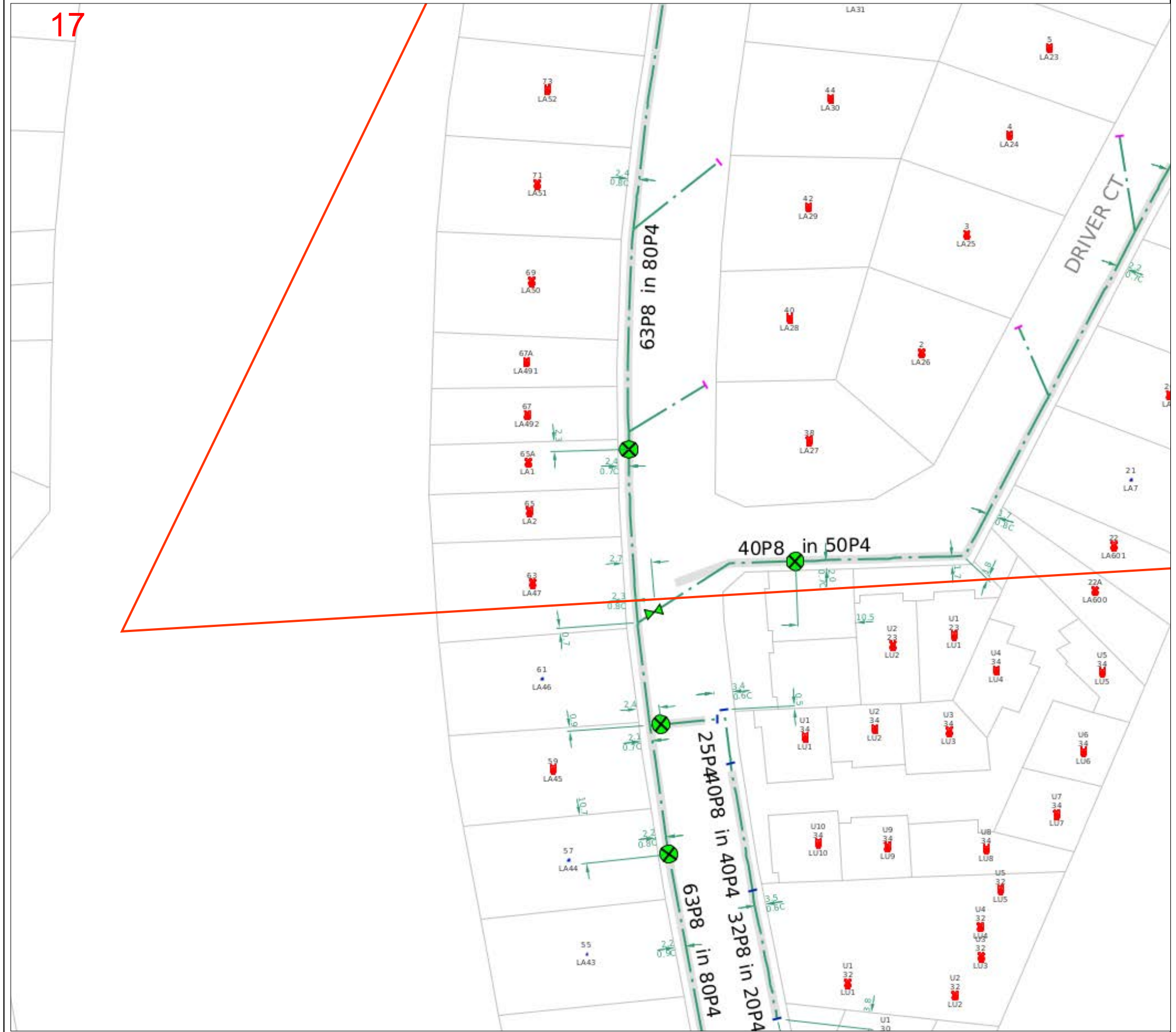
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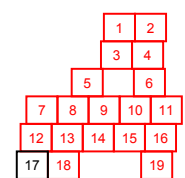
#### LEGEND

PIPE AND BOUNDARIES	PIPE CODE / MATERIALS	OBJECTS or TERMS
LOW PRESSURES	C# (e.g. C2) Cast Iron	VALVES
MEDIUM PRESSURES	CU Copper	BURIED VALVES
HIGH PRESSURES	N2 Nylon	REGULATORS
TRANSMISSION PRESSURES	P# (e.g. P6) Polyethylene (PE)	GAS SUPPLIED = YES
PRIORITY MAIN (BEHIND PIPE)	P6,P7,P9-P12 Medium Density PE	CP RECTIFIER UNIT
PROPOSED (COLOUR BY PRESSURE)	P2,P4,P8 High Density PE	CP TEST POINT/ ANODE
LPG (COLOUR BY PRESSURE)	S# (e.g. S8) Steel	SYPHON
ABANDONED	W2 Wrought Galv. Iron	TRACE WIRE POINT
IDLE	W3 Poly Coat Wrought Galv. Iron	PIPELINE MARKER
SLEEVE	Pipe diameter in millimetres is shown before pipe code	NOT TIED IN
CASING / SPLIT (BEHIND PIPE)	e.g. 40P6 = 40mm nominal diameter	DEPTH OF COVER
EASEMENT/ JURISDICTION		BACK / FRONT OF KERB
<b>EXAMPLES</b>		
40P6 in 80C2	40mm High Pressure Medium Density Polyethylene in an 80mm Cast Iron Casing	
63S8	63mm Medium Pressure Steel	

Line / Polygon Request

This map is created in colour and shall be printed in colour

#### Map Key



Scale 1:700

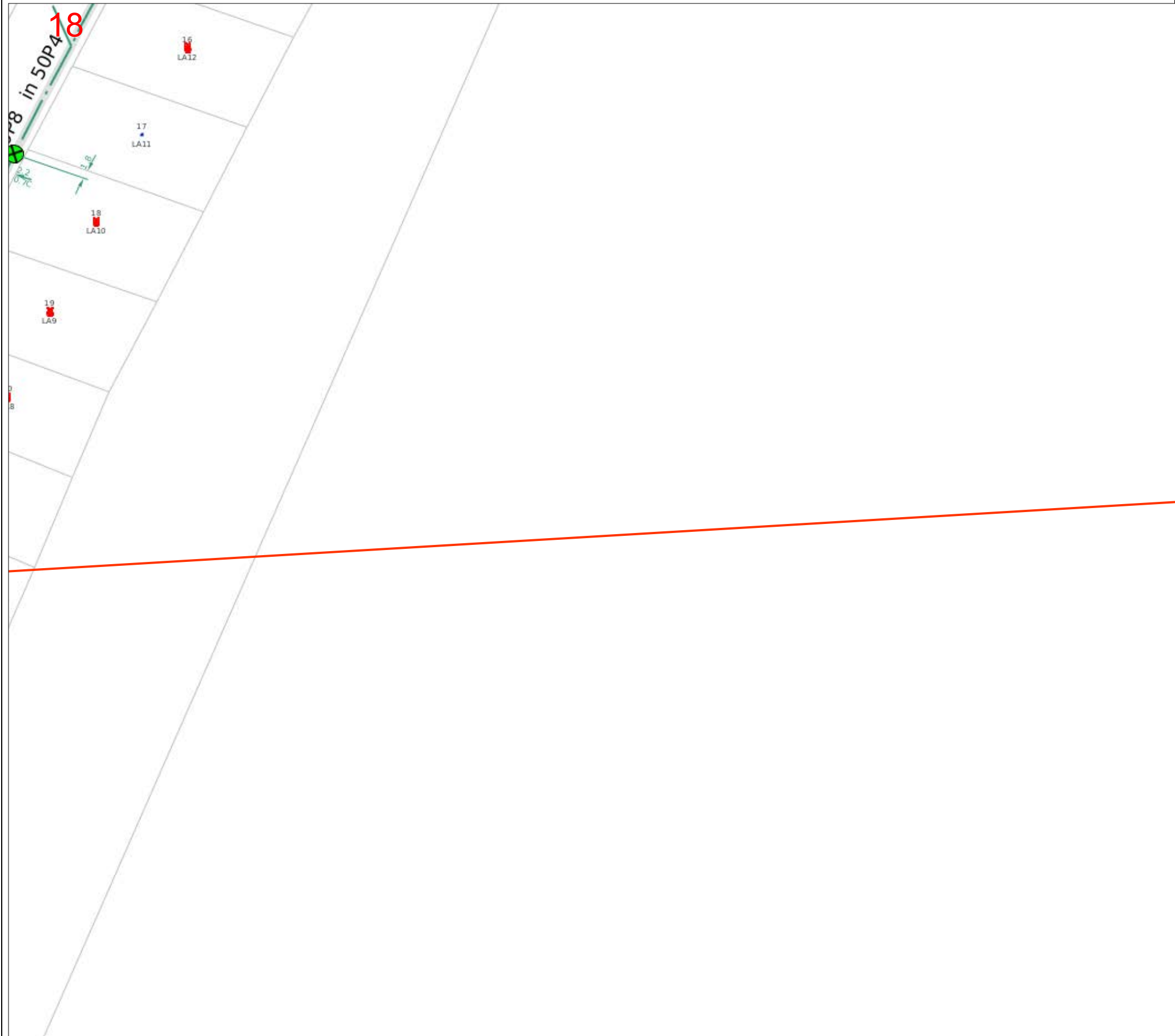
0 0.008km



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Site Address	16 Frederick Road West Lakes 5021	Sequence No	209292571
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**LEGEND**

PIPE AND BOUNDARIES		PIPE CODE / MATERIALS		OBJECTS or TERMS	
LOW PRESSURES		C# (e.g. C2)	Cast Iron	VALVES	
MEDIUM PRESSURES		CU	Copper	BURIED VALVES	
HIGH PRESSURES		N2	Nylon	REGULATORS	
TRANSMISSION PRESSURES		P# (e.g. P6)	Polyethylene (PE)	GAS SUPPLIED = YES	
PRIORITY MAIN (BEHIND PIPE)		P6,P7,P9-P12	Medium Density PE	CP RECTIFIER UNIT	
PROPOSED (COLOUR BY PRESSURE)		P2,P4,P8	High Density PE	CP TEST POINT/ ANODE	
LPG (COLOUR BY PRESSURE)		S# (e.g. S8)	Steel	SYPHON	
ABANDONED		W2	Wrought Galv. Iron	TRACE WIRE POINT	
IDLE		W3	Poly Coat Wrought Galv. Iron	PIPELINE MARKER	
SLEEVE		Pipe diameter in millimetres is shown before pipe code e.g. 40P6 = 40mm nominal diameter		NOT TIED IN	N.T.I.
CASING / SPLIT (BEHIND PIPE)				DEPTH OF COVER	C
EASEMENT/ JURISDICTION				BACK / FRONT OF KERB	Bok Fok

**EXAMPLES**  
 40mm High Pressure Medium Density Polyethylene in an 80mm Cast Iron Casing  
 63mm Medium Pressure Steel

Line / Polygon Request

This map is created in colour and shall be printed in colour

Map Key

Scale 1:700

0 0.008km

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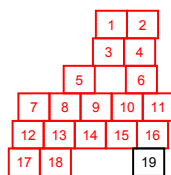
<b>Site Address</b>	16 Frederick Road West Lakes 5021	<b>Sequence No</b>	209292571
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#### LEGEND

PIPE AND BOUNDARIES	PIPE CODE / MATERIALS	OBJECTS or TERMS
LOW PRESSURES	C# (e.g. C2) Cast Iron	VALVES
MEDIUM PRESSURES	CU Copper	BURIED VALVES
HIGH PRESSURES	N2 Nylon	REGULATORS
TRANSMISSION PRESSURES	P# (e.g. P6) Polyethylene (PE)	GAS SUPPLIED = YES
PRIORITY MAIN (BEHIND PIPE)	P6,P7,P9-P12 Medium Density PE	CP RECTIFIER UNIT
PROPOSED (COLOUR BY PRESSURE)	P2,P4,P8 High Density PE	CP TEST POINT/ ANODE
LPG (COLOUR BY PRESSURE)	S# (e.g. S8) Steel	SYPHON
ABANDONED	W2 Wrought Galv. Iron	TRACE WIRE POINT
IDLE	W3 Poly Coat Wrought Galv. Iron	PIPELINE MARKER
SLEEVE	Pipe diameter in millimetres is shown before pipe code	NOT TIED IN
CASING / SPLIT (BEHIND PIPE)	e.g. 40P6 = 40mm nominal diameter	DEPTH OF COVER
EASEMENT/ JURISDICTION		BACK / FRONT OF KERB
<b>EXAMPLES</b>	40P6 in 80C2 40mm High Pressure Medium Density Polyethylene in an 80mm Cast Iron Casing	
	63S8 63mm Medium Pressure Steel	

#### Map Key



Line / Polygon Request

This map is created in colour and shall be printed in colour

Scale 1:700

0 0.008km



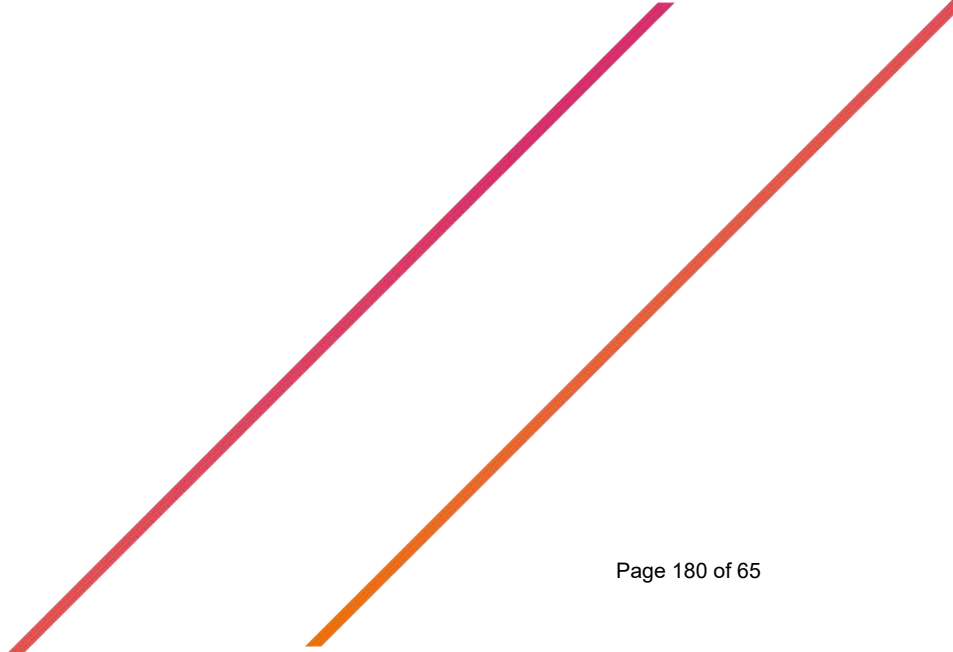
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## **Appendix C**

SA Water – Water Supply DBYD, Meeting Minutes and Email  
Correspondence



## Jordan Colbert

---

**From:** Wilkinson, Alex <Alex.Wilkinson@sawater.com.au>  
**Sent:** Tuesday, 12 April 2022 4:46 PM  
**To:** Jordan Colbert  
**Cc:** Jeff Zanker; dan@potentiaenvironment.com  
**Subject:** RE: Novo West Lakes / Potentia servicing

Hi Jordan

Yes, great to meet up.

We are in the process of approving a pressure system at Buckland Park. I will look into what I can provide you in relation to that project. I will also look into any low pressure information we have.

Send me a reminder late next week if I haven't got you anything.

Cheers

Alex

---

**From:** Jordan Colbert <jordan.colbert@fmgengineering.com.au>  
**Sent:** Tuesday, 12 April 2022 11:37 AM  
**To:** Wilkinson, Alex <Alex.Wilkinson@sawater.com.au>  
**Cc:** Jeff Zanker <Jeff.Zanker@fmgengineering.com.au>; dan@potentiaenvironment.com  
**Subject:** RE: Novo West Lakes / Potentia servicing



**External sender**  
Think before you click, open with caution

Hi Alex,

Great to see you last week.

Just following on from the below – we are reviewing alternatives (i.e. low pressure sewer) for 16 Frederick Road. To fold into this, could you provide any recent precedence SA Water has recently approved to speed up the coordination?

Regards,

**Jordan Colbert**  
BEng (Civil & Struct)  
Civil Team Leader (SA)



**Engineering your success**

Adelaide | Melbourne | Sydney

P 08 8132 6600

D 08 8132 6661



M 0424 464 274  
67 Greenhill Rd Wayville SA 5034  
[jordan.colbert@fmengineering.com.au](mailto:jordan.colbert@fmengineering.com.au)

[fmengineering.com.au](http://fmengineering.com.au)

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---

**From:** Wilkinson, Alex <[Alex.Wilkinson@sawater.com.au](mailto:Alex.Wilkinson@sawater.com.au)>  
**Sent:** Friday, 18 March 2022 5:30 PM  
**To:** Jordan Colbert <[jordan.colbert@fmengineering.com.au](mailto:jordan.colbert@fmengineering.com.au)>  
**Cc:** Jeff Zanker <[Jeff.Zanker@fmengineering.com.au](mailto:Jeff.Zanker@fmengineering.com.au)>; [dan@potentiaenvironment.com](mailto:dan@potentiaenvironment.com); Stanway, Craig <[Craig.Stanway@sawater.com.au](mailto:Craig.Stanway@sawater.com.au)>; Czura, Alex <[Alex.Czura@sawater.com.au](mailto:Alex.Czura@sawater.com.au)>; Wegener, Blake <[Blake.Wegener@sawater.com.au](mailto:Blake.Wegener@sawater.com.au)>; Silz, Sally <[Sally.Silz@sawater.com.au](mailto:Sally.Silz@sawater.com.au)>  
**Subject:** Novo West Lakes / Potentia servicing

Hi Jordan

Thank you for arranging today, please see the below advice we provided in 2017 for the below yields.

I couldn't see any flow test data associated with the subject site.

In relation to the Systems Planning Process SA Water will provide the base case (similar to the below) and review alternate options provided by FMG. This review will need to take place in conjunction with our Systems Planning Team, Reticulation Networks Team, Assets and Operations Teams.

Please do not hesitate to contact me if you require anything in addition.

Kind regards

**Alex Wilkinson**

Account Manager – Major Land Development

[alex.wilkinson@sawater.com.au](mailto:alex.wilkinson@sawater.com.au) • 0436 684 899

250 Victoria Square/Tarntanyangga ADELAIDE SA 5000

### 2017 advice

Yield forecast

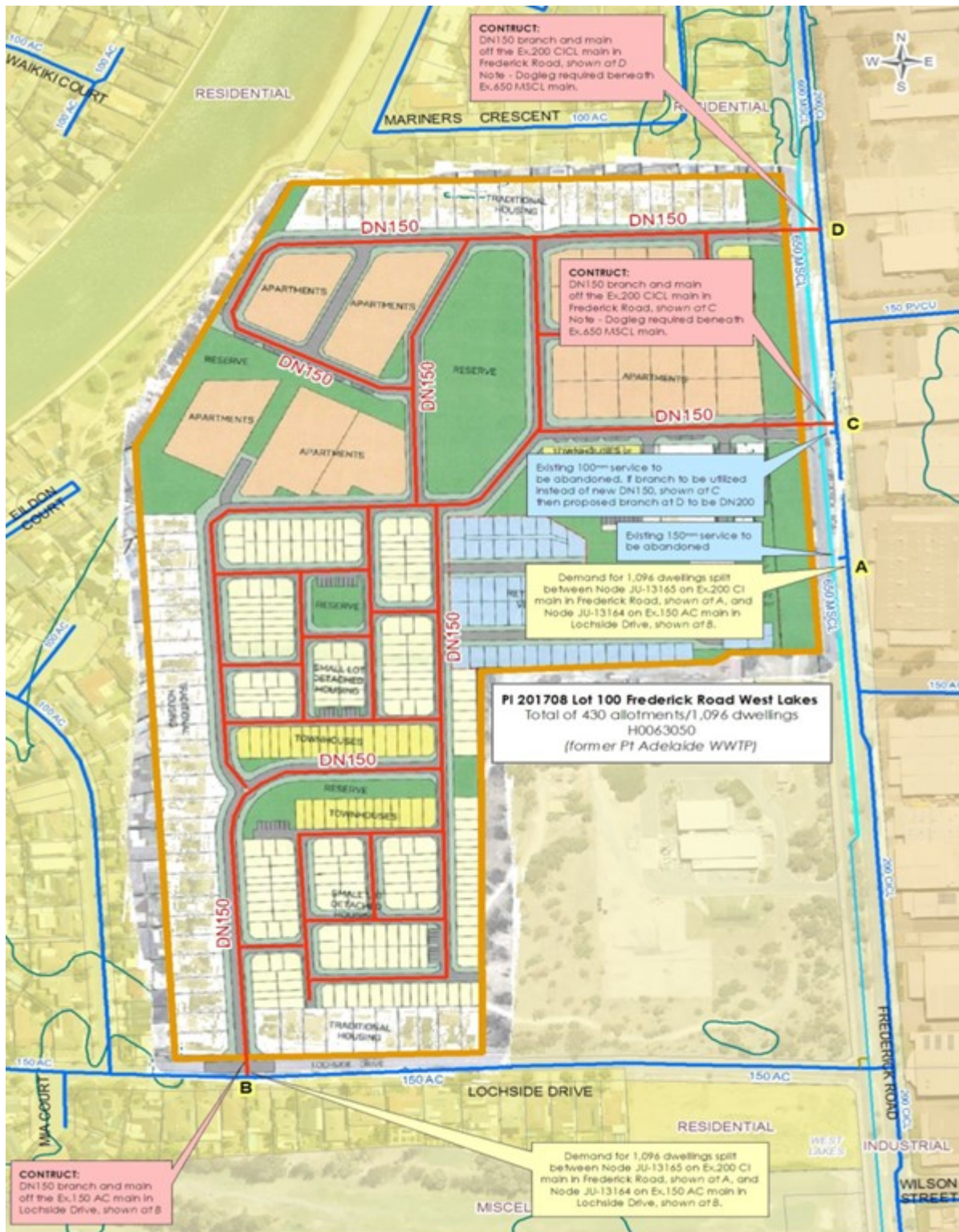
- Detached dwellings 61
- Townhouses 49
- Small lot dwellings 226
- Apartments 640
- Retirement Village 149

- Proposed Total number of allotments = 430 (1,095 dwellings)

### Water

Based on TNP investigation, the network has sufficient capacity to support the additional 1,095 dwelling development subject to:

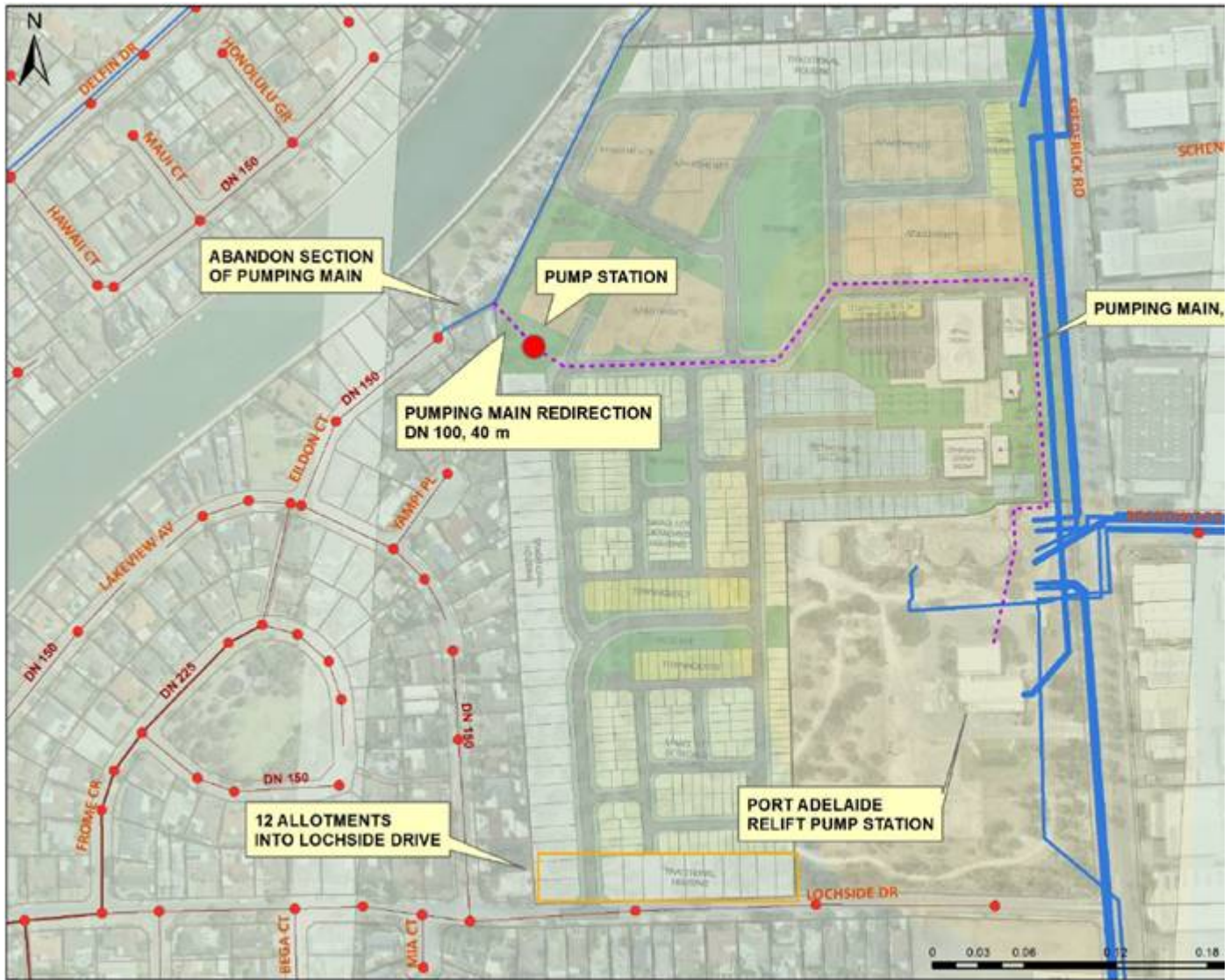
- Construction of 2 x new DN200/150 branch mains off the Ex.200 C1CL main in Frederick Road, **Shown at C and D on Figure 1.**
- Construction of a new DN150/150 branch main off the Ex.150 AC main in Lochside Drive, **shown at B on Figure 1.**
- Proposed DN150 internal mains to interlink between Frederick Road and Lochside Drive where possible.
- Proposed DN150 branches off Frederick Road will require being dog-legged beneath the Ex.650 MSCL main on the western side before entering development, **shown at C and D on Figure 1.**
- Traditional Housing allotments fronting Lochside Drive will require direct servicing off Ex.150 AC main
- Infrastructure is to be constructed in accordance with SA Water networks Infrastructure Standards





## SEWER

Infrastructure	Catchment	Infrastructure	
		Option 1	Option 2
Gravity main	Development site	DN 150 and DN 225 (internal mains)	
Pump station	WWPS119	The pump station diversion should be configured such that its performance is n	
	Development site	20.1 L/s @ 16.4 mH MWL EL -1.9 Velocity 1.0 m/s	24.5 L/s @ 20.2 mH MWL EL -2.0 Velocity 1.2 m/s
Pumping main	WWPS119	DN 100 (ID 100, C 120), 40 m	
	Development site	DN 150 (ID 160.8, C 125), 620 m	
Pump sump diameter	Development site	2.2 m (see TG 11a)	
Pump sump depth	Development site	5.08 m	5.28 m
Pump system detention time	Development site	1.2 hours	



Be green - read on the screen

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# Meeting minutes

**Date:** 18.03.2022

**Time:** 1330

**Location:** Online - Teams

**Meeting number:** 01

**Project:** Novo West Lakes / Potentia

**Attendees:**

NAME	COMPANY	INITIALS
Dan De Conno	Potentia	DC
Jeff Zanker	FMG	JZ
Jordan Colbert	FMG	JTC
Alex Wilkinson	SA Water (SAW)	AW

ITEM	DESCRIPTION	ACTION	DUE
<b>0.0</b>	<b>PREVIOUS MINUTES</b>		
<b>1.0</b>	<b>SA WATER INFRASTRUCTURE ASSESSMENT</b>		
<b>1.1</b>	SA Water request a copy of the current land division plan, including yields, building heights and indicative staging to best inform the SA Water infrastructure assessment by the systems and network review team.	<b>DC</b>	(ETA Wednesday 23.03)
<b>1.2</b>	SAW advises ~3 month turnaround for network assessment (i.e. anticipate EOFY response, FMG to incorporate general information / previous advice in meantime to support code amendment).	-	
<b>1.3</b>	FMG aiming to be able to outline feasible water and servicing of the proposed development (at a high level) with reference to SA Water correspondence, and some light information on alternative sewer constructions which might be considered at a later date if economically viable.	-	
<b>2.0</b>	<b>WATER</b>		
<b>2.1</b>	No anticipated issues servicing the subdivision from a conceptual point of view. SA Water to advise following network assessment any external augmentation required and internal reticulation sizing		
<b>2.2</b>	SAW to check any existing flow test data for the area which may assist feasibility / fire WSAA requirements.	<b>AW</b>	Wednesday 23.03.2022
<b>3.0</b>	<b>SEWER</b>		
<b>3.1</b>	Capacity exists within Lochside drive for connection of <u>some</u> residential allotments directly. SA Water to provide previous correspondence to FMG for incorporation into reporting	<b>AW</b>	Wednesday 23.03.2022
<b>3.2</b>	Previous correspondence by Waterniche / SAW has outlined feasible sewer connections into the lifting station via either;	<b>AW</b>	Wednesday 23.03.2022

	<ul style="list-style-type: none"> <li>- Connection into existing rising main in Frederick Road (capacity is available in this system)</li> <li>- Direct connection into base of pump chamber within lifting station</li> </ul> <p>SAW to provide previous correspondence for reference</p>		
<b>3.3</b>	<p>Alternative sewer drainage systems discussed (low pressure sewer etc.) to achieve a desirable SA Water outcome of maintaining internal sewer above groundwater levels. AW to discuss with Blake and others within SA Water and provide some precedence / examples of other systems which have been approved previously for use in similar circumstances.</p> <p>FMG to then review and provide a recommendation back to SA Water for discussion.</p>	<b>AW</b>	April 22
<b>4.0</b>	<b>RECYCLED WATER</b>		
<b>4.1</b>	Note: recycled water is available in the area, but is owned and operated by Council		
<b>4.2</b>			

**Meeting closed: 1400**

**Next meeting: TBC**

**FMG Engineering**

ABN 58 083 071 185

**FMG Research**

ABN 58 083 071 185

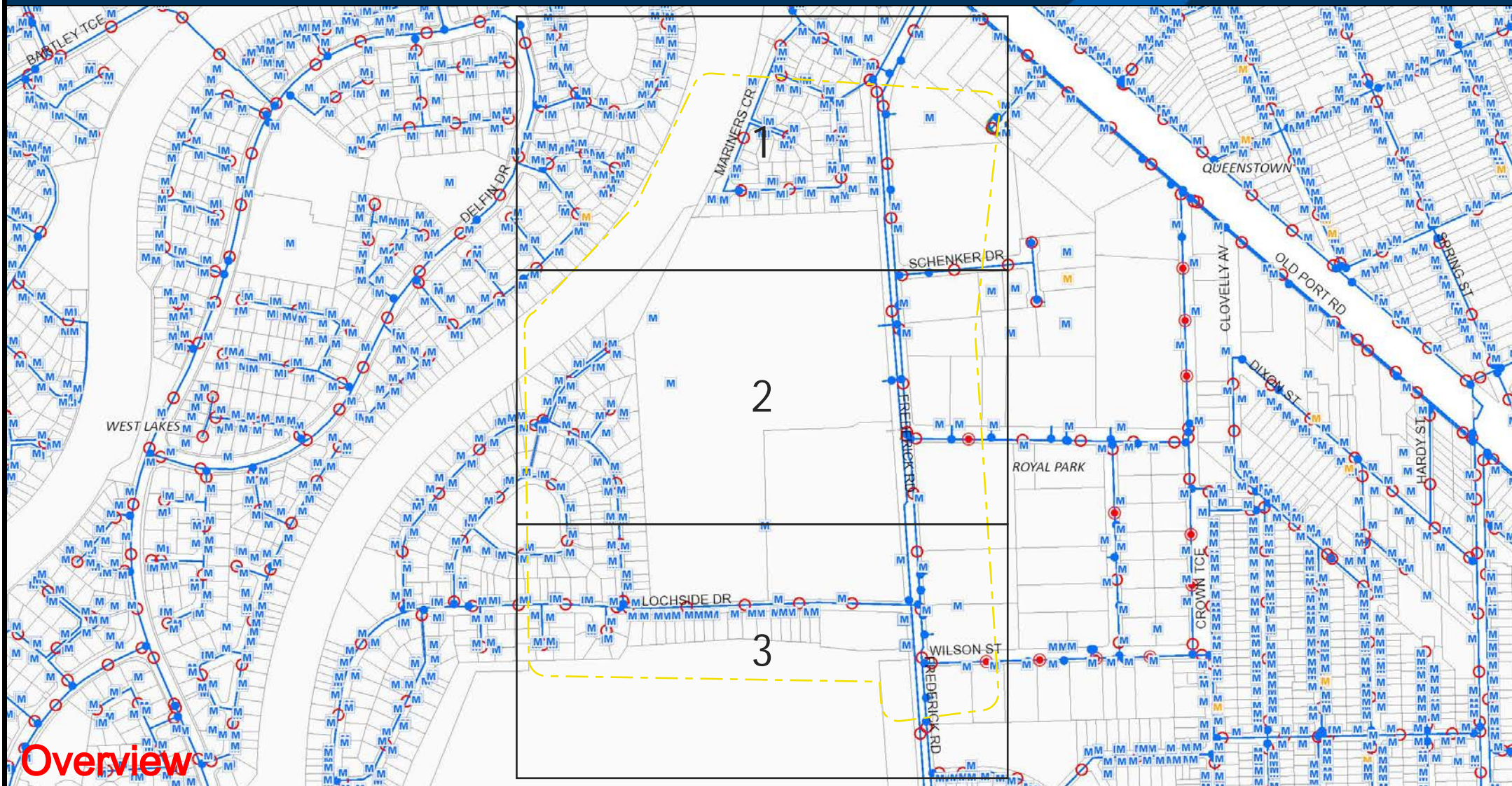
[fmgengineering.com.au](http://fmgengineering.com.au)





# WATER RETICULATION

DBYD Sequence No: 209101393



- |                                 |                          |                                |                        |
|---------------------------------|--------------------------|--------------------------------|------------------------|
| ● Water Valves                  | ● Water Pillar Hydrant   | — CP Anode/Cathode Cables      | — Railway              |
| — Water Main                    | ○ Water Hydrant          | — CP Electricity Supply Cables | □ Land Parcels         |
| --- Water Main (Decommissioned) | ▲ CP Facility            | □ CP Anode Bed Outlines        | ■ Water Meter*         |
| — Decommissioned Asbestos Mains | CP = Cathodic Protection |                                | ■ Shifted Water Meter* |
- \* Connection between water meter and pipe not shown

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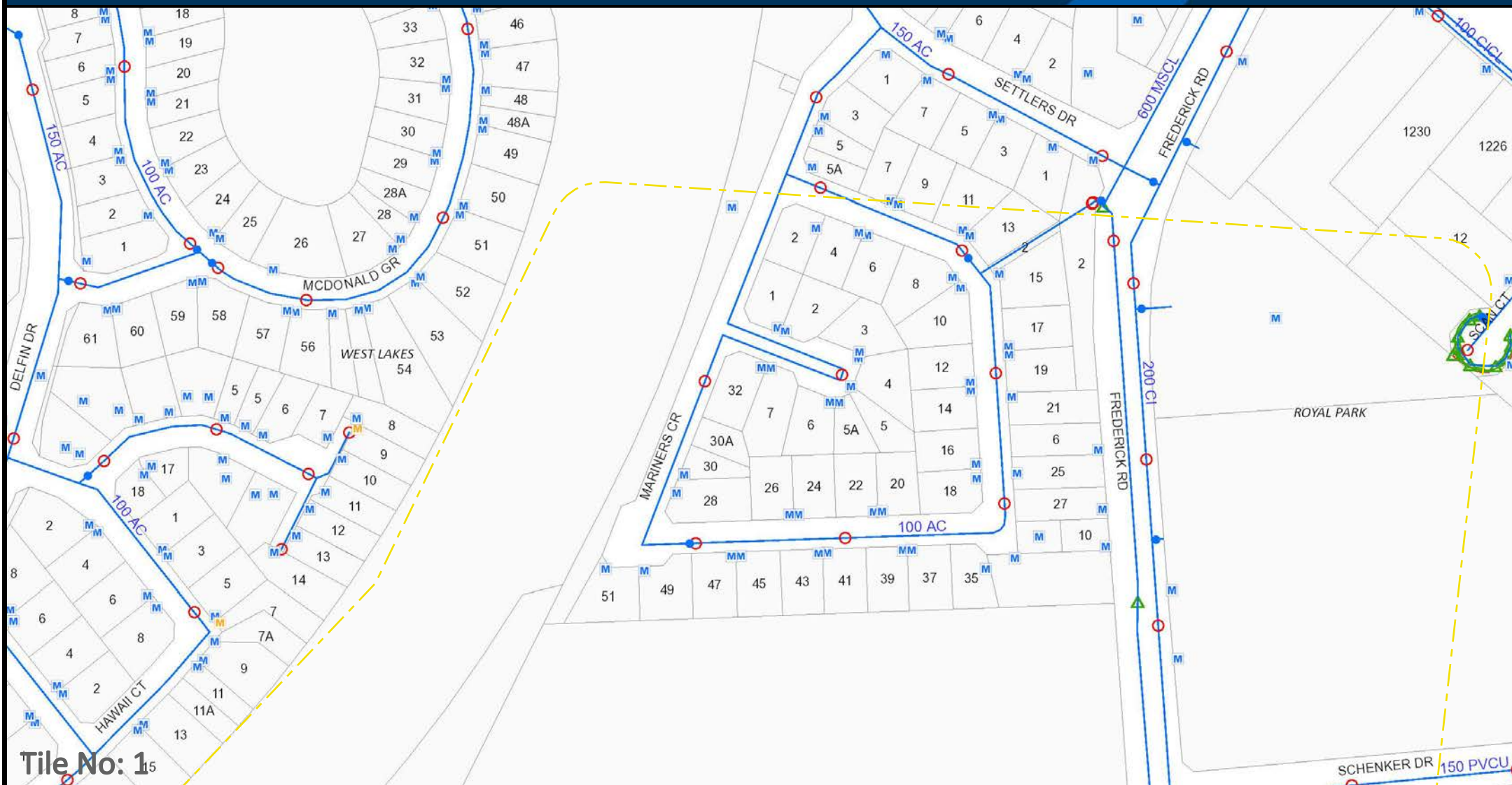
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# WATER RETICULATION

DBYD Sequence No: 209101393



Tile No: 1<sub>5</sub>

- |                                 |                          |                                |                        |
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| ● Water Valves                  | ● Water Pillar Hydrant   | — CP Anode/Cathode Cables      | — Railway              |
| — Water Main                    | ○ Water Hydrant          | — CP Electricity Supply Cables | □ Land Parcels         |
| --- Water Main (Decommissioned) | ▲ CP Facility            | □ CP Anode Bed Outlines        | ■ Water Meter*         |
| — Decommissioned Asbestos Mains | CP = Cathodic Protection |                                | ■ Shifted Water Meter* |
- \* Connection between water meter and pipe not shown

Scale @ A4: 1:2500

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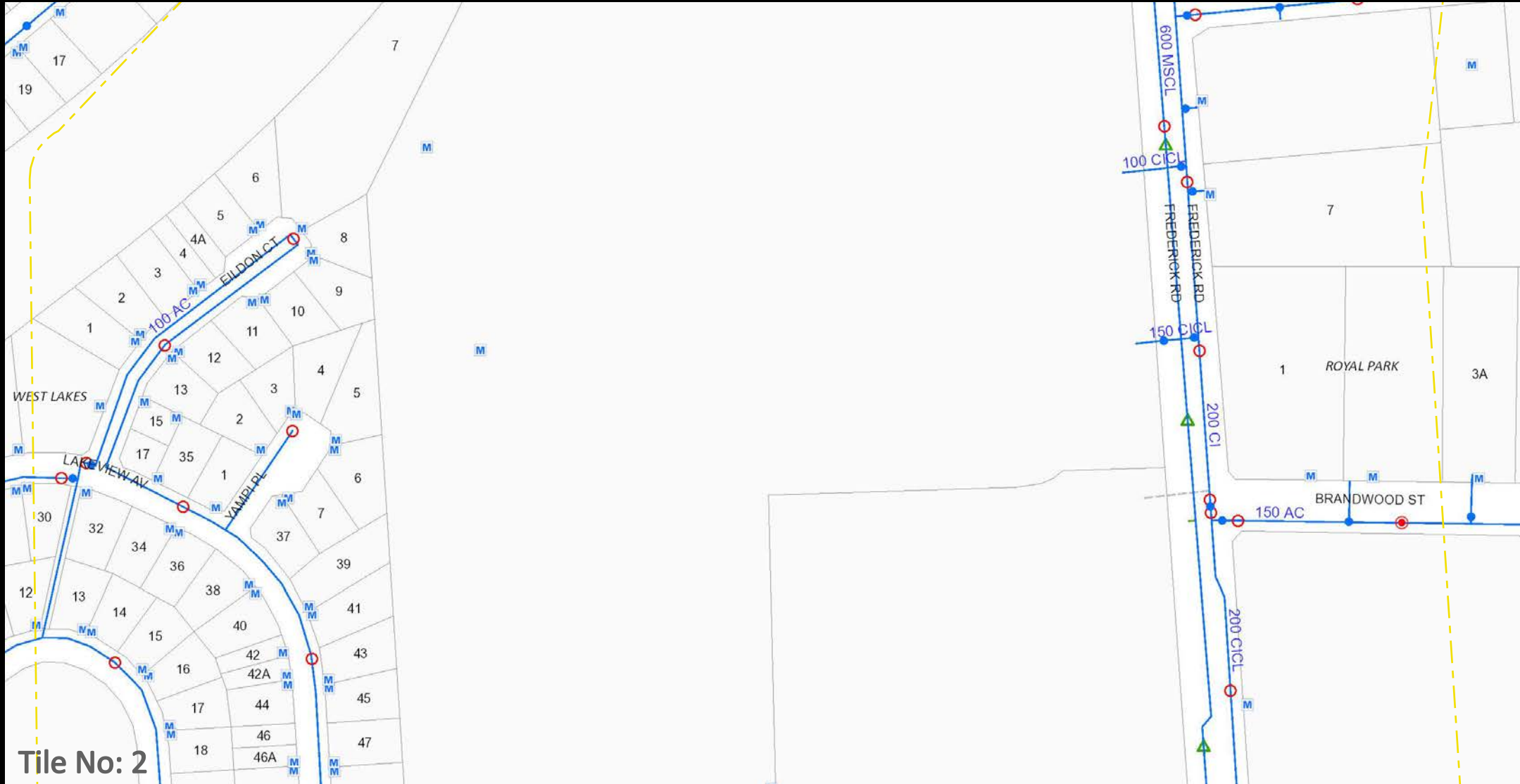
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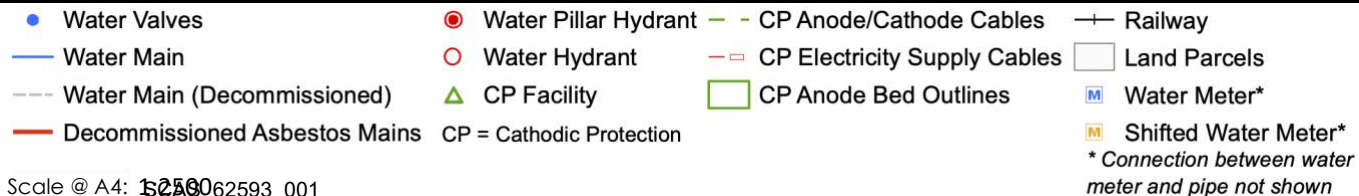


# WATER RETICULATION

DBYD Sequence No: 209101393



Tile No: 2



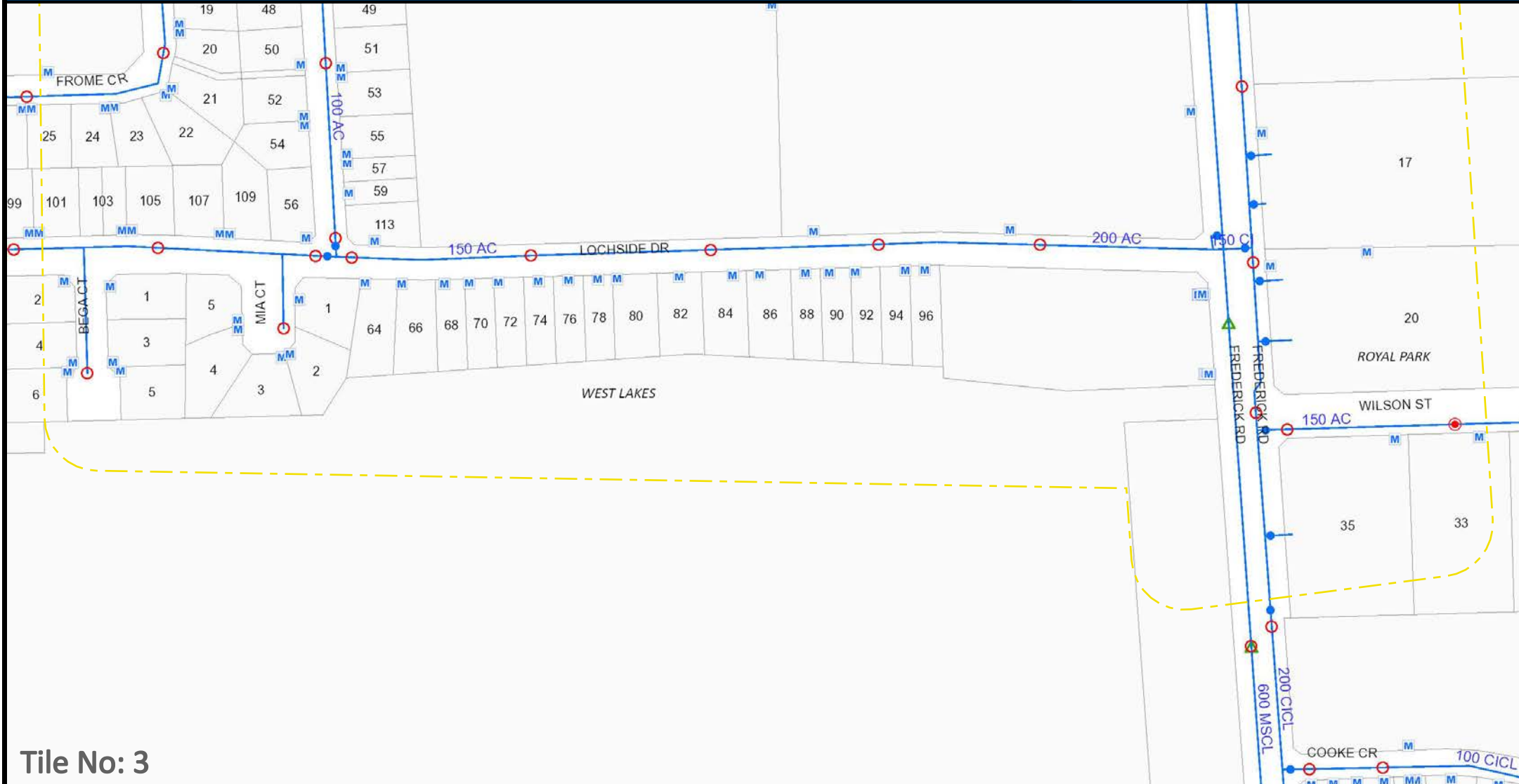
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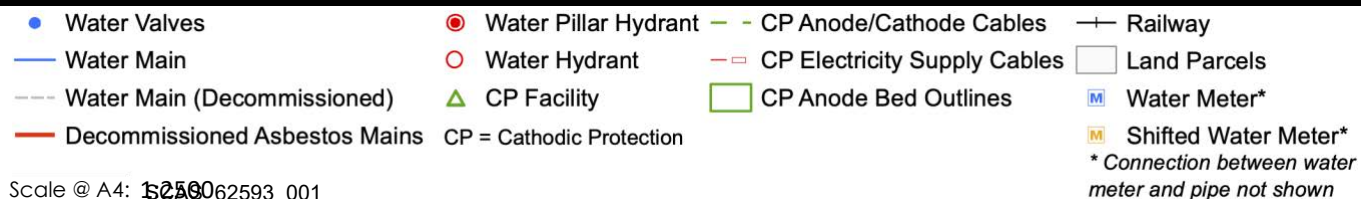


# WATER RETICULATION

DBYD Sequence No: 209101393



Tile No: 3



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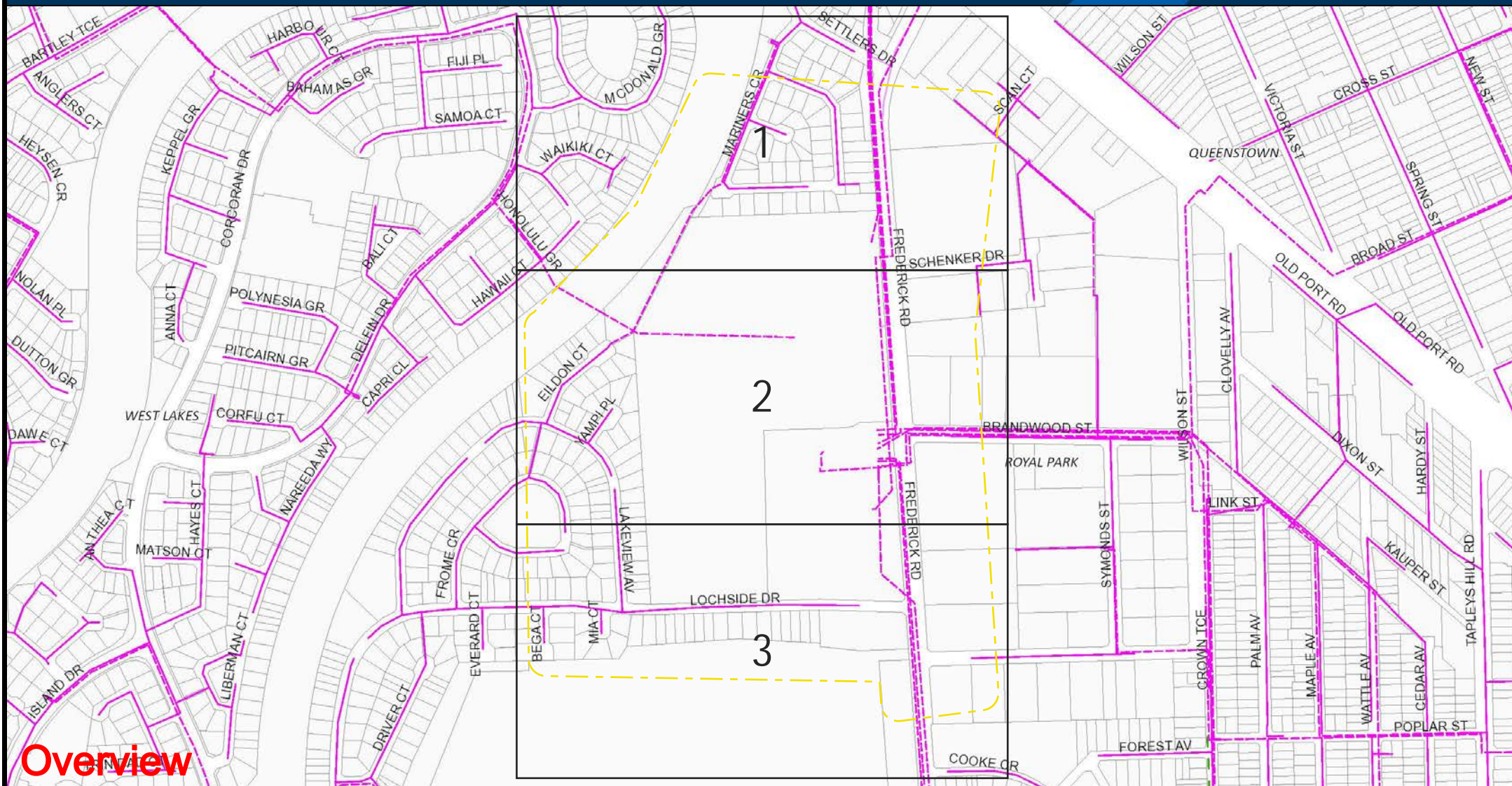
## **Appendix D**

SA Water – Waste Water DBYD



# WASTEWATER RETICULATION

DBYD Sequence No: 209101393



Overview

- |                     |                                 |                     |                |                                    |
|---------------------|---------------------------------|---------------------|----------------|------------------------------------|
| • GIP               | ○ Inspection Opening            | — Gravity Mains     | — Railway      | — CP Anode/Cathode Cables          |
| ● Valve             | — Wastewater Connections        | - - - Low Pressure  | □ Land Parcels | - - - CP Electricity Supply Cables |
| ⊙ Maintenance Hole  | — Decommissioned Asbestos Mains | - - - Pumping Mains | ▲ CP Facility  | □ CP Anode Bed Outlines            |
| ⊙ Maintenance Shaft | — Ancillary Pipes               | - - - Vacuum Mains  |                | CP = Cathodic Protection           |

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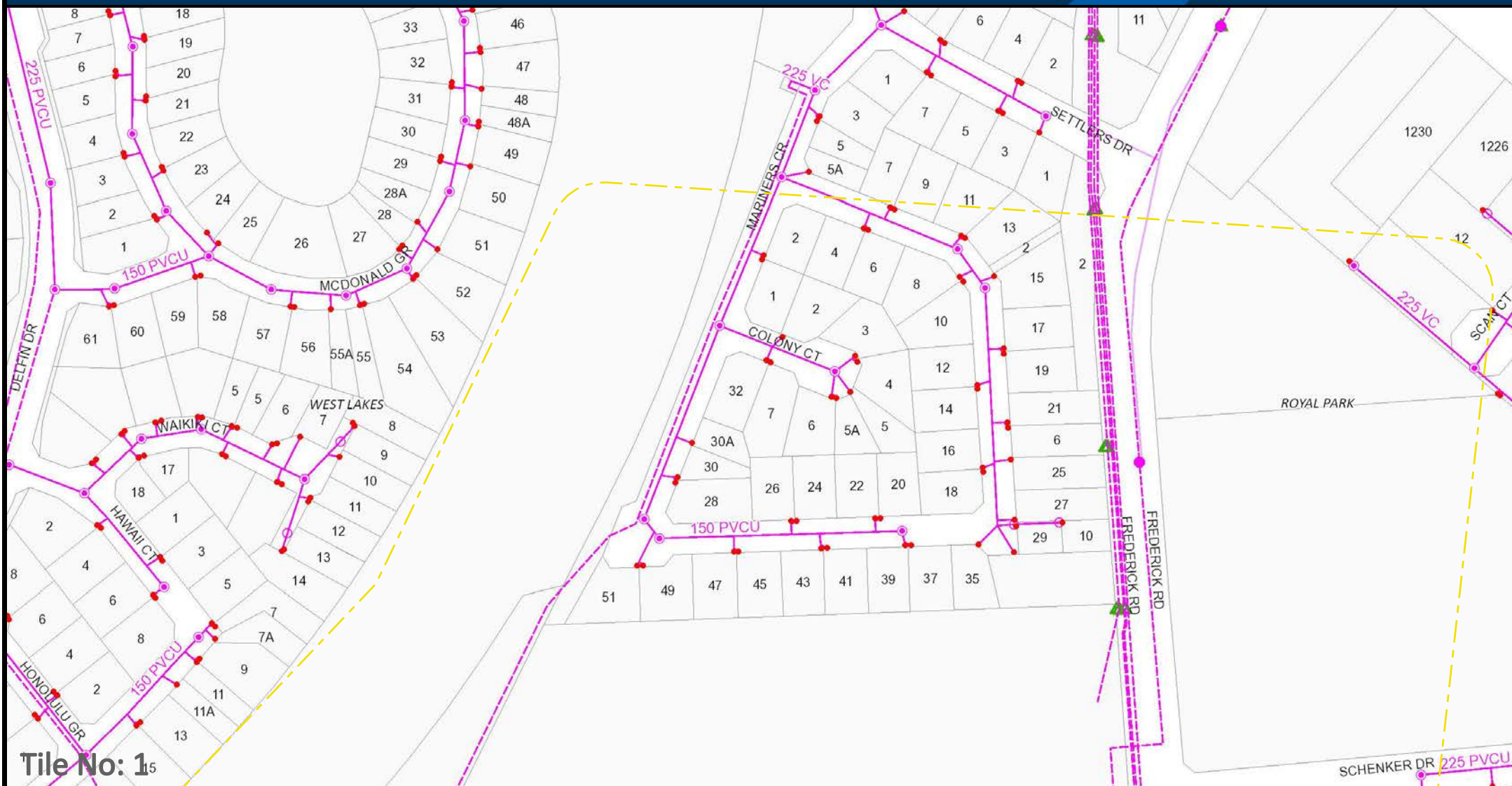
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# WASTEWATER RETICULATION

DBYD Sequence No: 209101393



Tile No: 15

- |                     |                                 |                   |                |                                  |
|---------------------|---------------------------------|-------------------|----------------|----------------------------------|
| • GIP               | ○ Inspection Opening            | — Gravity Mains   | — Railway      | — CP Anode/Cathode Cables        |
| ● Valve             | — Wastewater Connections        | - - Low Pressure  | □ Land Parcels | - - CP Electricity Supply Cables |
| ⊙ Maintenance Hole  | — Decommissioned Asbestos Mains | - - Pumping Mains | ▲ CP Facility  | □ CP Anode Bed Outlines          |
| ⊙ Maintenance Shaft | — Ancillary Pipes               | - - Vacuum Mains  |                | CP = Cathodic Protection         |

Scale @ A4: 1:2500

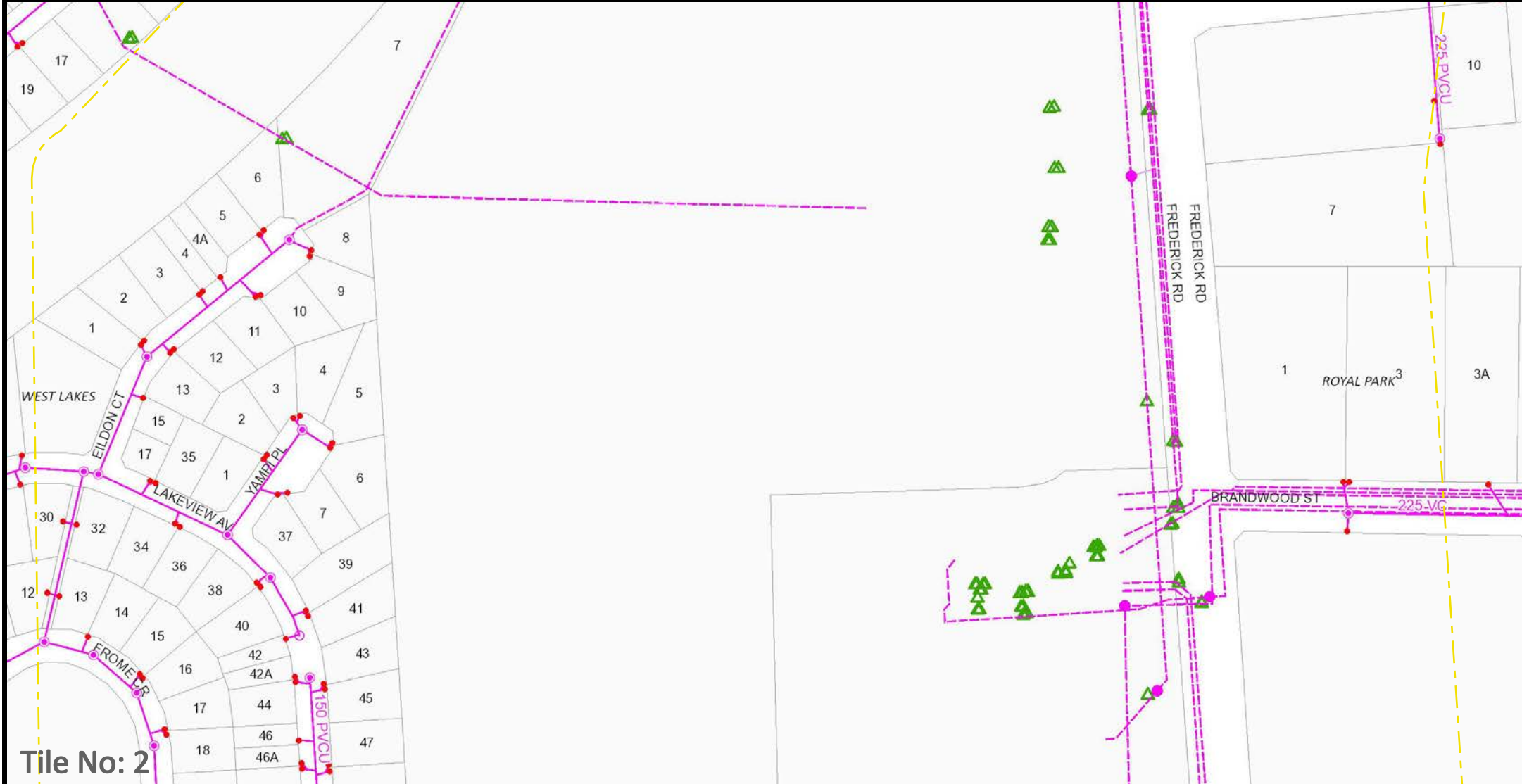
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# WASTEWATER RETICULATION

DBYD Sequence No: 209101393



Tile No: 2

- |                     |                                 |                   |                |                                  |
|---------------------|---------------------------------|-------------------|----------------|----------------------------------|
| • GIP               | ○ Inspection Opening            | — Gravity Mains   | — Railway      | — CP Anode/Cathode Cables        |
| ● Valve             | — Wastewater Connections        | - - Low Pressure  | □ Land Parcels | - - CP Electricity Supply Cables |
| ⊙ Maintenance Hole  | — Decommissioned Asbestos Mains | - - Pumping Mains | △ CP Facility  | □ CP Anode Bed Outlines          |
| ⊙ Maintenance Shaft | — Ancillary Pipes               | - - Vacuum Mains  |                | CP = Cathodic Protection         |

Scale @ A4: 1:2500 62593\_001

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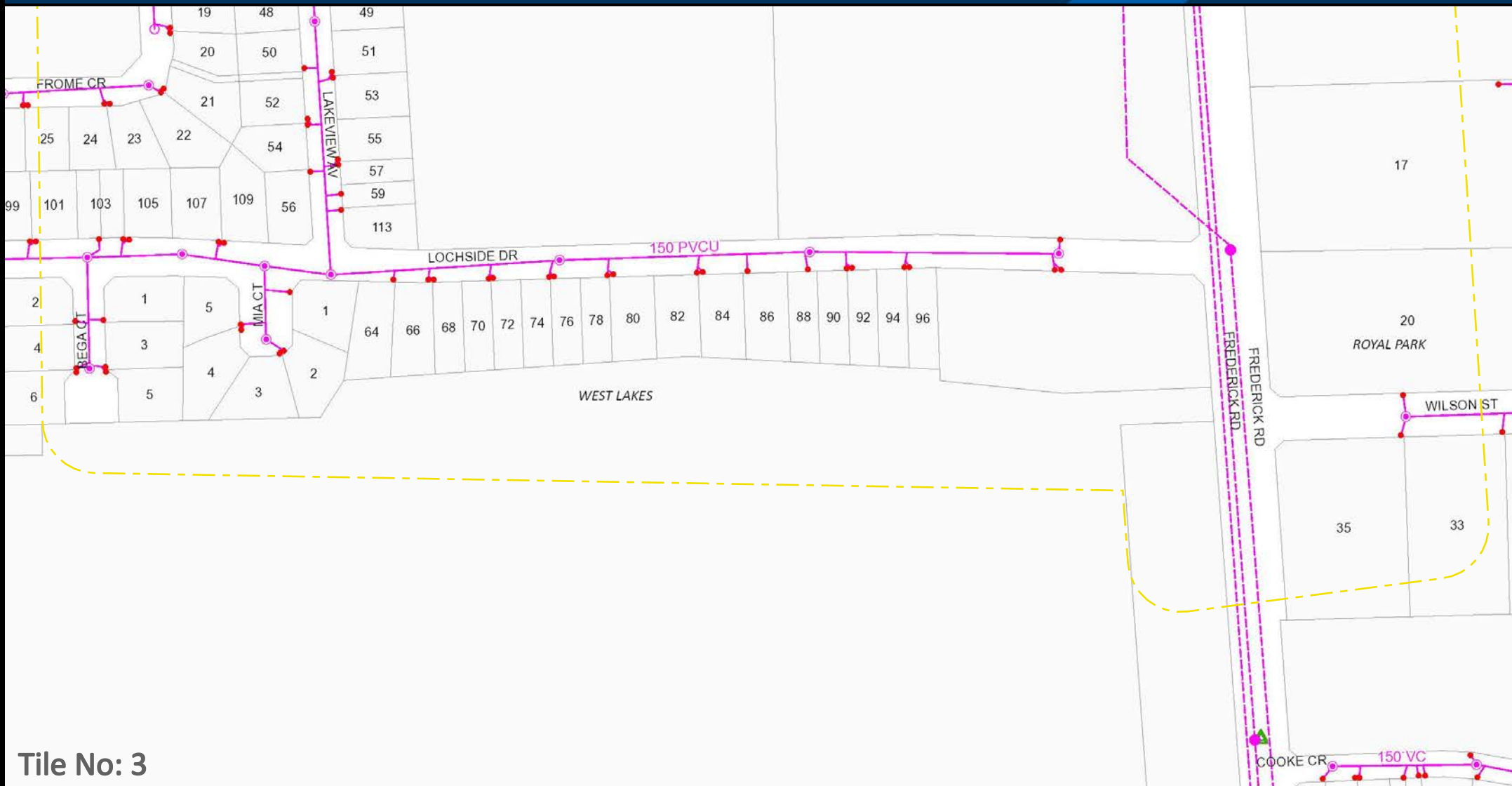
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# WASTEWATER RETICULATION

DBYD Sequence No: 209101393



Tile No: 3

- |                     |                                 |                   |                |                                  |
|---------------------|---------------------------------|-------------------|----------------|----------------------------------|
| • GIP               | ○ Inspection Opening            | — Gravity Mains   | — Railway      | — CP Anode/Cathode Cables        |
| ● Valve             | — Wastewater Connections        | - - Low Pressure  | □ Land Parcels | - - CP Electricity Supply Cables |
| ⊙ Maintenance Hole  | — Decommissioned Asbestos Mains | - - Pumping Mains | ▲ CP Facility  | □ CP Anode Bed Outlines          |
| ⊙ Maintenance Shaft | — Ancillary Pipes               | - - Vacuum Mains  |                | CP = Cathodic Protection         |

Scale @ A4: 1:2500 209101393\_001

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# **Appendix E**

Communications DBYD



**To:** Kylie Raine  
**Phone:** Not Supplied  
**Fax:** Not Supplied  
**Email:** kylie.raine@fmgengineering.com.au

<b>Dial before you dig Job #:</b>	31591684	
<b>Sequence #</b>	209292569	
<b>Issue Date:</b>	17/03/2022	
<b>Location:</b>	16 Frederick Road , West Lakes , SA , 5021	

## Indicative Plans

2	9	16	23
3	10	17	24
4	11	18	25
5	12	19	26
6	13	20	27
7	14	21	28

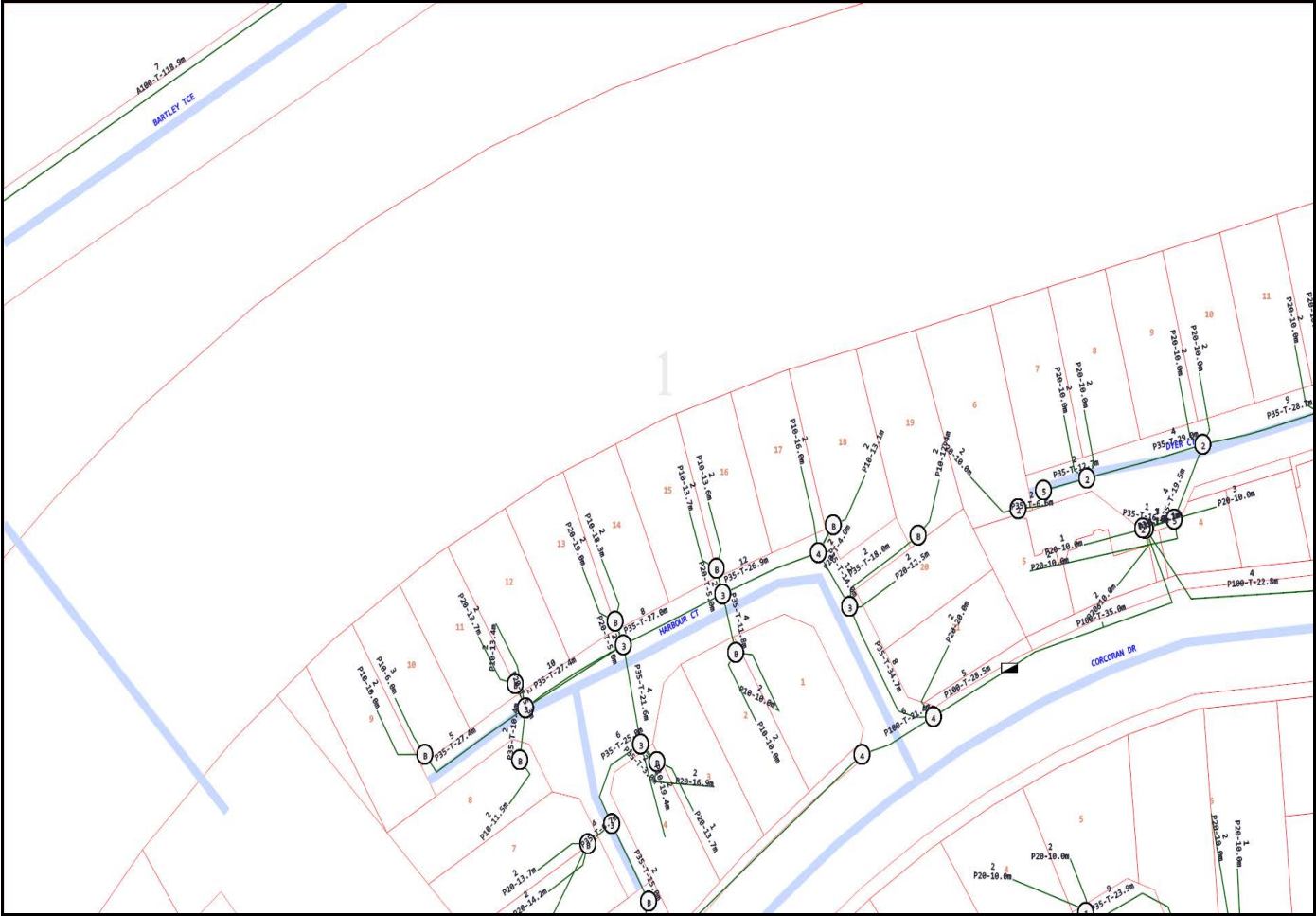


## LEGEND



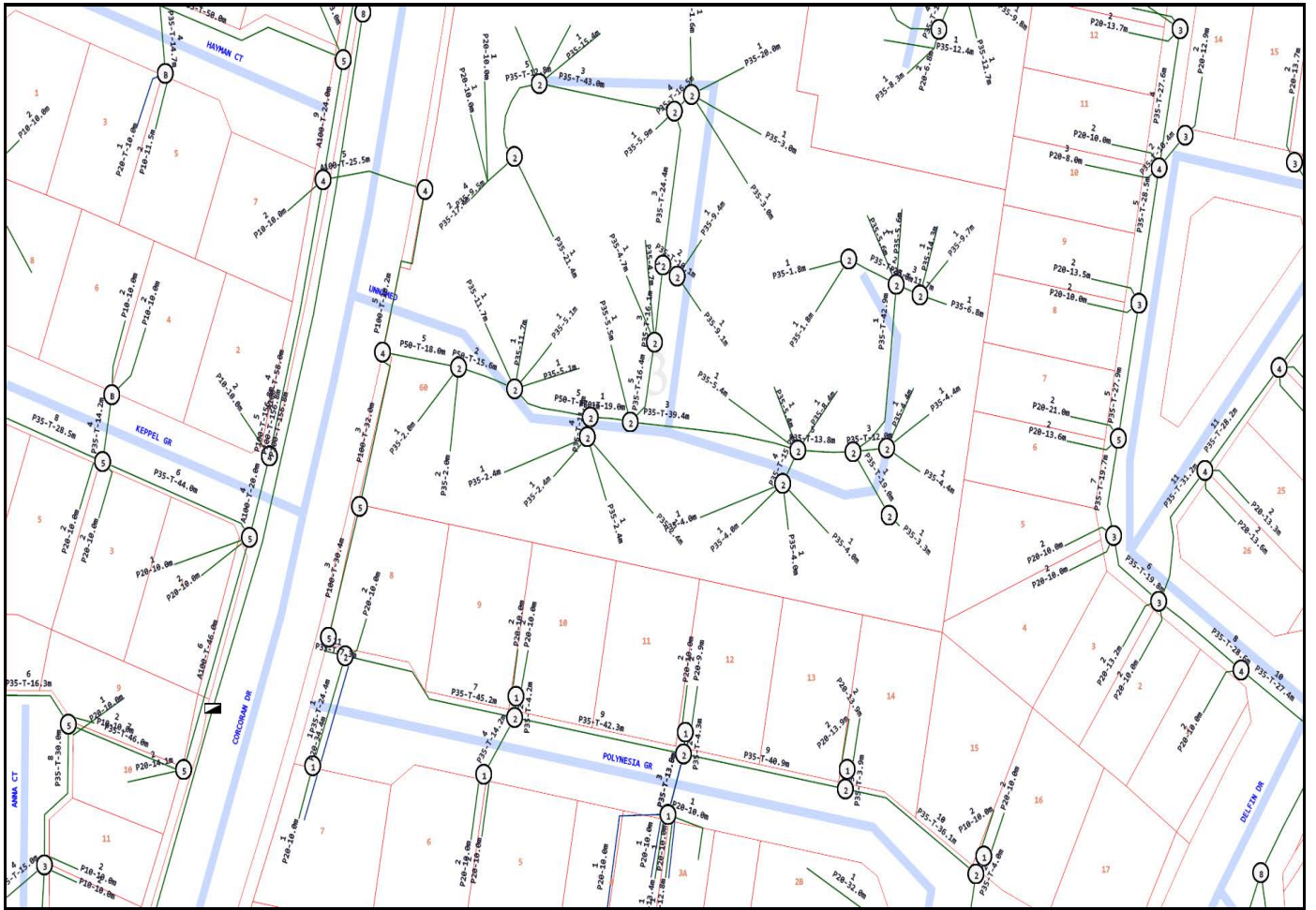
	Parcel and the location
	Pit with size "5"
	Power Pit with size "2E". Valid PIT Size: e.g. 2E, 5E, 6E, 8E, 9E, E, null.
	Manhole
	Pillar
	Cable count of trench is 2. One "Other size" PVC conduit (PO) owned by Telstra (-T-), between pits of sizes, "5" and "9" are 25.0m apart. One 40mm PVC conduit (P40) owned by NBN, between pits of sizes, "5" and "9" are 20.0m apart.
	2 Direct buried cables between pits of sizes, "5" and "9" are 10.0m apart.
	Trench containing any <b>INSERVICE/CONSTRUCTED</b> (Copper/RF/Fibre) cables.
	Trench containing only <b>DESIGNED/PLANNED</b> (Copper/RF/Fibre/Power) cables.
	Trench containing any <b>INSERVICE/CONSTRUCTED</b> (Power) cables.
	Road and the street name "Broadway ST"
Scale	0 20 40 60 Meters 1:2000 1 cm equals 20 m 





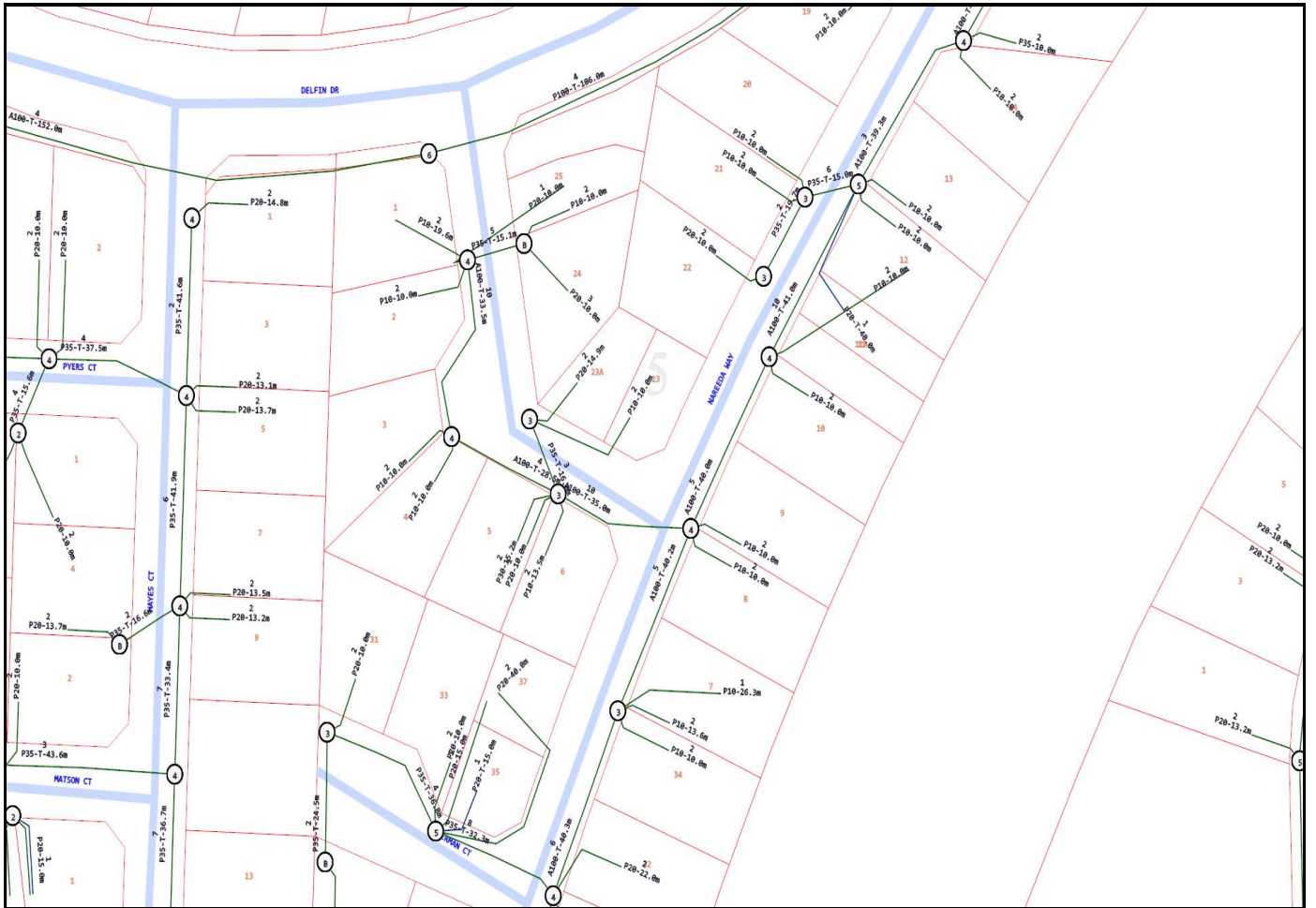


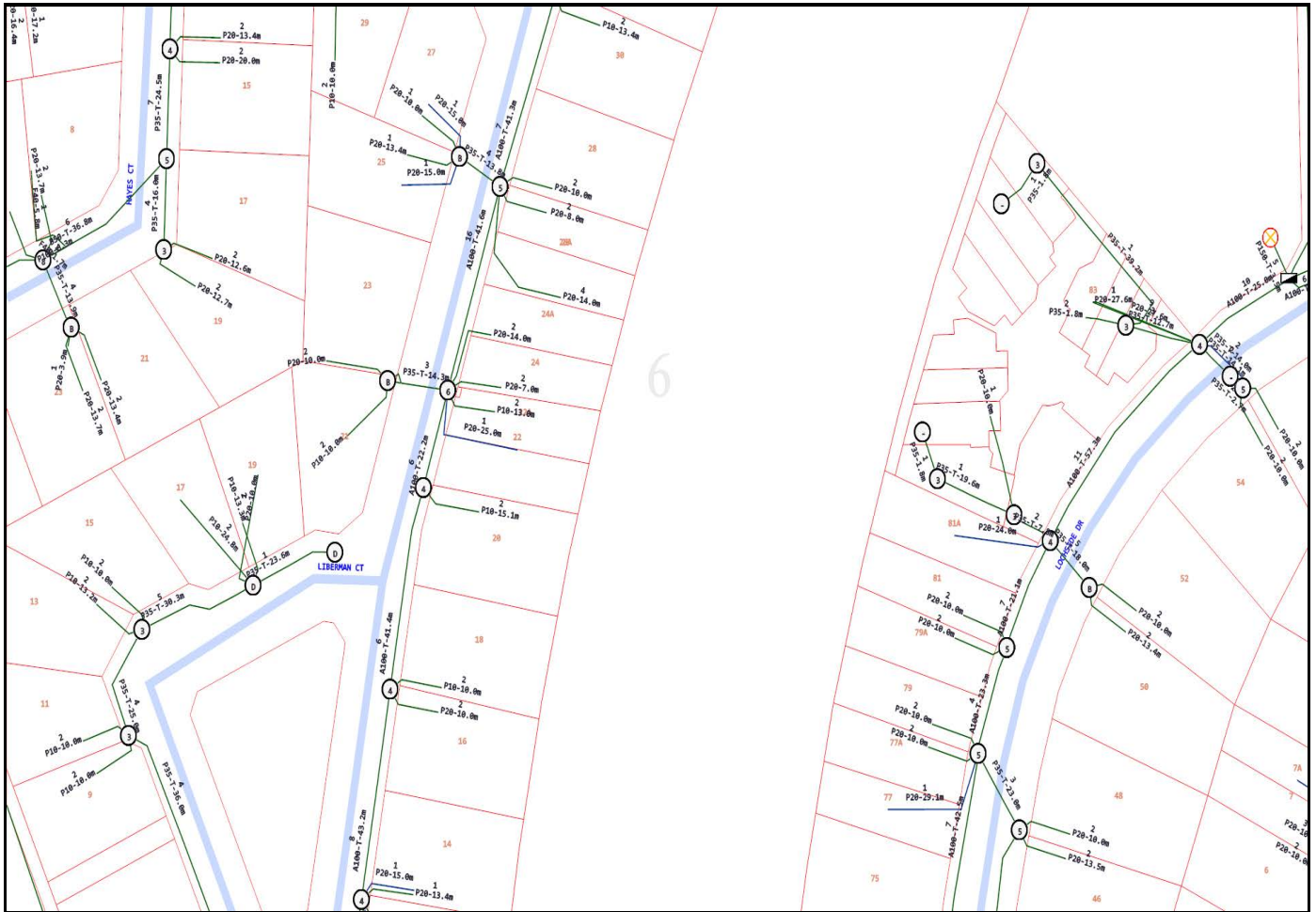




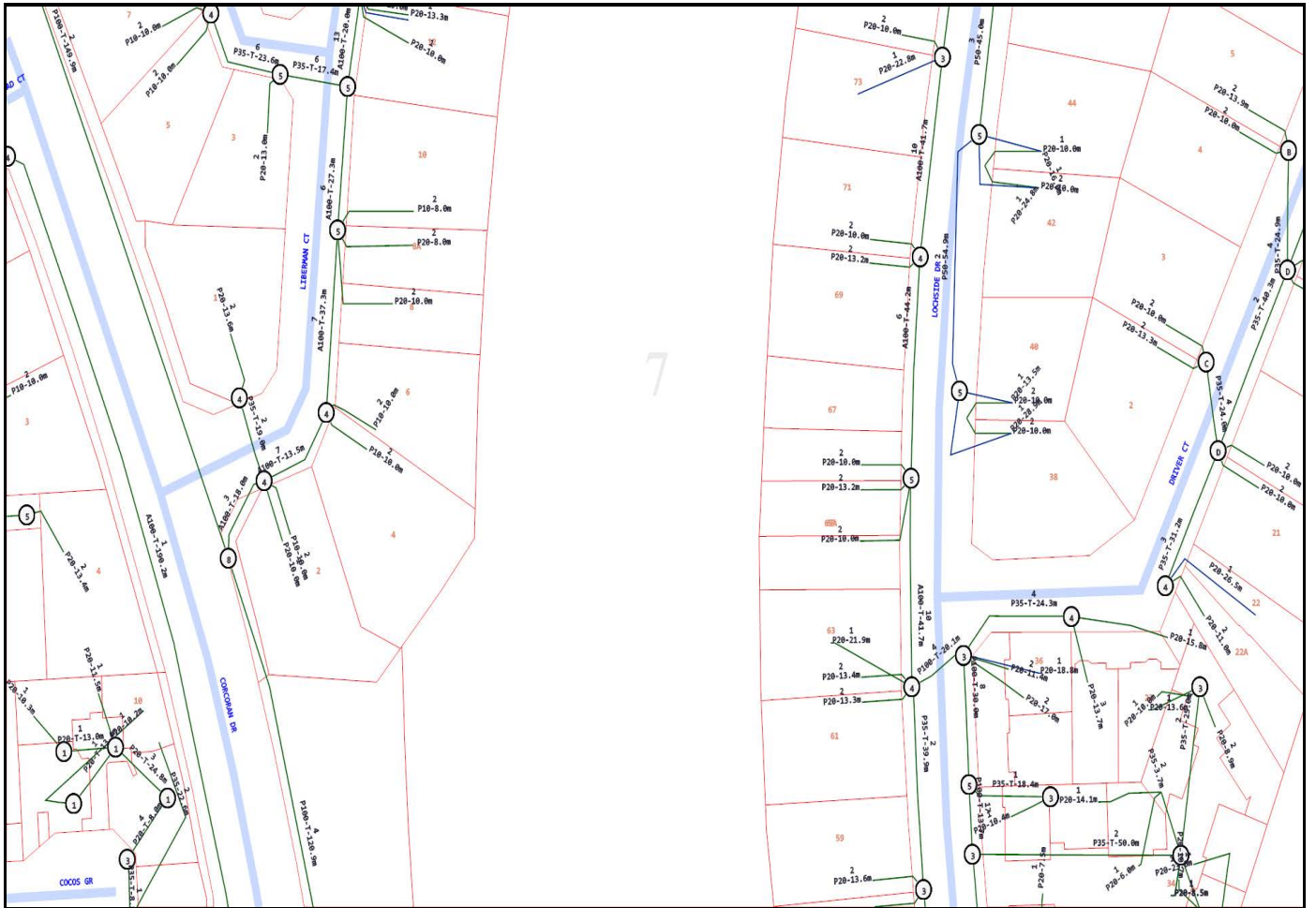














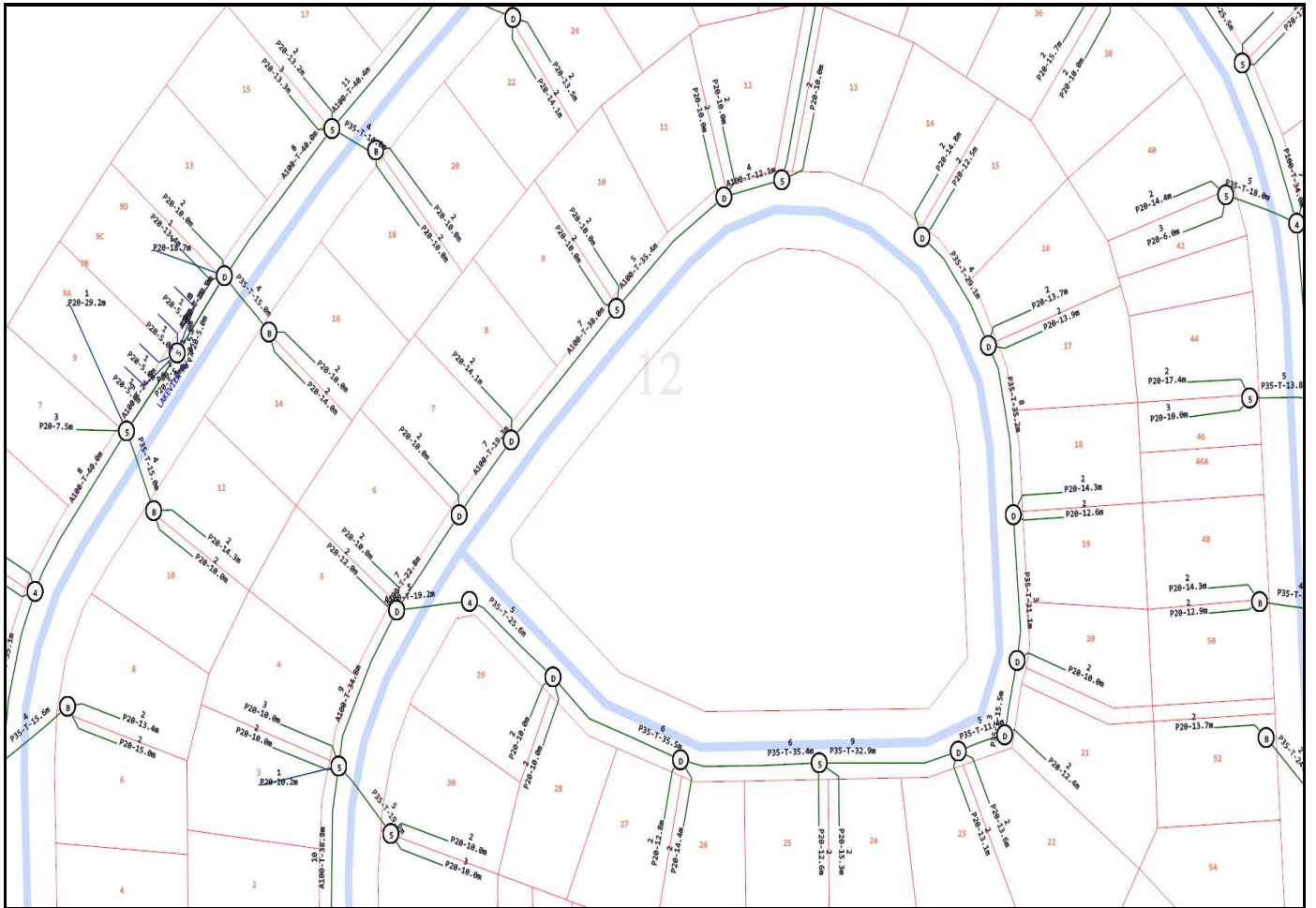






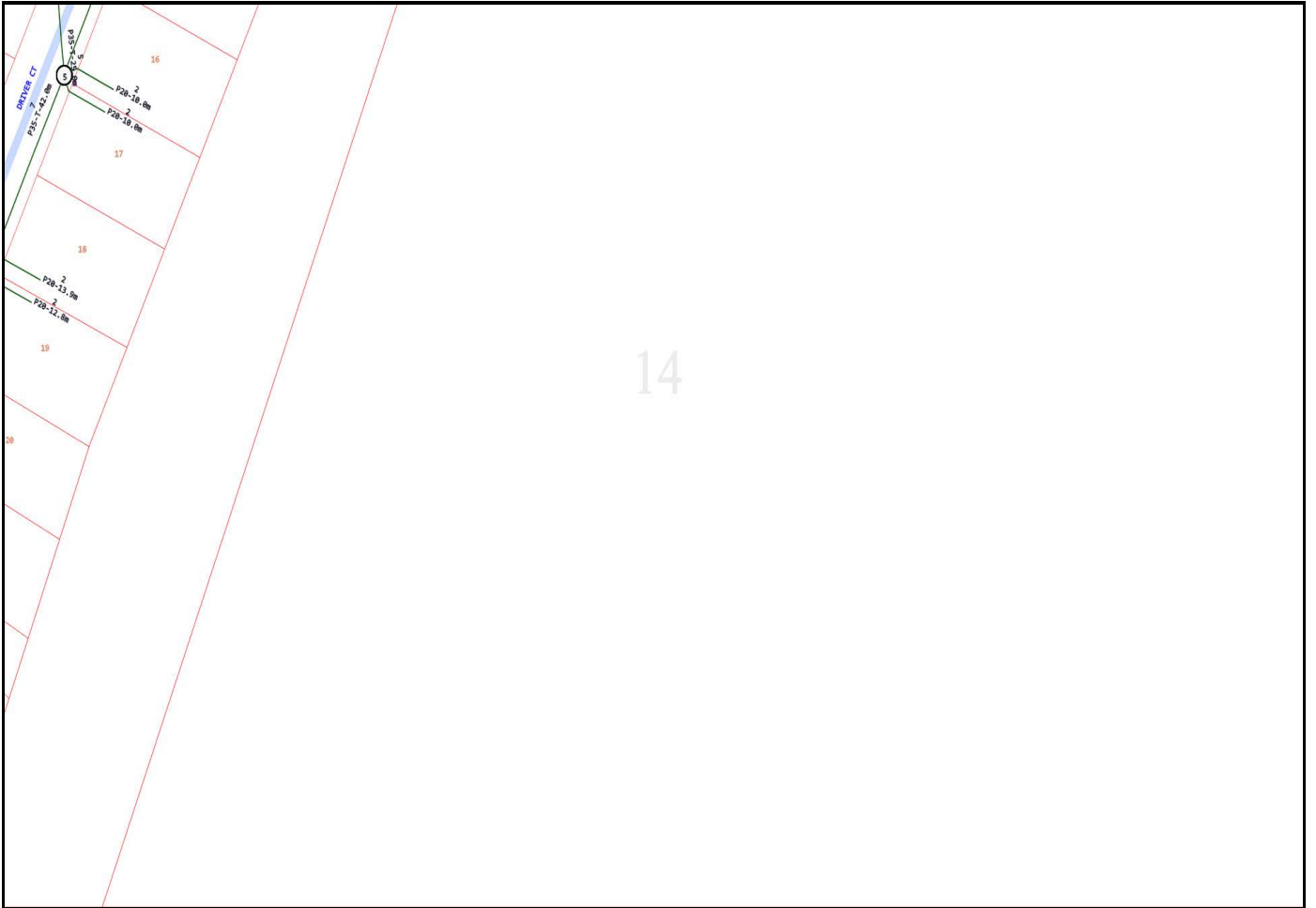




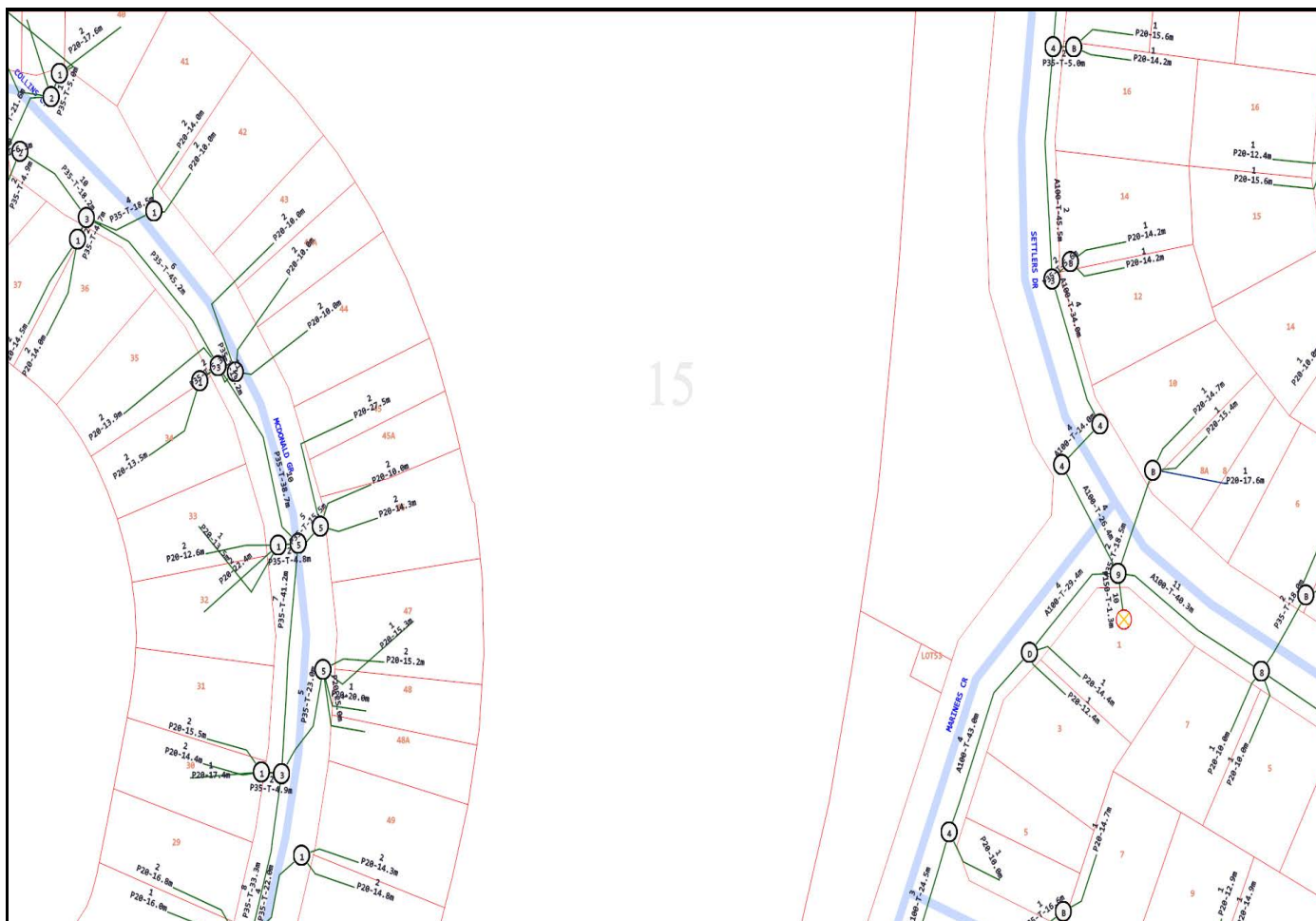


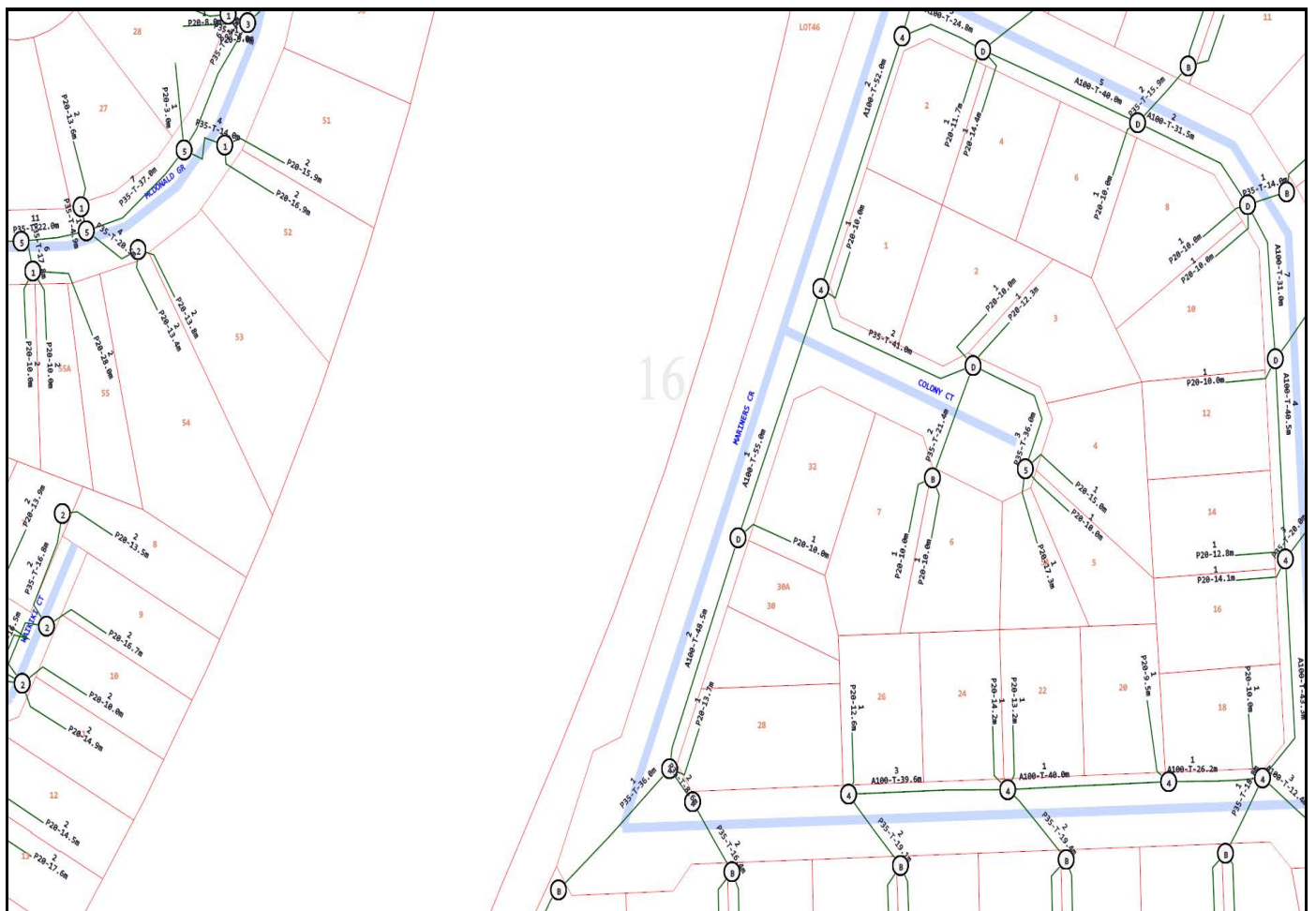




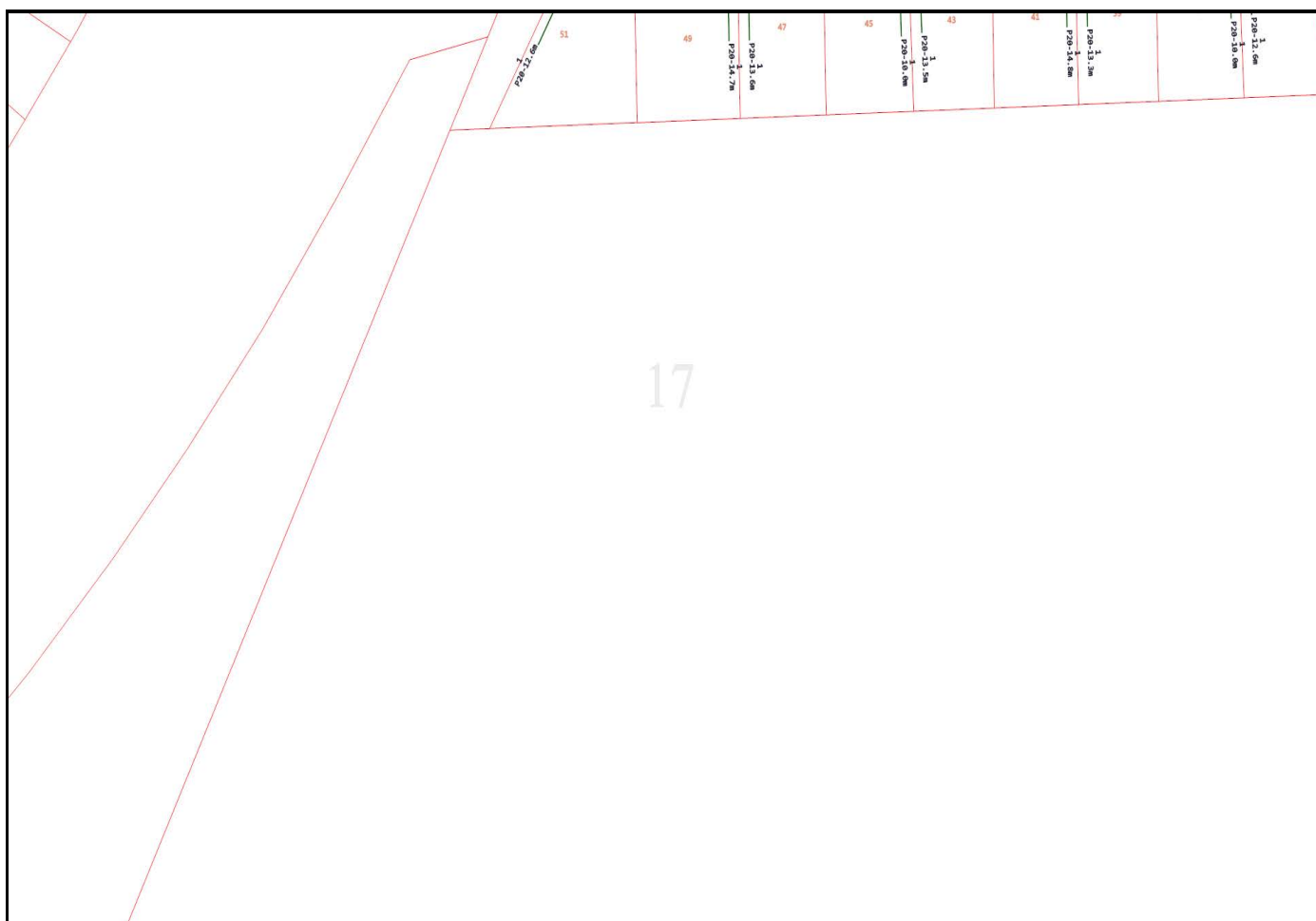


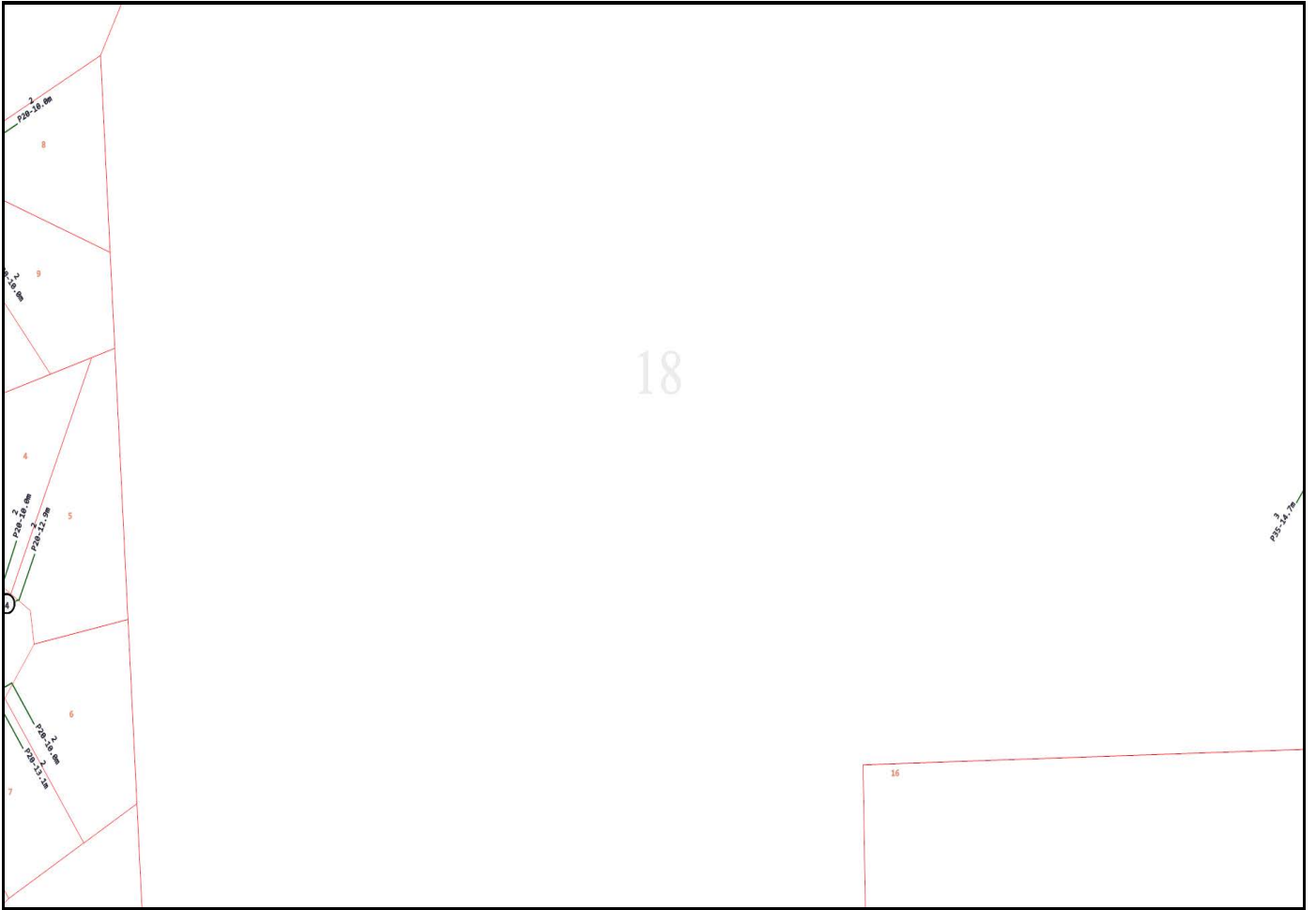




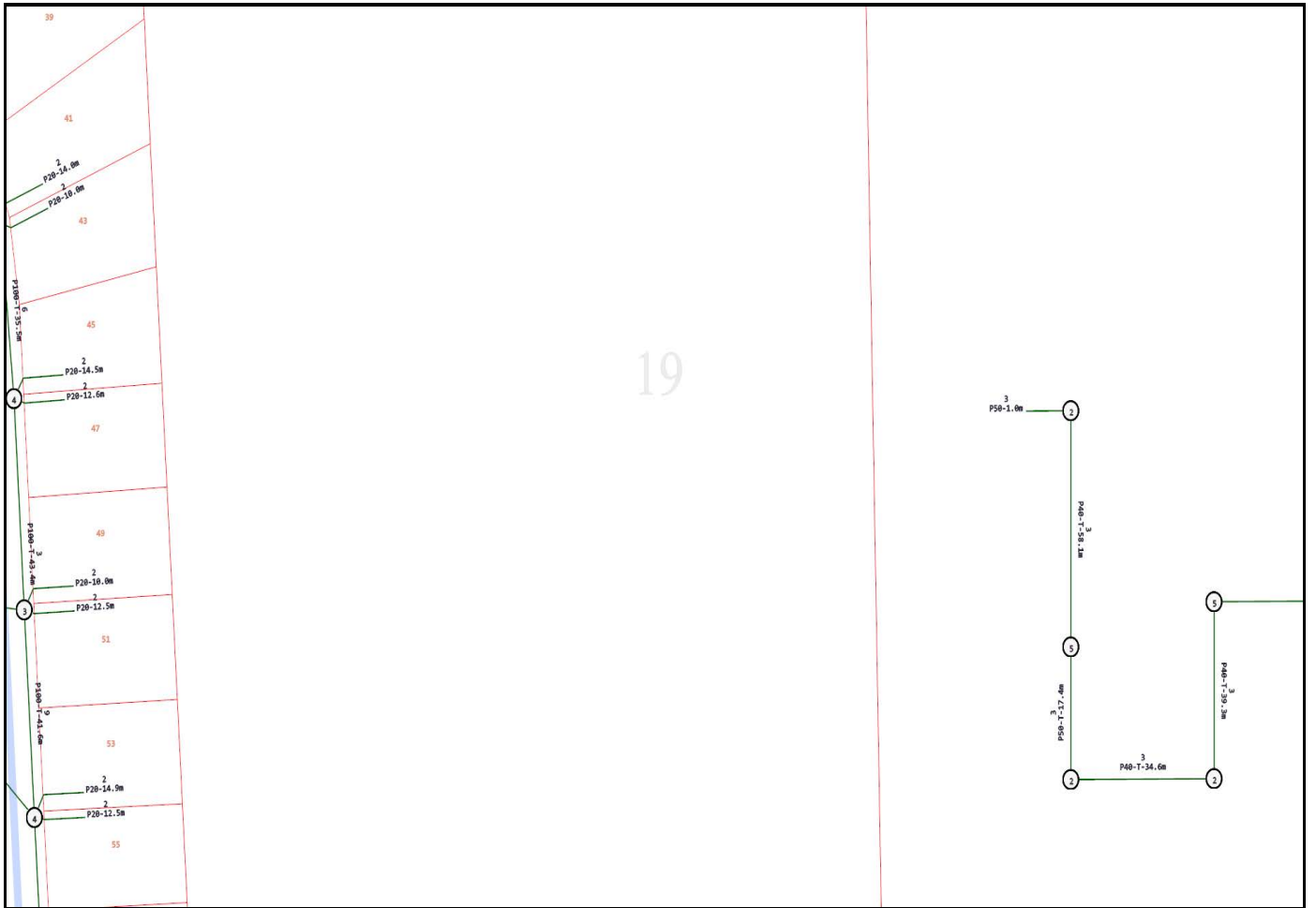


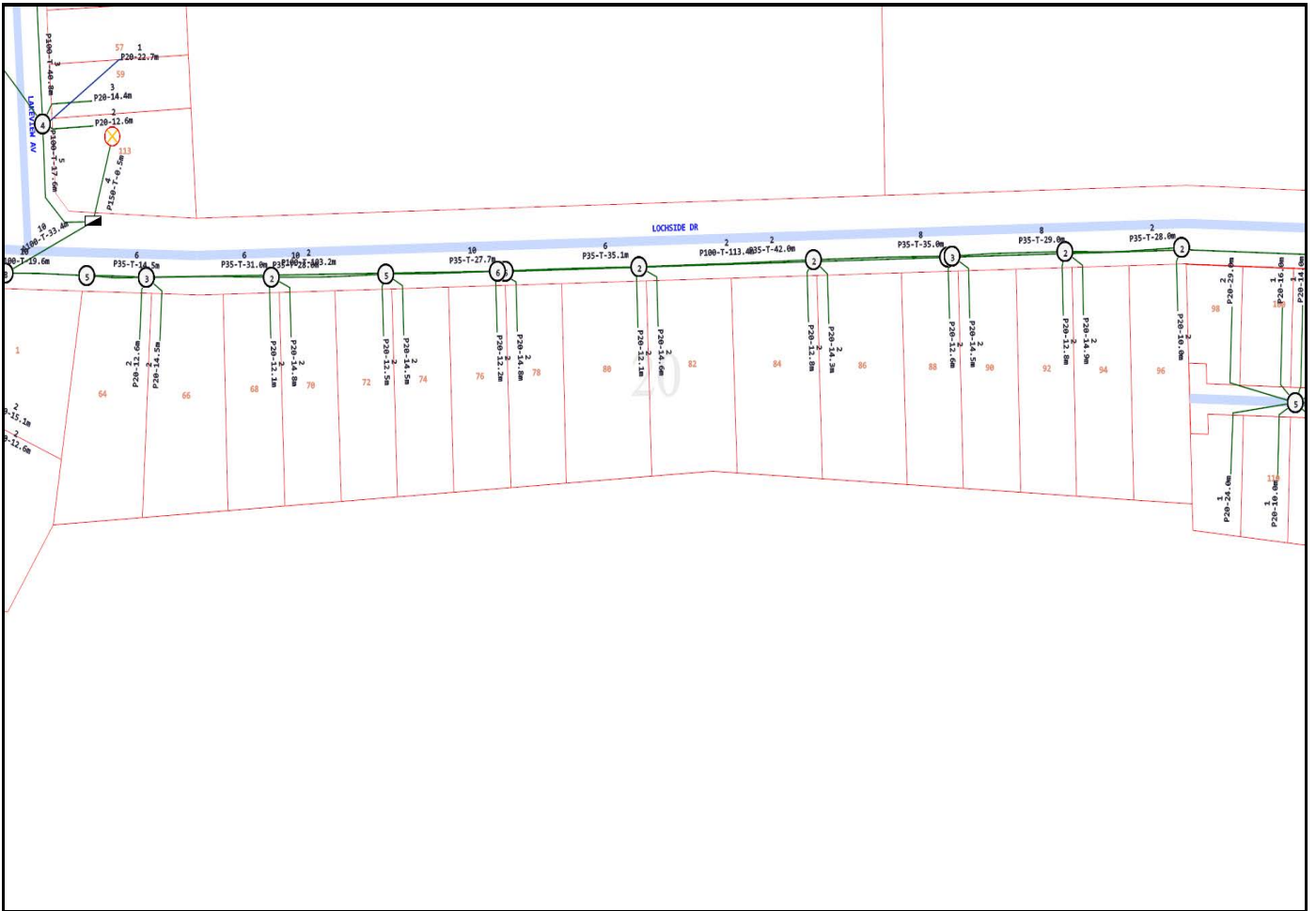








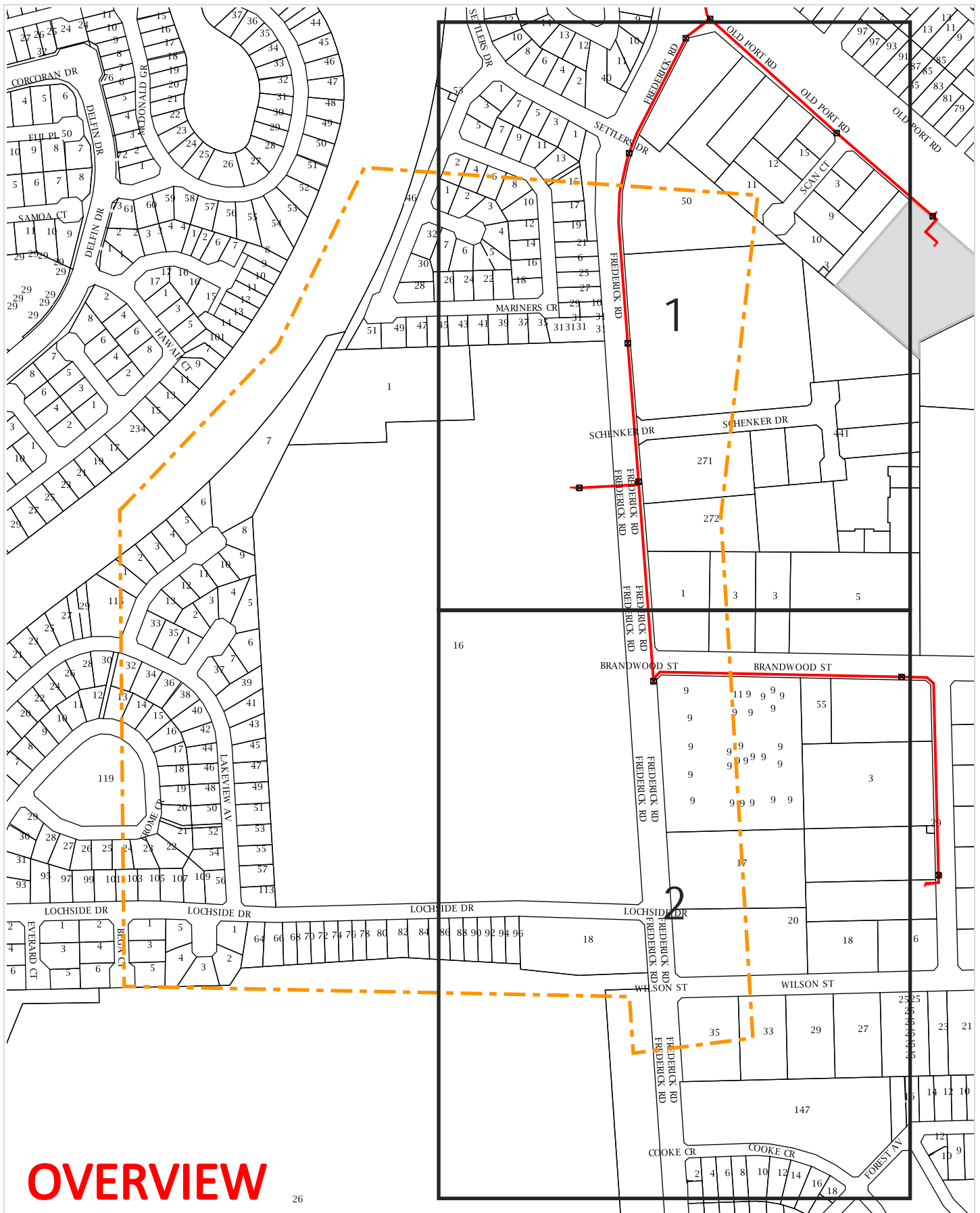




## Emergency Contacts

You must immediately report any damage to the **nbn™** network that you are/become aware of. Notification may be by telephone - 1800 626 329.





# OVERVIEW

26

**WARNING:** This document is confidential and may also be privileged. Confidentiality nor privilege is not waived or destroyed by virtue of it being transmitted to an incorrect addressee. Unauthorised use of the contents is therefore strictly prohibited. Any information contained in this document that has been extracted from our records is believed to be accurate, but no responsibility is assumed for any error or omission. Optus Plans and information supplied are valid for 30 days from the date of issue. If this timeline has elapsed, please raise a new enquiry.

Sequence Number: 209101392

Date Generated: 11 Mar 2022

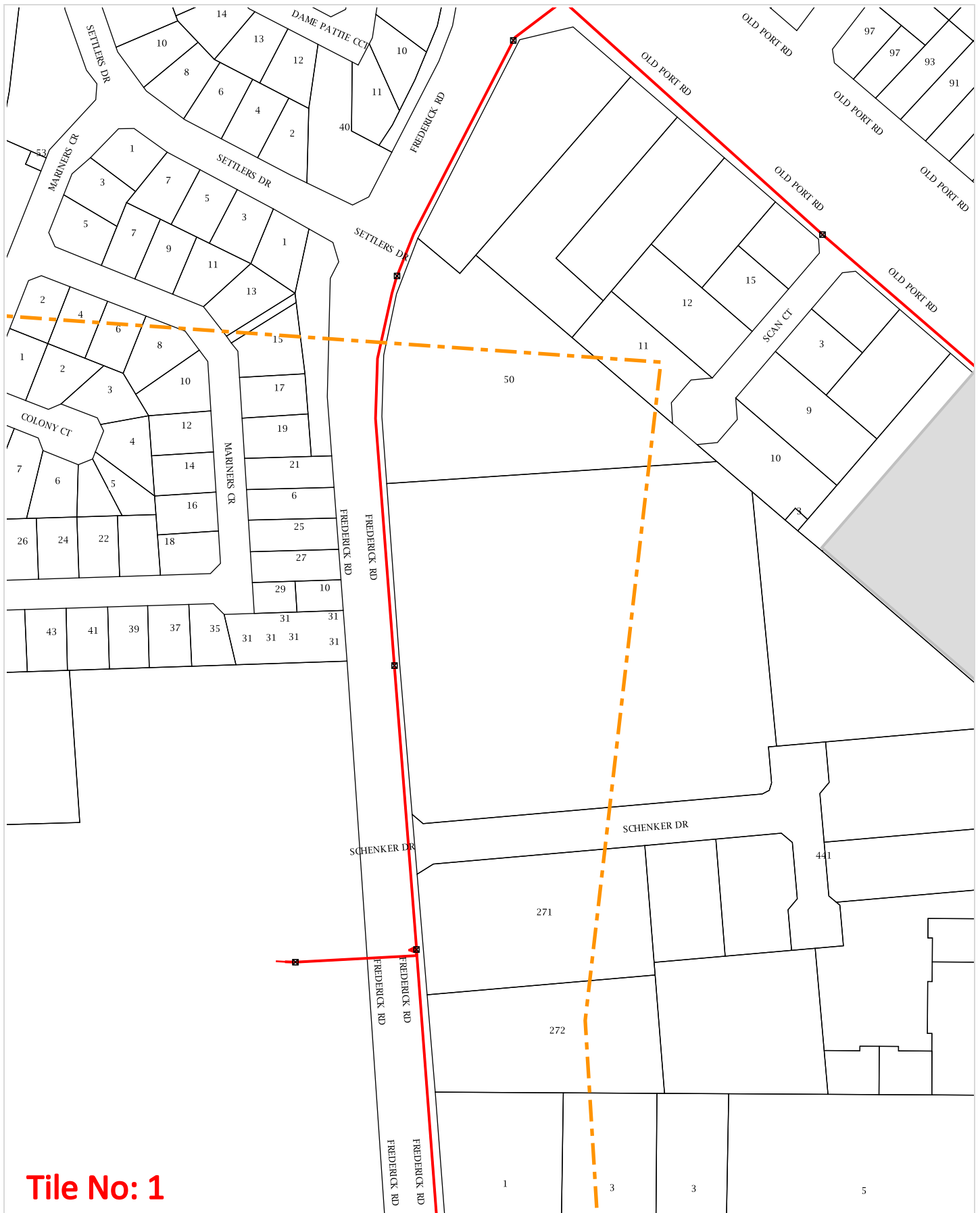


SCAS\_62593\_001

For all Optus DBYD plan enquiries –  
Email: [Fibre.Locations@optus.net.au](mailto:Fibre.Locations@optus.net.au)  
For urgent onsite assistance contact 1800 505 777  
Optus Limited ACN 052 833 208



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**Tile No: 1**

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For all Optus DBYD plan enquiries –  
 Email: [Fibre.Locations@optus.net.au](mailto:Fibre.Locations@optus.net.au)  
 For urgent onsite assistance contact 1800 505 777  
 Optus Limited ACN 052 833 208



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# Appendix F

SAPN Correspondence and DBYD



## Jordan Colbert

---

**From:** Jordan Colbert  
**Sent:** Monday, 4 April 2022 10:26 AM  
**To:** Quyen Hoang  
**Subject:** West Lakes - Frederick Road development feasibility  
**Attachments:** HPSCANNER0929.pdf

**Categories:** M-Files

Hi Queenie,

FMG is working on a proposed development at 16 Frederick Road, West Lakes on the behalf of a private developer (Novo West Lakes / Potentia) who is currently seeking a code amendment on the land with support from Council.

The site plan is currently being finalised with feasibility inputs, currently looking at approximately;

- Approximately 550-600 residential outcomes
  - Torrens Titled dwellings of ~300-350 dwellings (range of densities), and;
  - Community Titled dwellings of ~10
  - Apartments of 200-250 outcomes
- Mixed use / Commercial space fronting Frederick drive (1.8ha)

Two main accesses will be formed off of Frederick Road, Lochside drive which can be used for servicing requirements.

Can you please provide preliminary advice which we will use to inform our support of the code amendment from a servicing and infrastructure requirements perspective? Some guidance around which direction the feed might come from, and at what stage additional infrastructure might be triggered would be particularly handy. A rough markup of the current proposed staging is attached for your reference.



 AFFECTED AREA  CADASTRE

Regards,

**Jordan Colbert**

BEng (Civil & Struct)

Civil Team Leader (SA)



## Engineering your success

Adelaide | Melbourne | Sydney

**P** 08 8132 6600

**D** 08 8132 6661

**M** 0424 464 274

67 Greenhill Rd Wayville SA 5034

[jordan.colbert@fmengineering.com.au](mailto:jordan.colbert@fmengineering.com.au)

[fmengineering.com.au](http://fmengineering.com.au)

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## Jordan Colbert

---

**From:** Darren Marshall <Darren.Marshall@sapowernetworks.com.au>  
**Sent:** Wednesday, 11 May 2022 1:16 PM  
**To:** Jordan Colbert  
**Cc:** Gavin O'Cadin  
**Subject:** RE: West Lakes - Frederick Road development feasibility  
**Attachments:** HPSCANNER0929.pdf

Hi Jordan,

Thanks for your enquiry.

As the final layout is only indicative I will assume it will be standard staged development with a mixture of residential and commercial properties.

With this in mind I offer the following response

- The development can be serviced from the existing electrical infrastructure however no assessment has been made on the capacity of the Network or its suitability to carry the additional load.
- SA Power Networks has HV & LV infrastructure on Frederick Road and Lochside which would be the most suitable locations for a connection. Standard augmentation rates will apply including additional rates if the load goes above applicable thresholds.
- The number and location of TF's will depend on the load and final layout of streets and allotments with 315kVA and 500kVA being the standard TF sizes.
- I am not aware of any additional infrastructure apart from the normal requirements of a development of this nature.
- There may be a requirement to connect into existing infrastructure to reduce the risk of extended outages due to radial HV line sections e.g. looped HV Network
- The existing SA Power Networks infrastructure onsite may be unsuitable for this development due to operational limitations and location.

SA Power Networks has made assumptions with best intentions on both the scope and line route that may be available or suitable.

This response is based on the information that you have provided to SA Power Networks and, as such, if this information is incomplete or inaccurate, SA Power Networks reserves the right to vary its assessment of the requirements for the construction works.

All design and construction work must comply with applicable SA Power Networks Technical Standards, Specifications, Policies and Procedures. refer to our Connection Policy for additional information.

Please contact me if you have any further questions

Kind regards,

Darren Marshall

**Senior Network Project Officer**

-----  
Direct: 08 8300 2116

Mobile: 0403 582 282

[darren.marshall@sapowernetworks.com.au](mailto:darren.marshall@sapowernetworks.com.au)

-----  
12 Senna Road Wingfield SA 5013

[www.sapowernetworks.com.au](http://www.sapowernetworks.com.au)



Empowering South Australia

**To:**

FMG Engineering - Carolyn McGuire

(03) 9815 7600, 2 Domville Avenue

Hawthorn

VIC

3123

Enquiry Details	
Utility ID	50800
Sequence Number	209101396
Enquiry Date	11/03/2022 14:16
Response	<b>AFFECTED</b>
Address	16 Frederick Road West Lakes
Location in Road	Road, Nature Strip, Footpath
Activity	Manual Excavation, Non-Destructive Digging

Enquirer Details			
Customer ID	3196180		
Contact	Carolyn McGuire		
Company	FMG Engineering		
Email	carolyn.mcguire@fmgengineering.com.au		
Phone	+61398157600	Mobile	



## Underground cable locations ASSETS FOUND

### The process:

1. You made an enquiry with Dial Before You Dig (1100).
2. Dial Before You Dig referred your enquiry to SA Power Networks (South Australia's Distribution Network).
3. SA Power Networks has checked their records and have found underground assets in your request area.
4. Please review the attached Asset Map(s) in regard to your excavation, as there may be some restrictions that apply if your excavation is greater than 300mm below ground level and less than 3.0m from an SA Power Networks Asset. Further explanation of restricted and exclusion zones can be found at <http://www.sapowernetworks.com.au/public/download.jsp?id=1775> OR search sapowernetworks.com.au for NICC 404 and by referring to the figure on page 10, 11 or 12.
5. An on-site assessment and/or technical drawings may also be necessary to ascertain the exact cable/asset location. This service can be provided by SA Power Networks and may incur a cost.
6. Please contact your local SA Power Networks Location Officer to schedule work or make further enquiries regarding this request either by return email or the contact number supplied. Other general enquiries can be made on (08) 8292 0218.
7. If you have damaged SA Power Networks Assets immediately notify Faults & Emergencies on (08) 8404 4496.

**Please note: Underground services in the vicinity of any proposed earthworks must be located by hand digging (pot-holing) prior to the commencement of works. Persons conducting works will be held responsible for any resulting loss or damage to the services associated with infrastructure**

### Important information and conditions of use for users of underground services information supplied by SA Power Networks

#### Indicative information only

The accompanying information is intended only to indicate the presence of SA Power Networks' underground services and/or to convey general indicative information in respect of the location marked on the plans. **The information does not necessarily provide current, comprehensive or accurate description or location of the underground services or associated infrastructure.**

The information may also describe or indicate the presence of underground services or infrastructure not owned by SA Power Networks, for example, electrical services connected to an SA Power Networks' service point. SA Power Networks takes no responsibility for services or infrastructure that is not owned or operated by SA Power Networks or the accuracy or completeness of their description or location in the accompanying information.

Additional technical information may be requested from SA Power Networks for planning or engineering design (non-digging) purposes. Such requests are to be directed to SA Power Networks Builders and Contractors Electrical Service Line (1300 650 014).

### **Identifying the location of underground services**

Working near or around live electrical cables can be hazardous. **An on-site assessment is strongly recommended prior to undertaking ANY works and is necessary to determine the location of the underground services.** This can be undertaken by SA Power Networks or an alternative professional locating service provider. Enquiries can be made about SA Power Networks' cable location service by telephoning (08) 8292 0218.

Restrictions may apply in regard to your excavation particularly if your excavation is greater than 300mm below ground level and less than 3.0m from an SA Power Networks asset. Further explanation regarding restricted exclusion zones can be found at <http://www.sapowernetworks.com.au/public/download.jsp?id=1775> OR search sapowernetworks.com.au for NICC 404 and by referring to the figures on pages 10, 11 or 12.

Underground services in the vicinity of any proposed earthworks must be located by hand digging (pot-holing) prior to the commencement of the works. Persons conducting works will be held responsible for any resulting loss or damage to the services or associated infrastructure.

### **Working near high voltage 66kV underground cables**

Persons intending to conduct earthworks in the vicinity of an SA Power Networks high voltage 66kV underground cable MUST first obtain a site-specific clearance by contacting the SA Power Networks Cable Management Technical Officer on 0403 582 174.

### **Basis of information supply**

The accompanying information is supplied at the request of, and is only provided for use by, the requestor. The information is valid for 30 days from the date of issue.

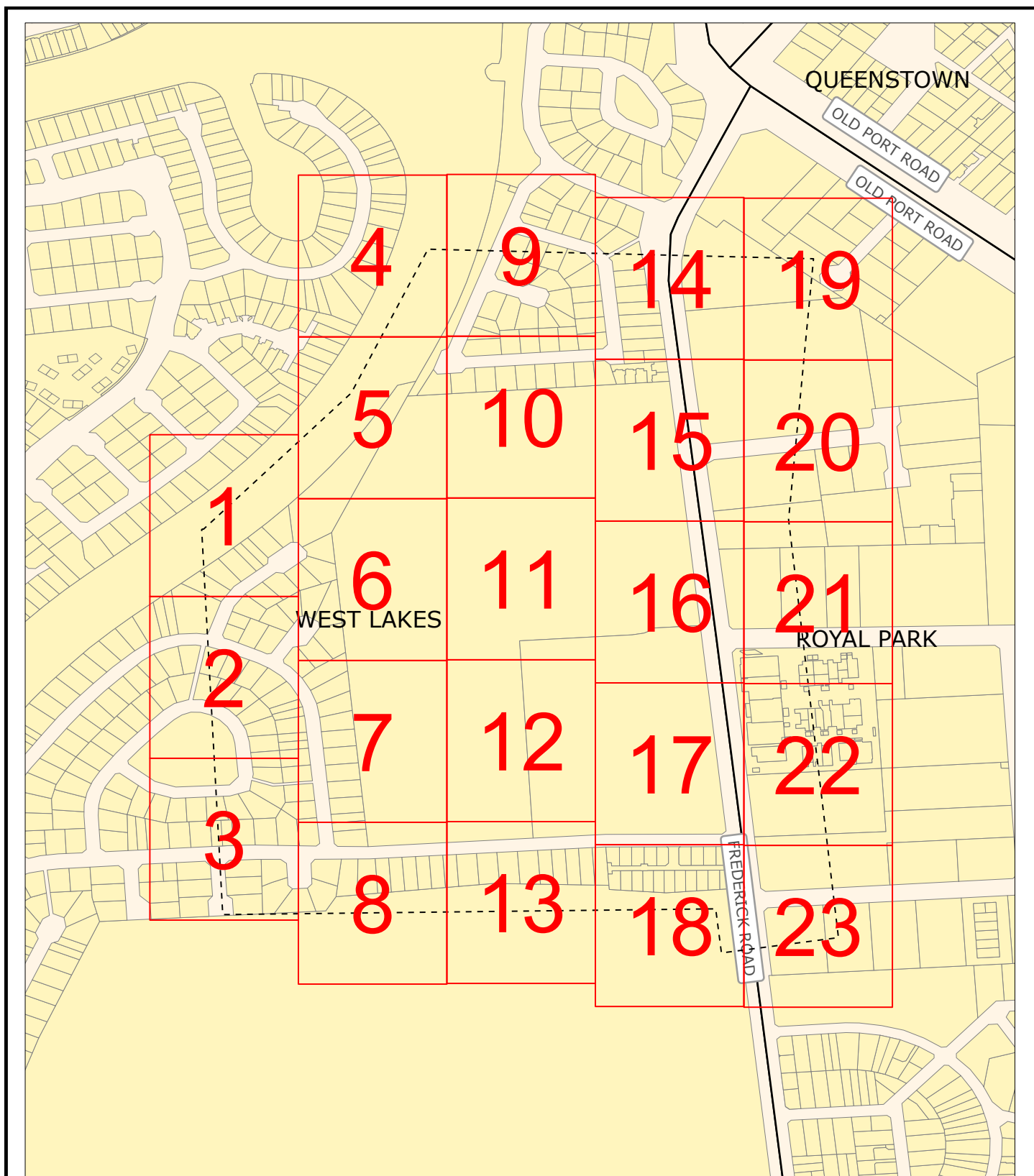
SA Power Networks, its employees, agents and contractors shall accept no responsibility for any inaccuracy or incompleteness in the information provided or liability in respect of any personal injury, death, loss or damage to any real or personal property or otherwise that arises out of or in connection with, directly or indirectly, the provision of or reliance upon the information.

It is the requestor's responsibility to ensure that the information provided accords with the area depicted on the requestor's Dial Before You Dig request. The information provided should not be used in respect of any area outside of the area depicted on the Dial Before You Dig request. SA Power Networks does not warrant that the information is suitable for the requestor's intended purposes.

**Any use of the accompanying information is subject to the requestor's agreement to the conditions contained in this document.** Upon acceptance of these conditions, SA Power Networks grants the requestor permission to use the information. The information must be returned to SA Power Networks if the conditions are not accepted.

***Important note: It is an offence under the Electricity Act 1996 (SA) to cause damage to or interfere with electrical infrastructure***





**Disclaimer:** The Plan/Sketch is supplied at your request and is subject to your agreement that SA Power Networks shall not be liable or responsible for the correctness or otherwise of any such information supplied pursuant to this request. Upon acceptance of this condition SA Power Networks grants you permission to use the Plan/Sketch as a guide to the location of SA Power Networks assets. The Plan/Sketch must be returned to SA Power Networks if you fail to accept the conditions of use.



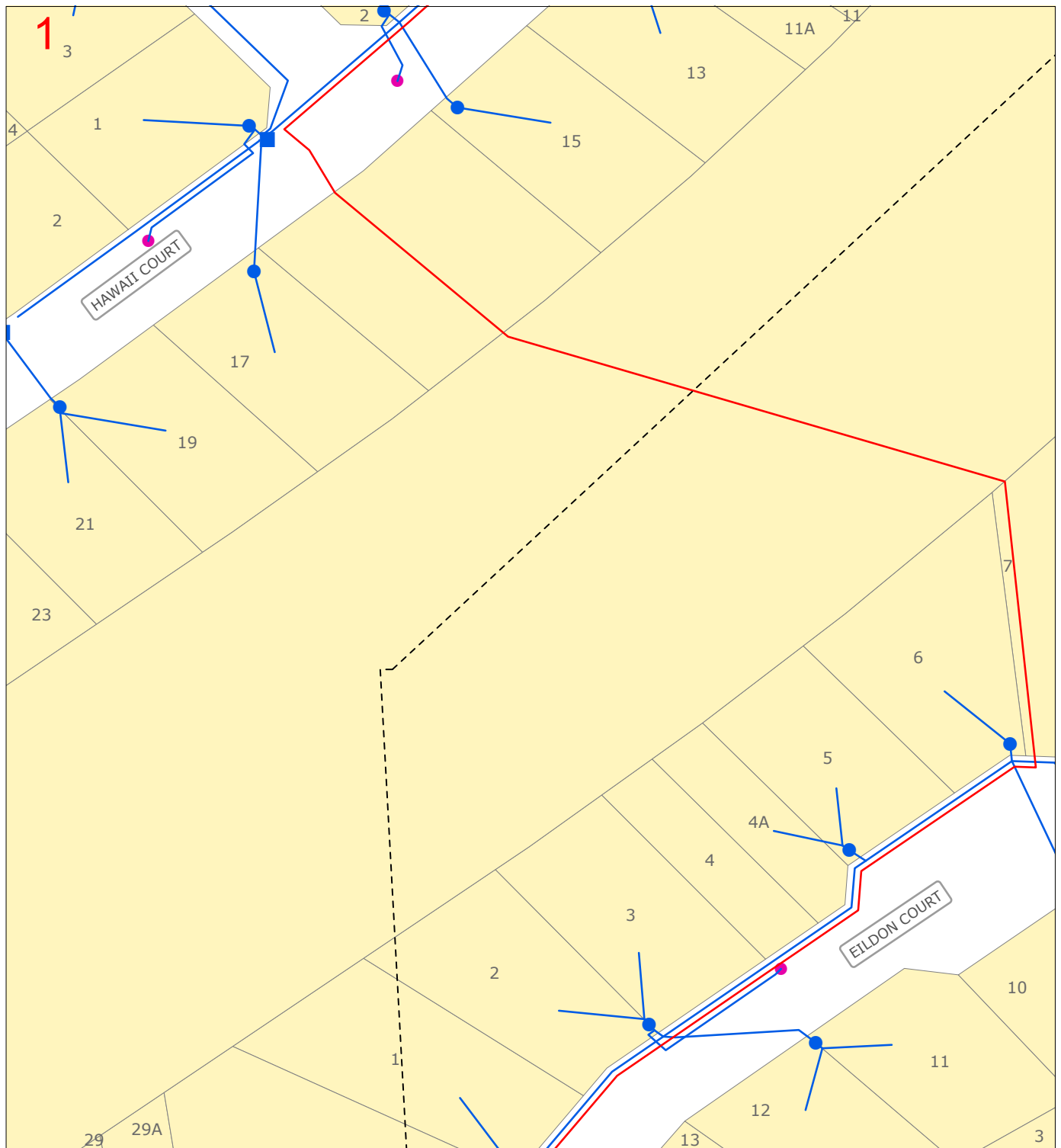
## LEGEND:

- 1 Detail Map
- DBYD Requested Area

# Map 1

## Sequence No: 209101396








### 16 Frederick Road West Lakes










Note: The presence of lighting columns and cable exits may indicate unidentified additional cables.

#### LEGEND:







##### Cable Exits

-  66kV/132kV
-  33kV
-  19kV
-  11kV
-  7.6kV
-  Not In Service
-  Low Voltage








##### Cables

-  66kV/132kV
-  33kV
-  19kV
-  11kV
-  7.6kV
-  Not In Service
-  Low Voltage

##### DBYD Requested Area

-  HV Switching Cubicle
-  Transformer Cubicle
-  Cable Joint Bay
-  LV Switching Cubicle/Pit
-  Service Pit/Pillar
-  Earthing Grid

##### Fibre Optic Cable/Duct

-  Fibre Optic Cable/Duct
-  Fibre Manhole/Pit
-  Pilot Cable
-  Pilot Manhole/Pit
-  Substation
-  Electricity Pole
-  Light Column



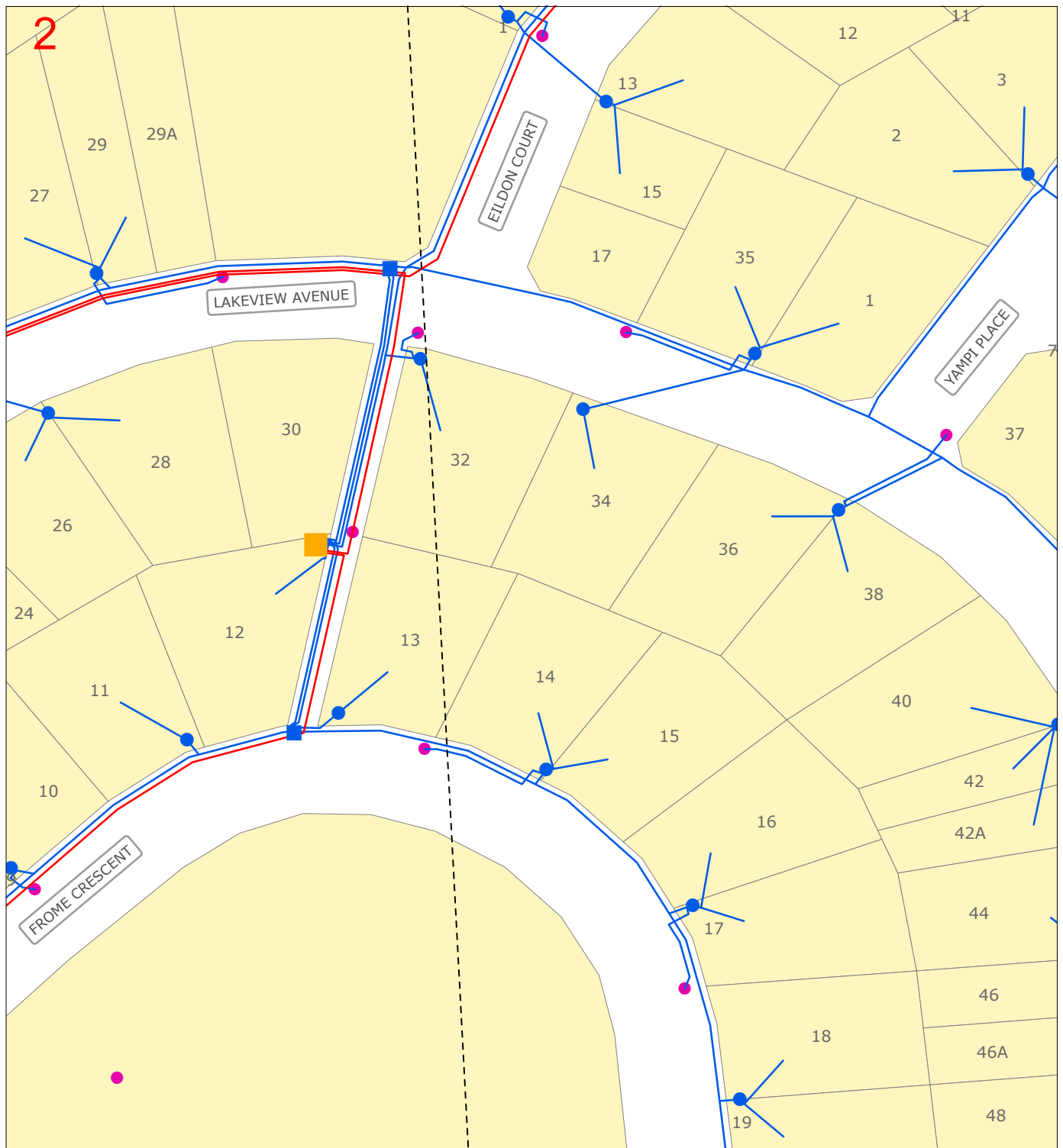
0 0.009km



# Map 2

## Sequence No: 209101396








### 16 Frederick Road West Lakes










Note: The presence of lighting columns and cable exits may indicate unidentified additional cables.

#### LEGEND:







##### Cable Exits

-  66kV/132kV
-  33kV
-  19kV
-  11kV
-  7.6kV
-  Not In Service
-  Low Voltage

##### Cables

-  66kV/132kV
-  33kV
-  19kV
-  11kV
-  7.6kV
-  Not In Service
-  Low Voltage

##### DBYD Requested Area

-  HV Switching Cubicle
-  Transformer Cubicle
-  Cable Joint Bay
-  LV Switching Cubicle/Pit
-  Service Pit/Pillar
-  Earthing Grid

##### Fibre Optic Cable/Duct

-  Fibre Optic Cable/Duct
-  Fibre Manhole/Pit
-  Pilot Cable
-  Pilot Manhole/Pit
-  Substation
-  Electricity Pole
-  Light Column

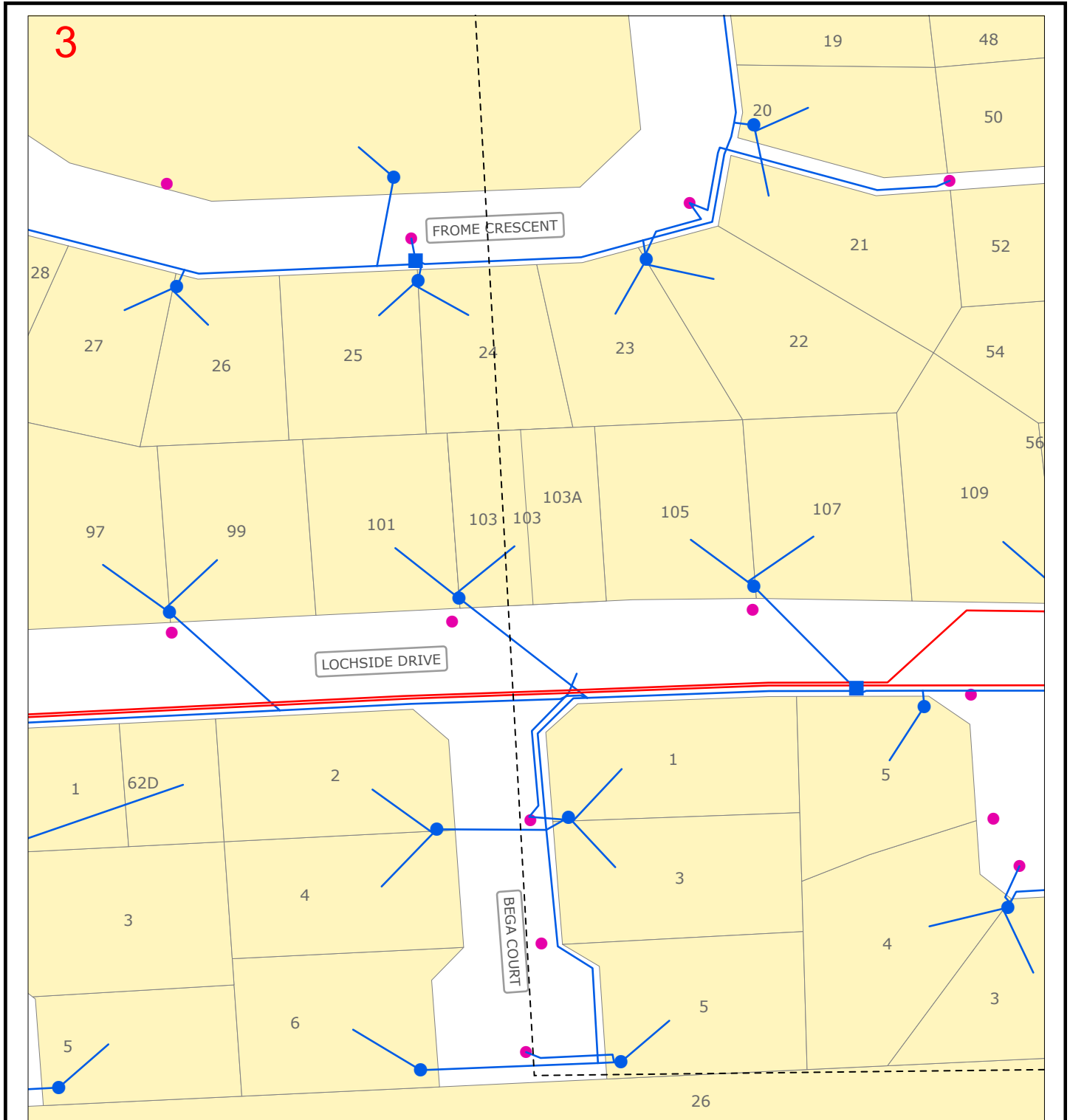


0 0.009km

# Map 3

## Sequence No: 209101396

### 16 Frederick Road West Lakes



Note: The presence of lighting columns and cable exits may indicate unidentified additional cables.

#### LEGEND:

##### Cable Exits

- 66kV/132kV
- 33kV
- 19kV
- 11kV
- 7.6kV
- Not In Service
- Low Voltage

##### Cables

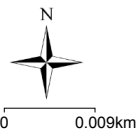
- 66kV/132kV
- 33kV
- 19kV
- 11kV
- 7.6kV
- Not In Service
- Low Voltage

##### DBYD Requested Area

- HV Switching Cubicle
- Transformer Cubicle
- Cable Joint Bay
- LV Switching Cubicle/Pit
- Service Pit/Pillar
- Earthing Grid

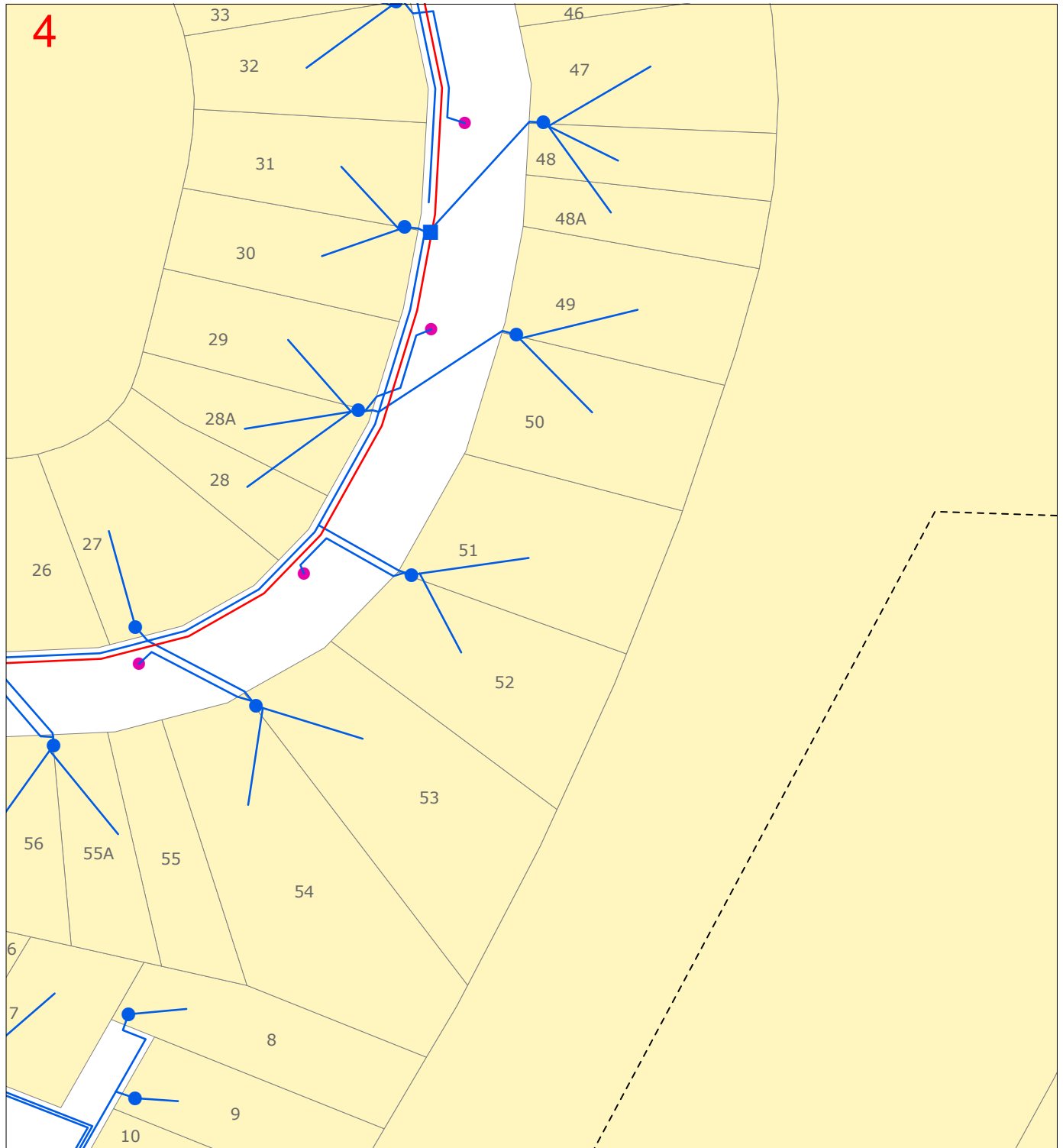
##### Fibre Optic Cable/Duct

- Fibre Manhole/Pit
- Pilot Cable
- Pilot Manhole/Pit
- Substation
- Electricity Pole
- Light Column





# Map 4

**Sequence No: 209101396**
**16 Frederick Road West Lakes**


Note: The presence of lighting columns and cable exits may indicate unidentified additional cables.

**LEGEND:**
**Cable Exits**

- 66kV/132kV
- 33kV
- 19kV
- 11kV
- 7.6kV
- Not In Service
- Low Voltage

**Cables**

- 66kV/132kV
- 33kV
- 19kV
- 11kV
- 7.6kV
- Not In Service
- Low Voltage

- DBYD Requested Area

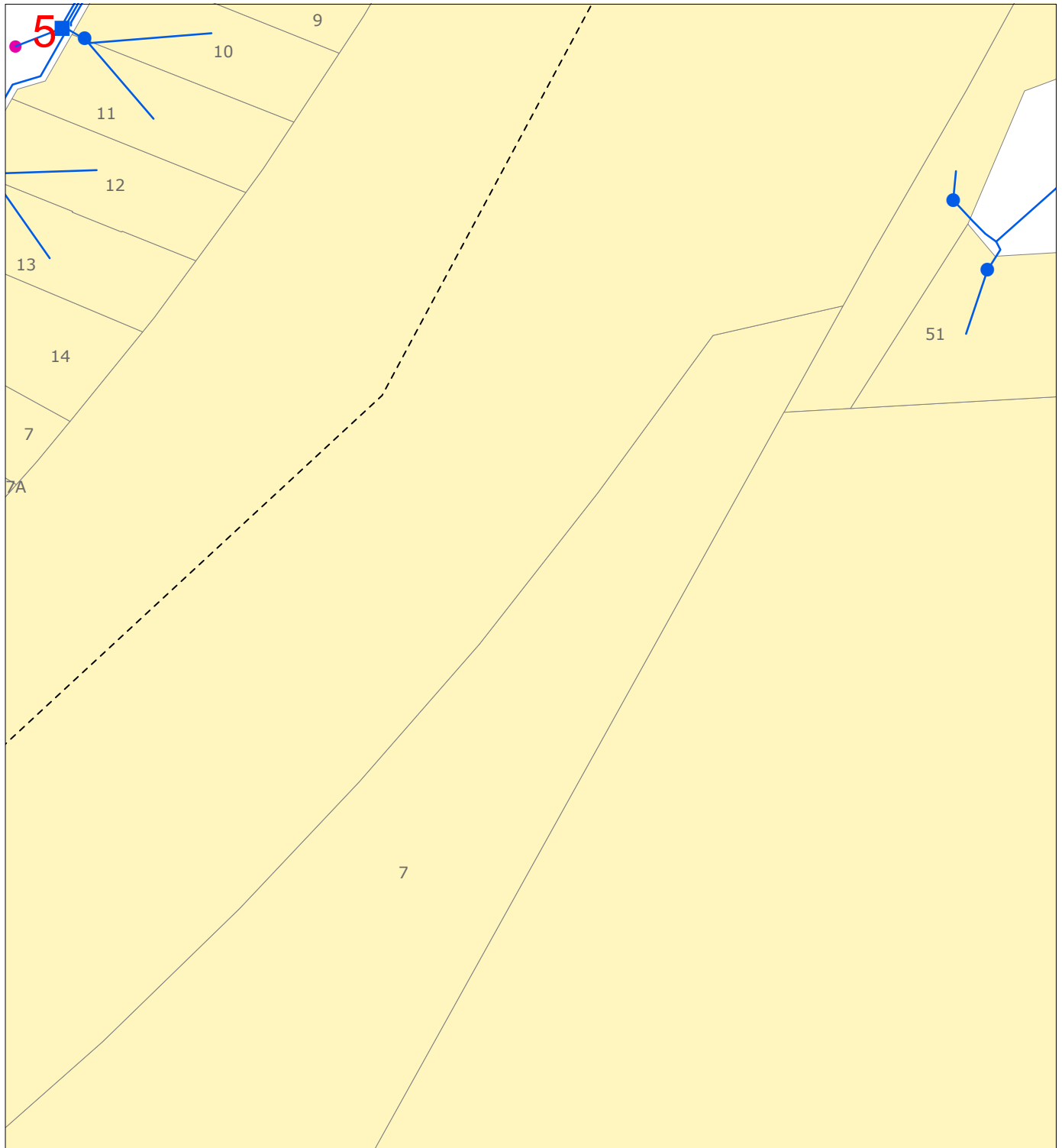
- HV Switching Cubicle
- Transformer Cubicle
- Cable Joint Bay
- LV Switching Cubicle/Pit
- Service Pit/Pillar
- Earthing Grid

- Fibre Optic Cable/Duct
- Fibre Manhole/Pit
- Pilot Cable
- Pilot Manhole/Pit
- Substation
- Electricity Pole
- Light Column










0 0.009km

# Map 5








**Sequence No: 209101396**
**16 Frederick Road West Lakes**


Note: The presence of lighting columns and cable exits may indicate unidentified additional cables.


**LEGEND:**
**Cable Exits**

-  66kV/132kV
-  33kV
-  19kV
-  11kV
-  7.6kV
-  Not In Service
-  Low Voltage


**Cables**

-  66kV/132kV
-  33kV
-  19kV
-  11kV
-  7.6kV
-  Not In Service
-  Low Voltage


 DBYD Requested Area

 HV Switching Cubicle

 Transformer Cubicle


 Cable Joint Bay


 LV Switching Cubicle/Pit

 Service Pit/Pillar


 Earthing Grid

 Fibre Optic Cable/Duct


 Fibre Manhole/Pit

 Pilot Cable

 Pilot Manhole/Pit

 Substation

 Electricity Pole

 Light Column

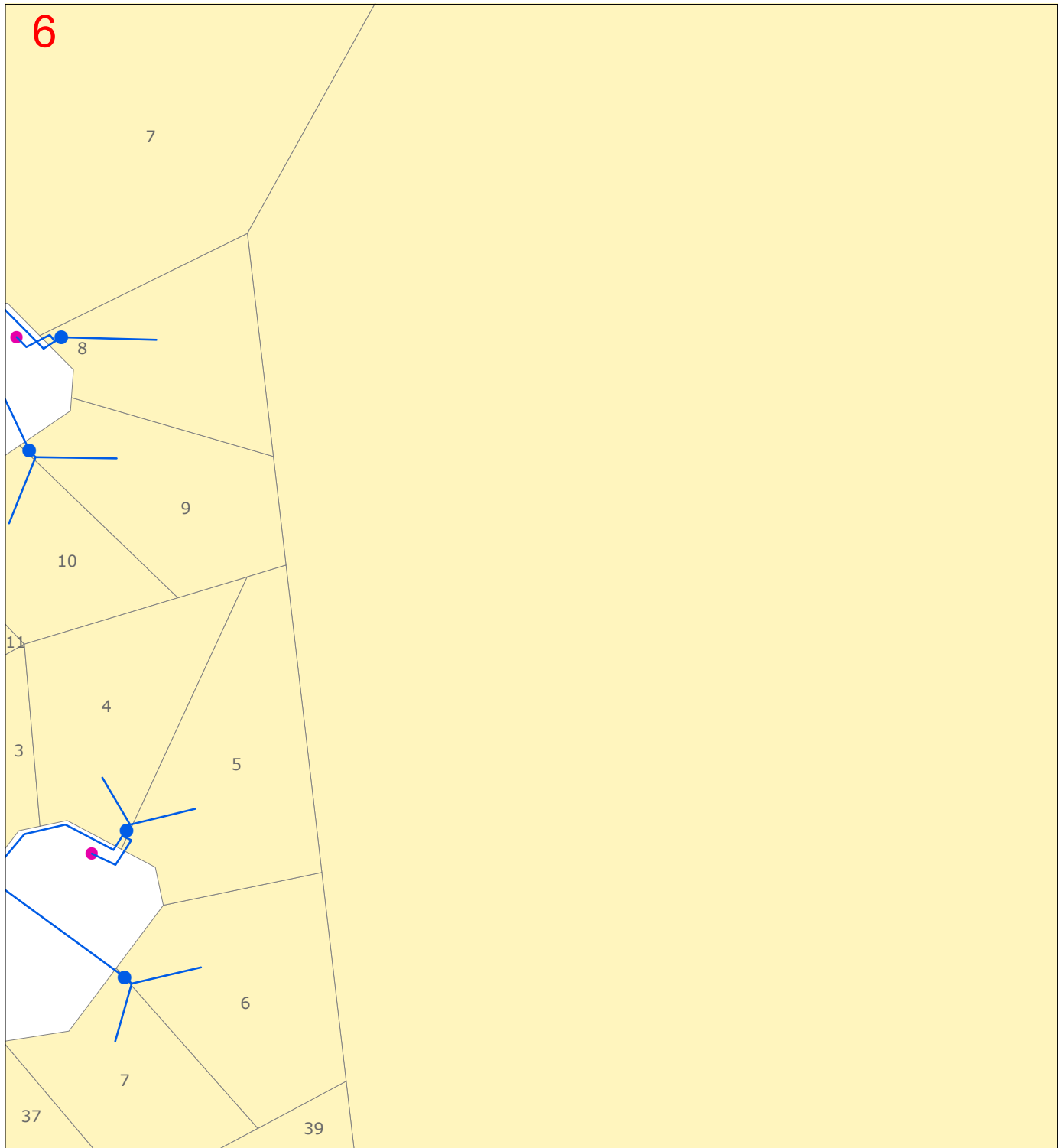

0 0.009km



# Map 6

**Sequence No: 209101396**

16 Frederick Road West Lakes



Note: The presence of lighting columns and cable exits may indicate unidentified additional cables.

**LEGEND:**
**Cable Exits**

- ▼ 66kV/132kV
- ▼ 33kV
- ▼ 19kV
- ▼ 11kV
- ▼ 7.6kV
- ▼ Not In Service
- ▼ Low Voltage

**Cables**


- 66kV/132kV
- 33kV
- 19kV
- 11kV
- 7.6kV
- Not In Service
- Low Voltage


 DBYD Requested Area

 HV Switching Cubicle

 Transformer Cubicle

 Cable Joint Bay


 LV Switching Cubicle/Pit


 Service Pit/Pillar


 Earthing Grid

 Fibre Optic Cable/Duct


 Fibre Manhole/Pit

 Pilot Cable

 Pilot Manhole/Pit

 Substation

 Electricity Pole

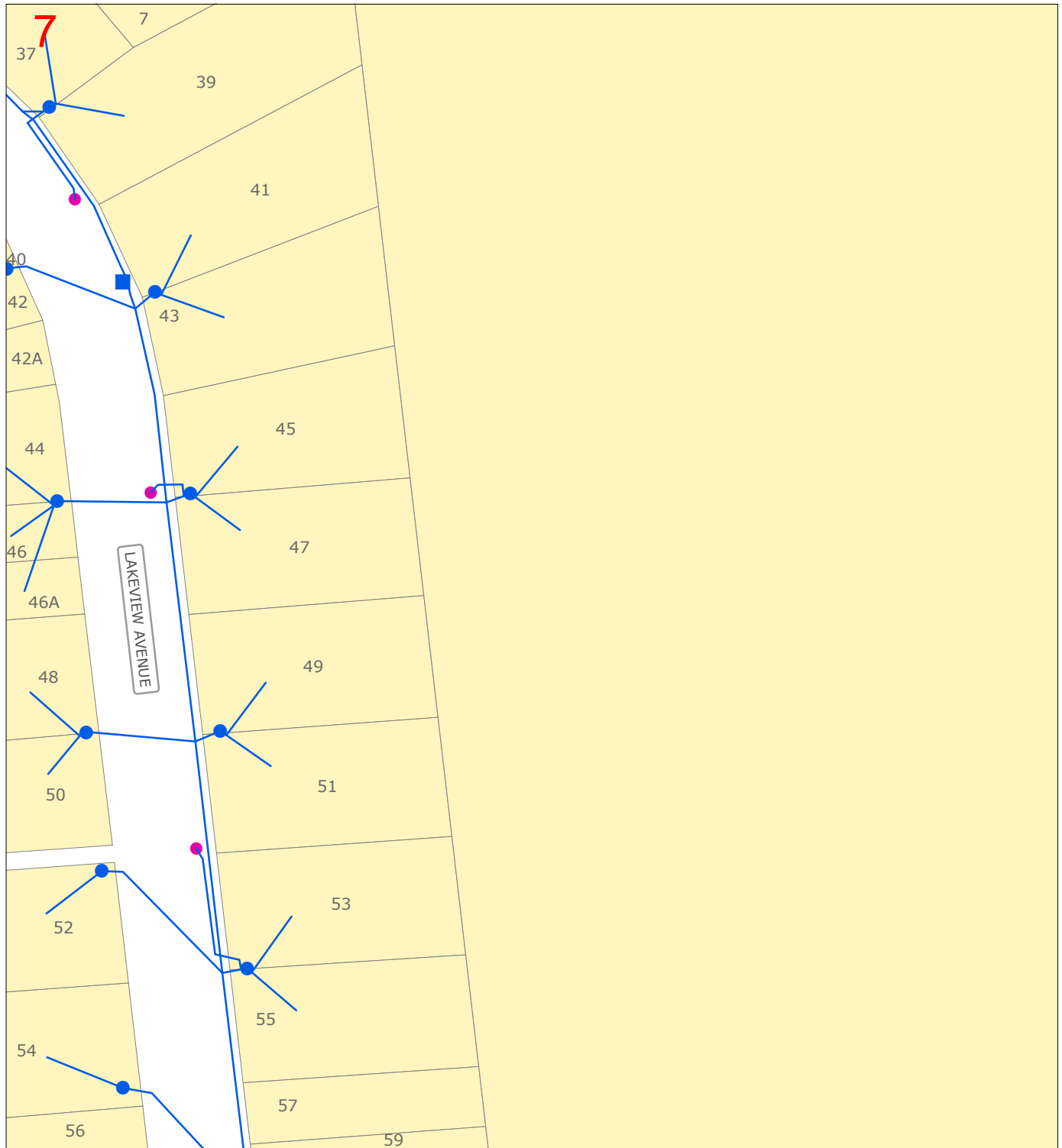
 Light Column


0 0.009km

# Map 7








**Sequence No: 209101396**

16 Frederick Road West Lakes










Note: The presence of lighting columns and cable exits may indicate unidentified additional cables.


**LEGEND:**
**Cable Exits**

-  66kV/132kV
-  33kV
-  19kV
-  11kV
-  7.6kV
-  Not In Service
-  Low Voltage


**Cables**


-  66kV/132kV
-  33kV
-  19kV
-  11kV
-  7.6kV
-  Not In Service
-  Low Voltage


 DBYD Requested Area


 HV Switching Cubicle


 Transformer Cubicle


 Cable Joint Bay

 LV Switching Cubicle/Pit

 Service Pit/Pillar


 Earthing Grid


 Fibre Optic Cable/Duct


 Fibre Manhole/Pit

 Pilot Cable

 Pilot Manhole/Pit

 Substation

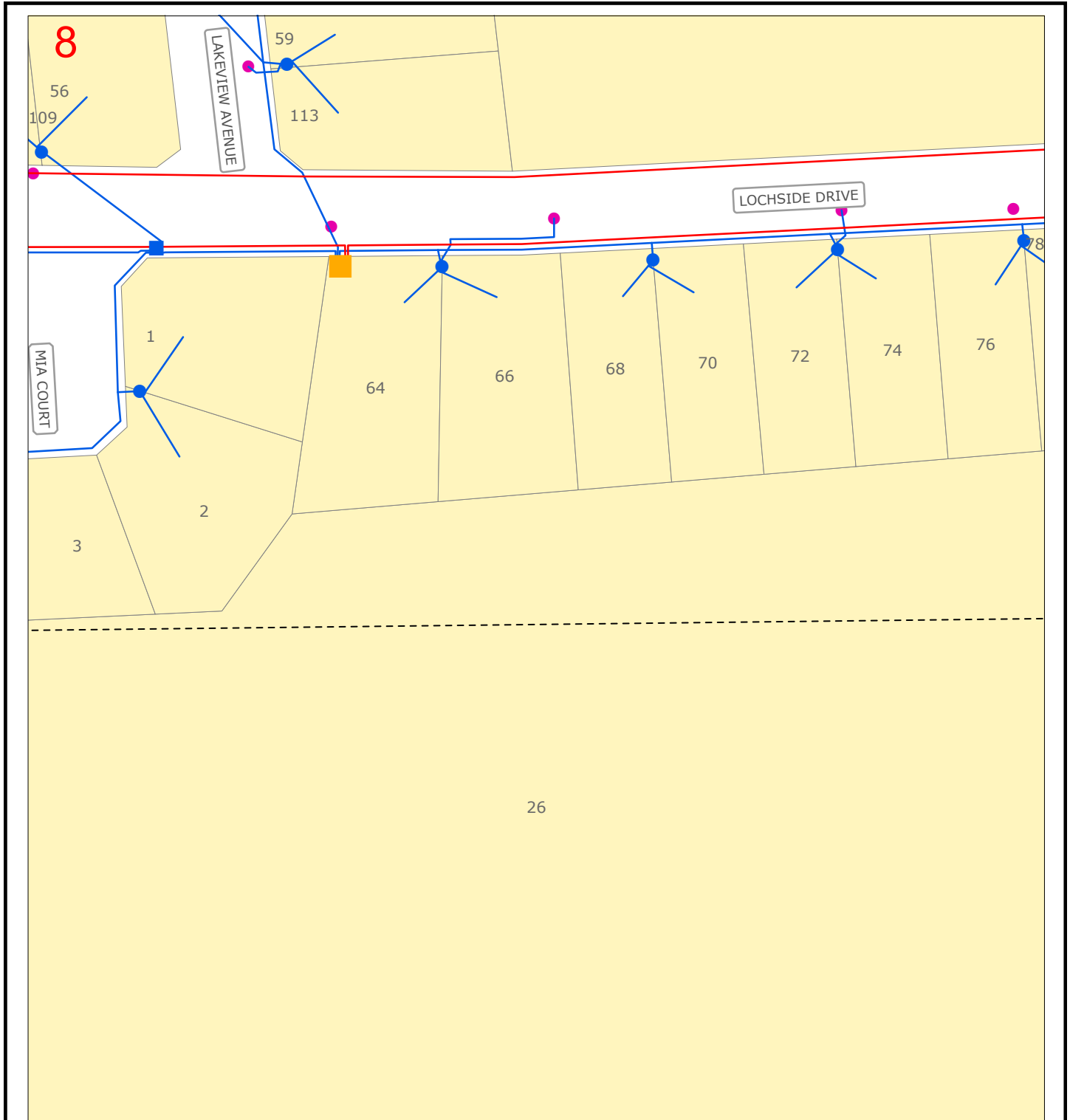
 Electricity Pole

 Light Column


0 0.009km



# Map 8

**Sequence No: 209101396**
**16 Frederick Road West Lakes**


Note: The presence of lighting columns and cable exits may indicate unidentified additional cables.

**LEGEND:**
**Cable Exits**

- ▼ 66kV/132kV
- ▼ 33kV
- ▼ 19kV
- ▼ 11kV
- ▼ 7.6kV
- ▼ Not In Service
- ▼ Low Voltage

**Cables**


- ~ 66kV/132kV
- ~ 33kV
- ~ 19kV
- ~ 11kV
- ~ 7.6kV
- ~ Not In Service
- ~ Low Voltage


 DBYD Requested Area


 HV Switching Cubicle

 Transformer Cubicle

 Cable Joint Bay


 LV Switching Cubicle/Pit


 Service Pit/Pillar


 Earthing Grid

 Fibre Optic Cable/Duct


 Fibre Manhole/Pit

 Pilot Cable

 Pilot Manhole/Pit

 Substation

 Electricity Pole

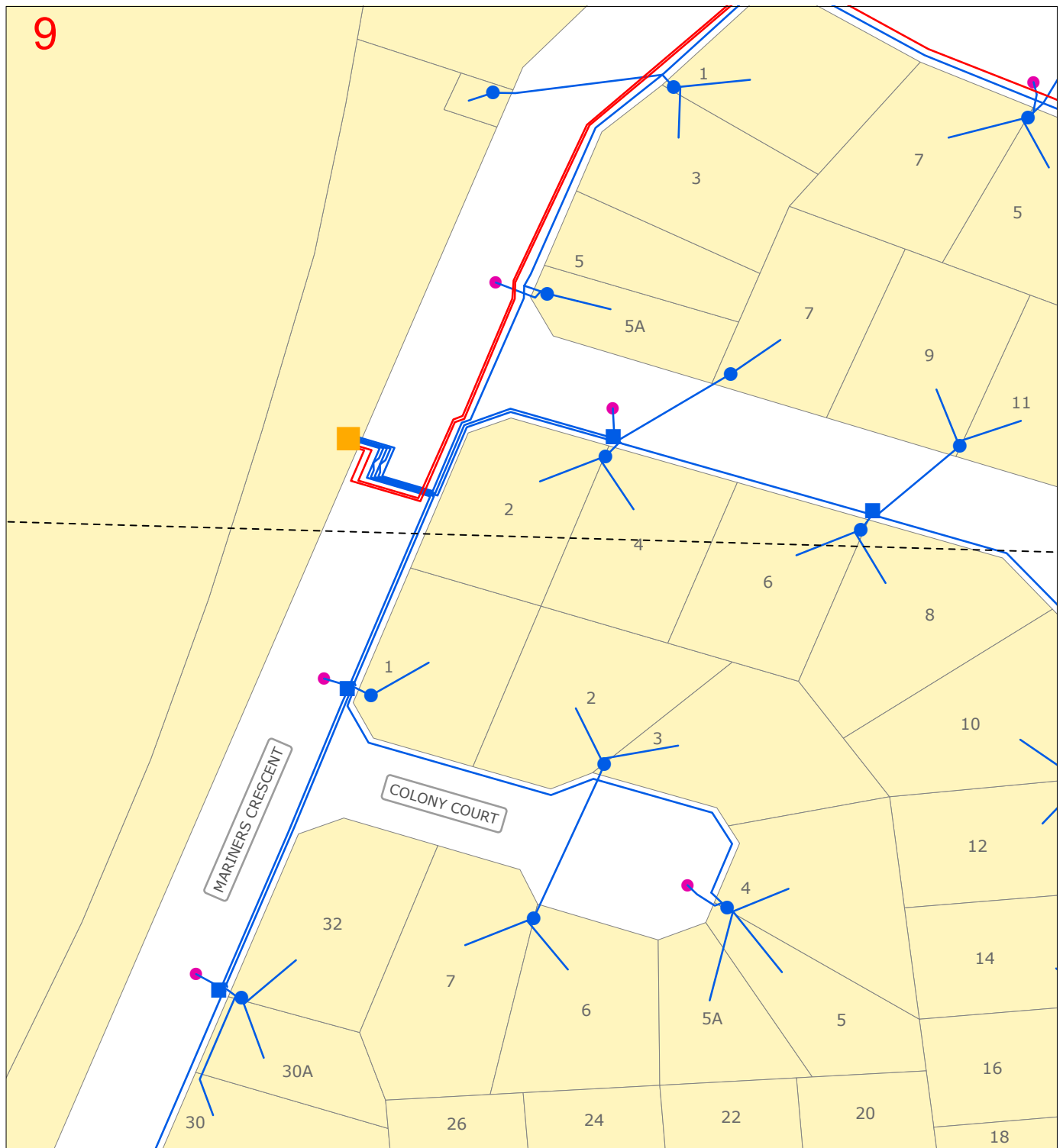
 Light Column


0 0.009km

# Map 9

## Sequence No: 209101396

### 16 Frederick Road West Lakes



Note: The presence of lighting columns and cable exits may indicate unidentified additional cables.

#### LEGEND:

##### Cable Exits

- 66kV/132kV
- 33kV
- 19kV
- 11kV
- 7.6kV
- Not In Service
- Low Voltage

##### Cables

- 66kV/132kV
- 33kV
- 19kV
- 11kV
- 7.6kV
- Not In Service
- Low Voltage

DBYD Requested Area

- HV Switching Cubicle
- Transformer Cubicle
- Cable Joint Bay
- LV Switching Cubicle/Pit
- Service Pit/Pillar
- Earthing Grid

Fibre Optic Cable/Duct

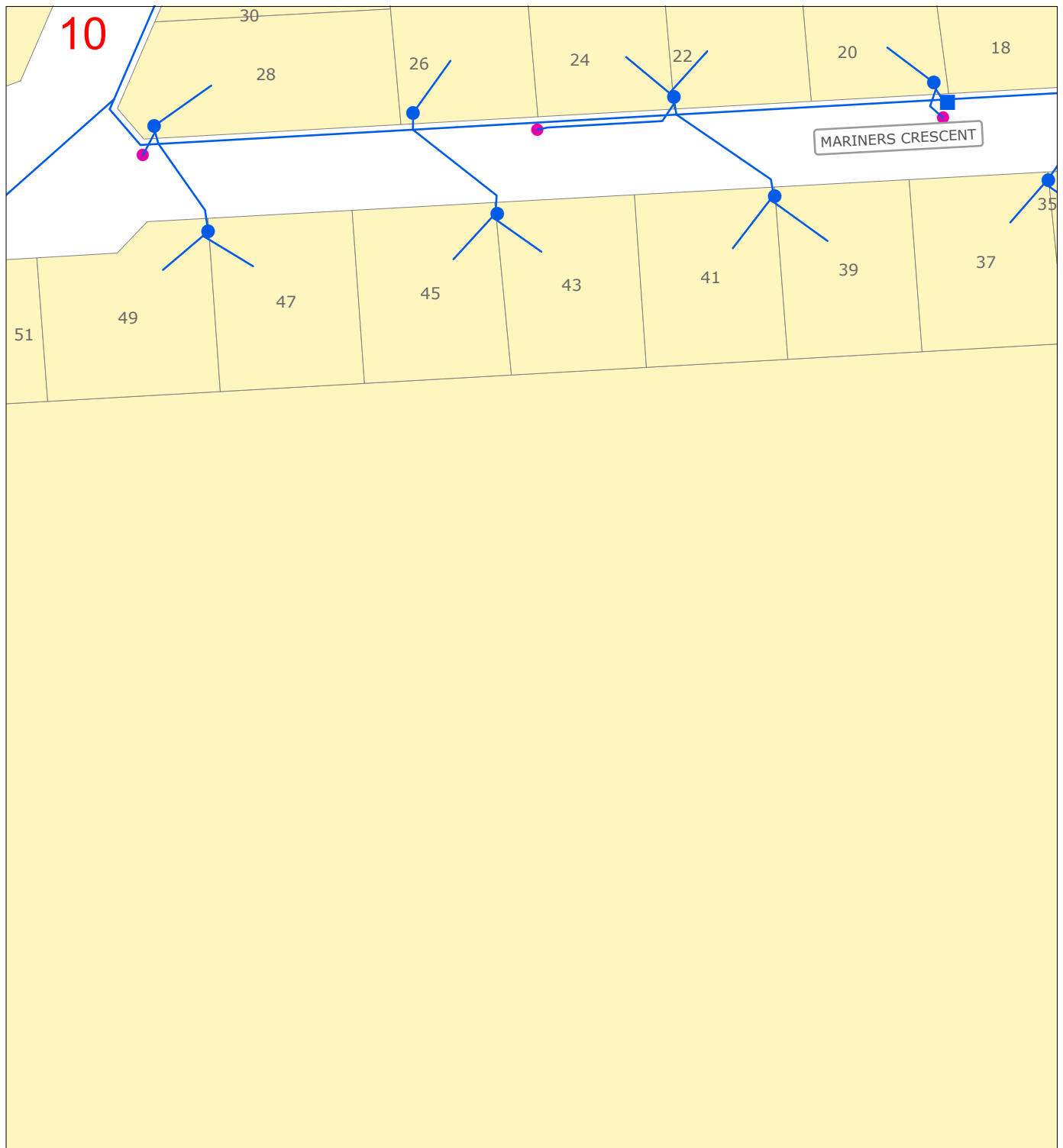
- Fibre Manhole/Pit
- Pilot Cable
- Pilot Manhole/Pit
- Substation
- Electricity Pole
- Light Column



0 0.009km










# Map 10








**Sequence No: 209101396**
**16 Frederick Road West Lakes**


Note: The presence of lighting columns and cable exits may indicate unidentified additional cables.

**LEGEND:**
**Cable Exits**


-  66kV/132kV
-  33kV
-  19kV
-  11kV
-  7.6kV
-  Not In Service
-  Low Voltage


**Cables**


-  66kV/132kV
-  33kV
-  19kV
-  11kV
-  7.6kV
-  Not In Service
-  Low Voltage


 DBYD Requested Area


 HV Switching Cubicle


 Transformer Cubicle

 Cable Joint Bay


 LV Switching Cubicle/Pit

 Service Pit/Pillar


 Earthing Grid


 Fibre Optic Cable/Duct


 Fibre Manhole/Pit

 Pilot Cable

 Pilot Manhole/Pit

 Substation

 Electricity Pole

 Light Column


0 0.009km

11

Note: The presence of lighting columns and cable exits may indicate unidentified additional cables.

### LEGEND:

#### Cable Exits

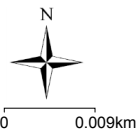
- ▼ 66kV/132kV
- ▼ 33kV
- ▼ 19kV
- ▼ 11kV
- ▼ 7.6kV
- ▼ Not In Service
- ▼ Low Voltage

#### Cables

- 66kV/132kV
- 33kV
- 19kV
- 11kV
- 7.6kV
- Not In Service
- Low Voltage

- DBYD Requested Area
- HV Switching Cubicle
- Transformer Cubicle
- Cable Joint Bay
- LV Switching Cubicle/Pit
- Service Pit/Pillar
- Earthing Grid

- Fibre Optic Cable/Duct
- Fibre Manhole/Pit
- Pilot Cable
- Pilot Manhole/Pit
- Substation
- Electricity Pole
- Light Column



12

Note: The presence of lighting columns and cable exits may indicate unidentified additional cables.

**LEGEND:****Cable Exits**

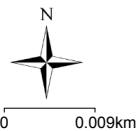
- ▼ 66kV/132kV
- ▼ 33kV
- ▼ 19kV
- ▼ 11kV
- ▼ 7.6kV
- ▼ Not In Service
- ▼ Low Voltage

**Cables**

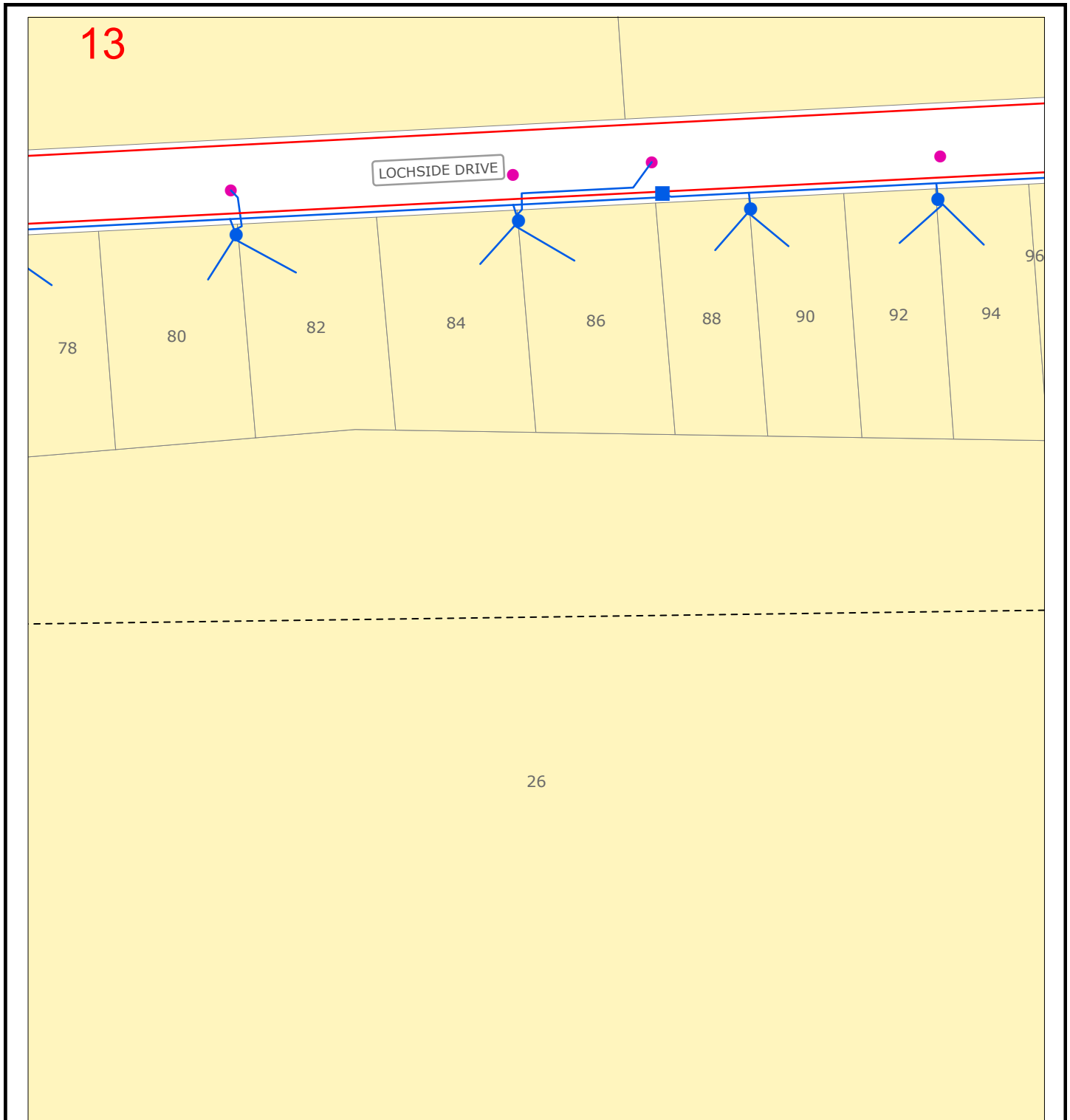
- 66kV/132kV
- 33kV
- 19kV
- 11kV
- 7.6kV
- Not In Service
- Low Voltage

- DBYD Requested Area
- HV Switching Cubicle
- Transformer Cubicle
- Cable Joint Bay
- LV Switching Cubicle/Pit
- Service Pit/Pillar
- ⊗ Earthing Grid

- Fibre Optic Cable/Duct
- Fibre Manhole/Pit
- Pilot Cable
- Pilot Manhole/Pit
- Substation
- Electricity Pole
- Light Column





















Note: The presence of lighting columns and cable exits may indicate unidentified additional cables.

### LEGEND:

#### Cable Exits

-  66kV/132kV
-  33kV
-  19kV
-  11kV
-  7.6kV
-  Not In Service
-  Low Voltage

#### Cables

-  66kV/132kV
-  33kV
-  19kV
-  11kV
-  7.6kV
-  Not In Service
-  Low Voltage

 DBYD Requested Area


 HV Switching Cubicle


 Transformer Cubicle


 Cable Joint Bay


 LV Switching Cubicle/Pit

 Service Pit/Pillar


 Earthing Grid


 Fibre Optic Cable/Duct


 Fibre Manhole/Pit

 Pilot Cable

 Pilot Manhole/Pit

 Substation

 Electricity Pole

 Light Column

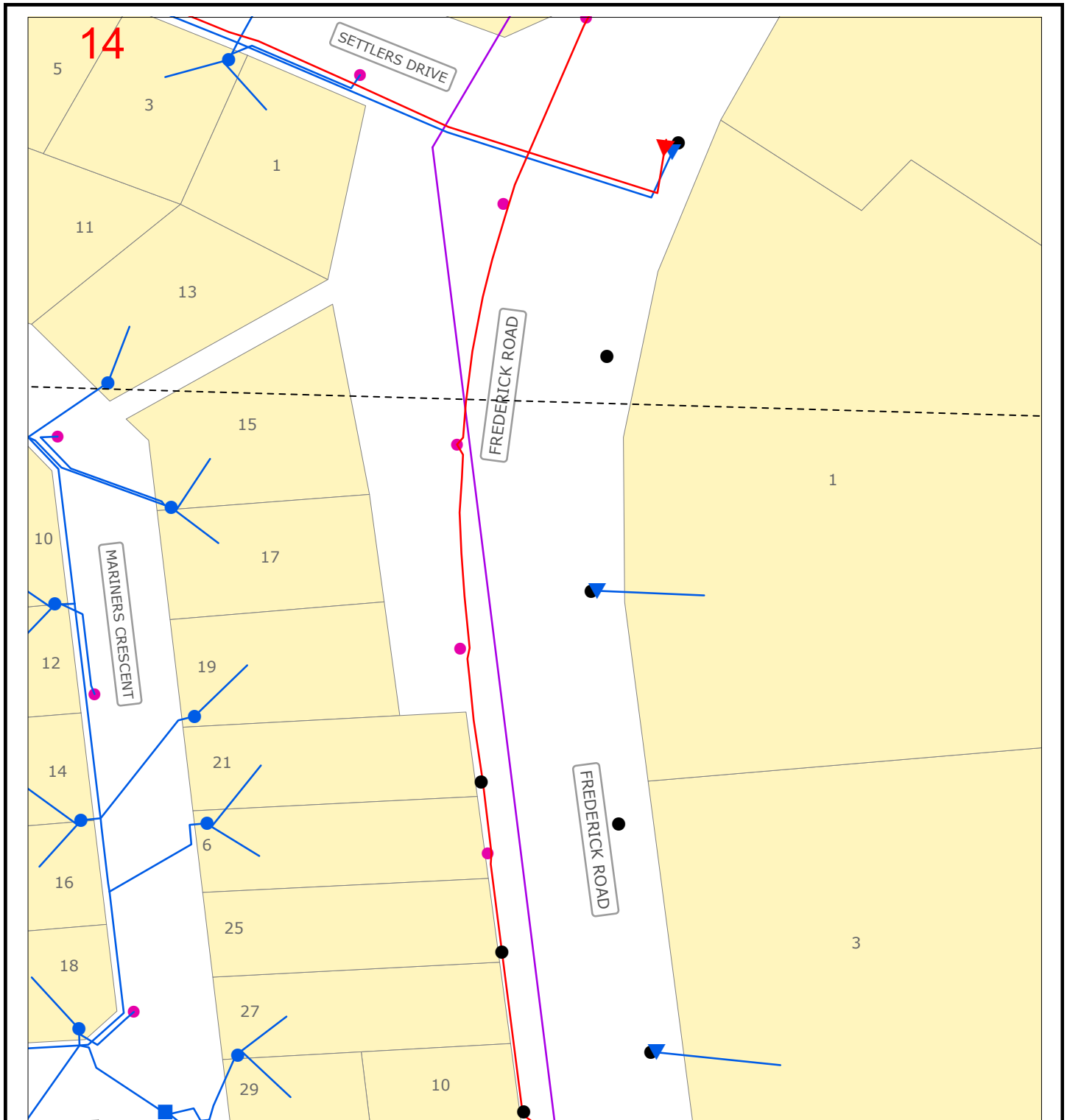


0 0.009km

# Map 14

## Sequence No: 209101396








### 16 Frederick Road West Lakes










Note: The presence of lighting columns and cable exits may indicate unidentified additional cables.


#### LEGEND:







##### Cable Exits


-  66kV/132kV
-  33kV
-  19kV
-  11kV
-  7.6kV
-  Not In Service
-  Low Voltage







##### Cables

-  66kV/132kV
-  33kV
-  19kV
-  11kV
-  7.6kV
-  Not In Service
-  Low Voltage

 DBYD Requested Area

-  HV Switching Cubicle
-  Transformer Cubicle
-  Cable Joint Bay
-  LV Switching Cubicle/Pit
-  Service Pit/Pillar
-  Earthing Grid

 Fibre Optic Cable/Duct

-  Fibre Manhole/Pit
-  Pilot Cable
-  Pilot Manhole/Pit
-  Substation
-  Electricity Pole
-  Light Column

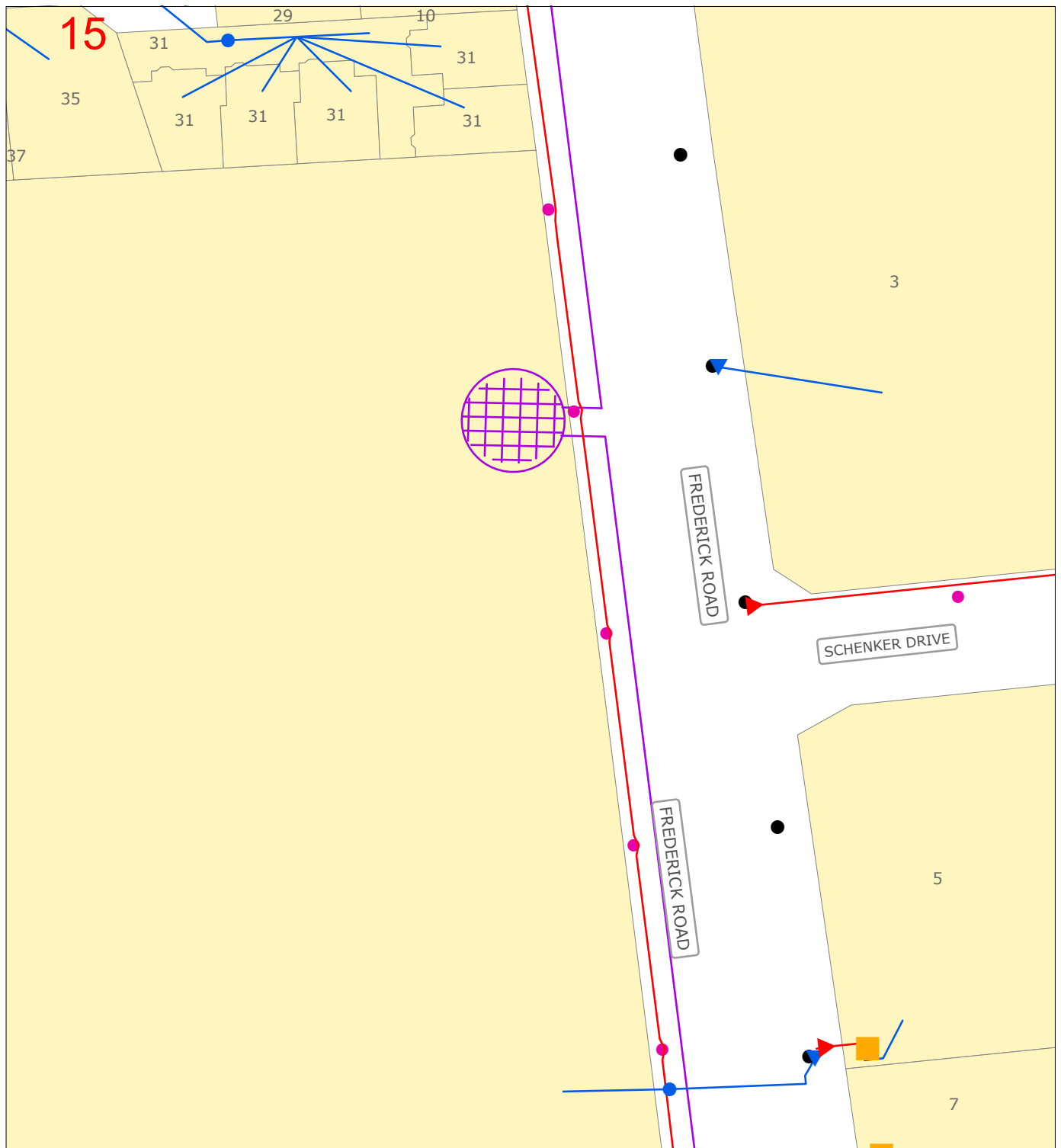


0 0.009km

# Map 15

## Sequence No: 209101396

### 16 Frederick Road West Lakes



Note: The presence of lighting columns and cable exits may indicate unidentified additional cables.

#### LEGEND:

##### Cable Exits

- ▼ 66kV/132kV
- ▼ 33kV
- ▼ 19kV
- ▼ 11kV
- ▼ 7.6kV
- ▼ Not In Service
- ▼ Low Voltage

##### Cables

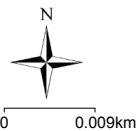
- ~ 66kV/132kV
- ~ 33kV
- ~ 19kV
- ~ 11kV
- ~ 7.6kV
- ~ Not In Service
- ~ Low Voltage

DBYD Requested Area

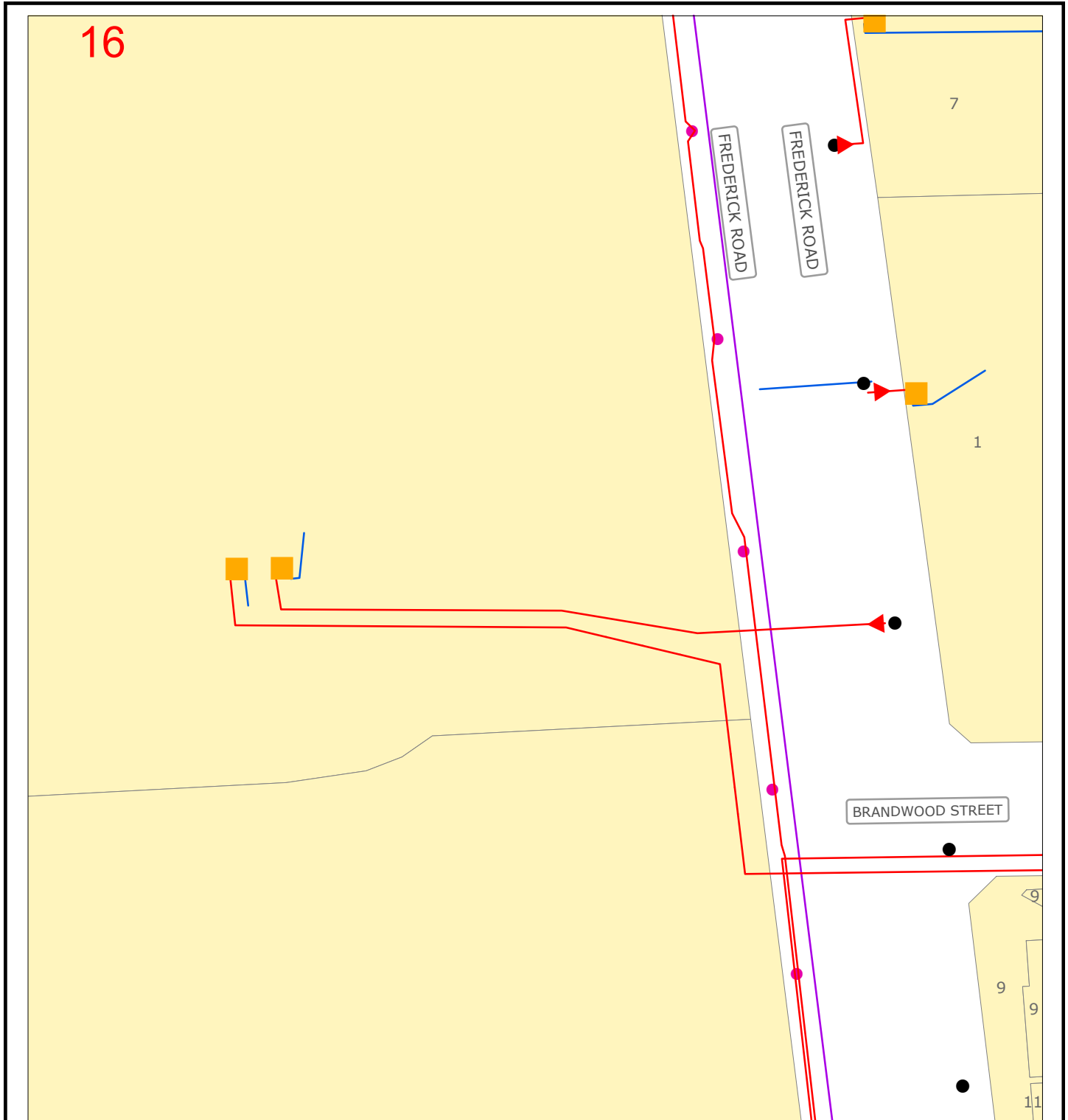
- HV Switching Cubicle
- Transformer Cubicle
- Cable Joint Bay
- LV Switching Cubicle/Pit
- Service Pit/Pillar
- ⊗ Earthing Grid

Fibre Optic Cable/Duct

- Fibre Manhole/Pit
- ~ Pilot Cable
- Pilot Manhole/Pit
- Substation
- Electricity Pole
- Light Column







Note: The presence of lighting columns and cable exits may indicate unidentified additional cables.

#### LEGEND:

##### Cable Exits

- ▼ 66kV/132kV
- ▼ 33kV
- ▼ 19kV
- ▼ 11kV
- ▼ 7.6kV
- ▼ Not In Service
- ▼ Low Voltage

##### Cables

- 66kV/132kV
- 33kV
- 19kV
- 11kV
- 7.6kV
- Not In Service
- Low Voltage

##### DBYD Requested Area

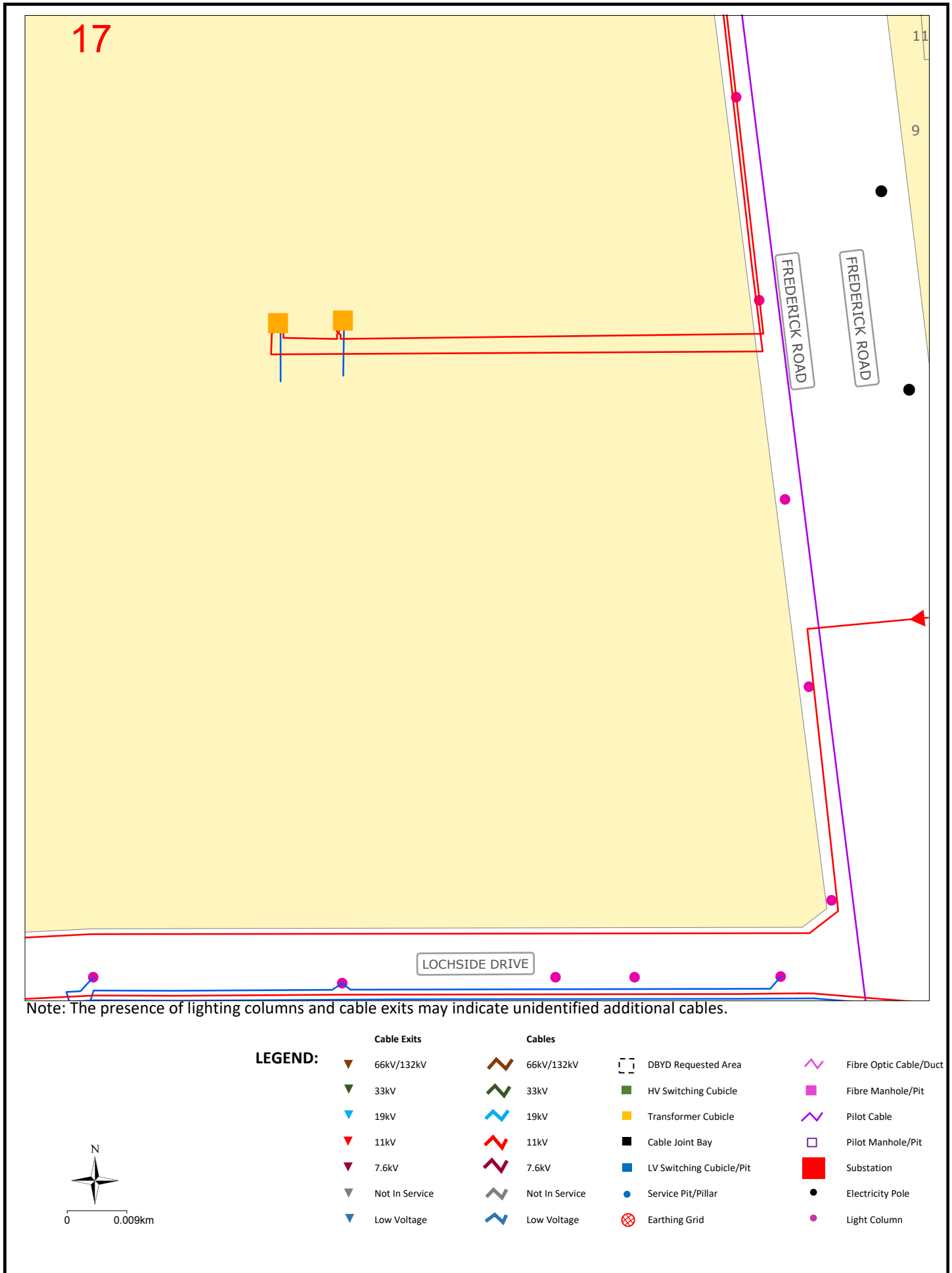
- HV Switching Cubicle
- Transformer Cubicle
- Cable Joint Bay
- LV Switching Cubicle/Pit
- Service Pit/Pillar
- ⊗ Earthing Grid

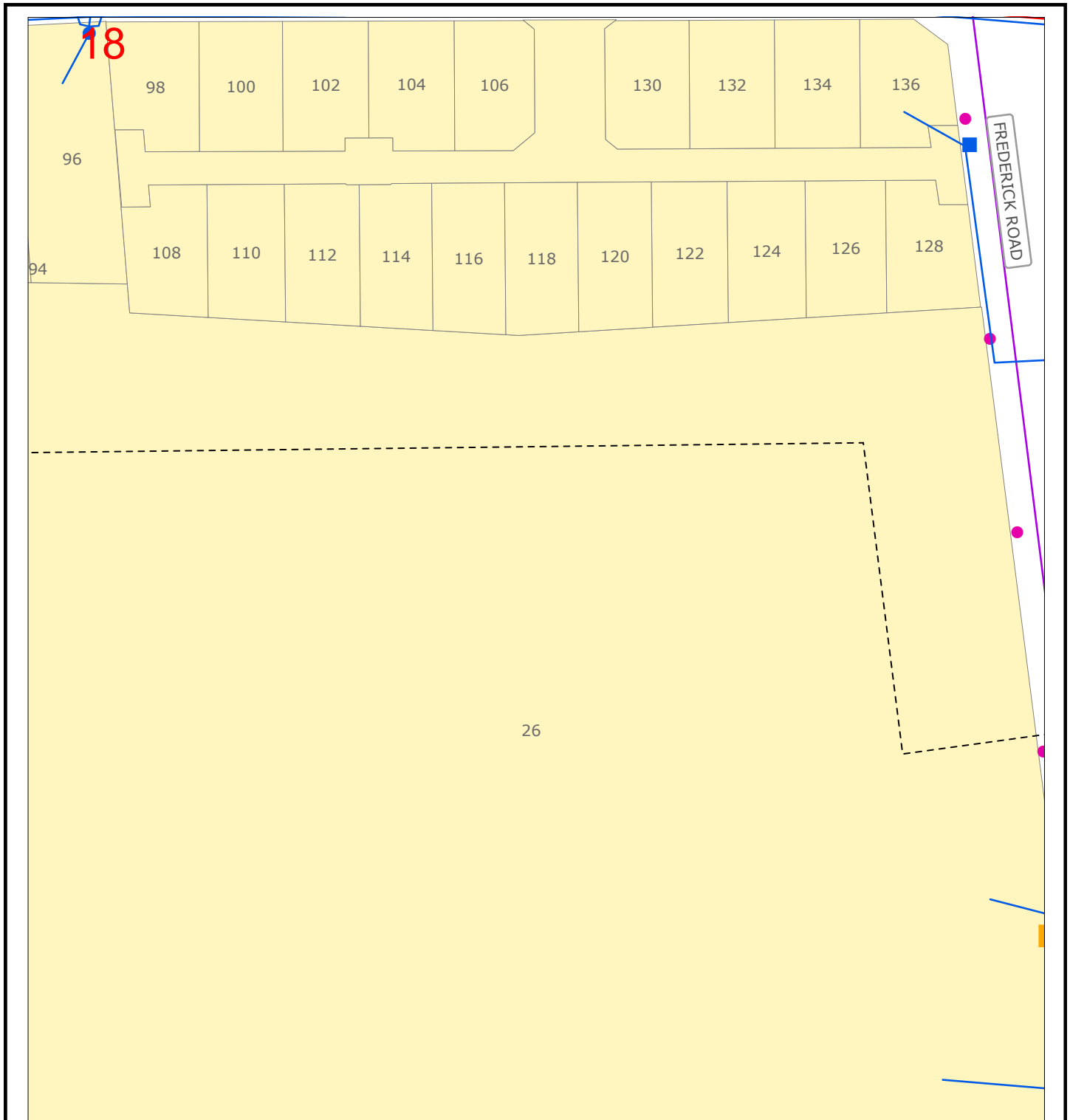
##### Fibre Optic Cable/Duct

- Fibre Manhole/Pit
- Pilot Cable
- Pilot Manhole/Pit
- Substation
- Electricity Pole
- Light Column































0 0.009km





Note: The presence of lighting columns and cable exits may indicate unidentified additional cables.

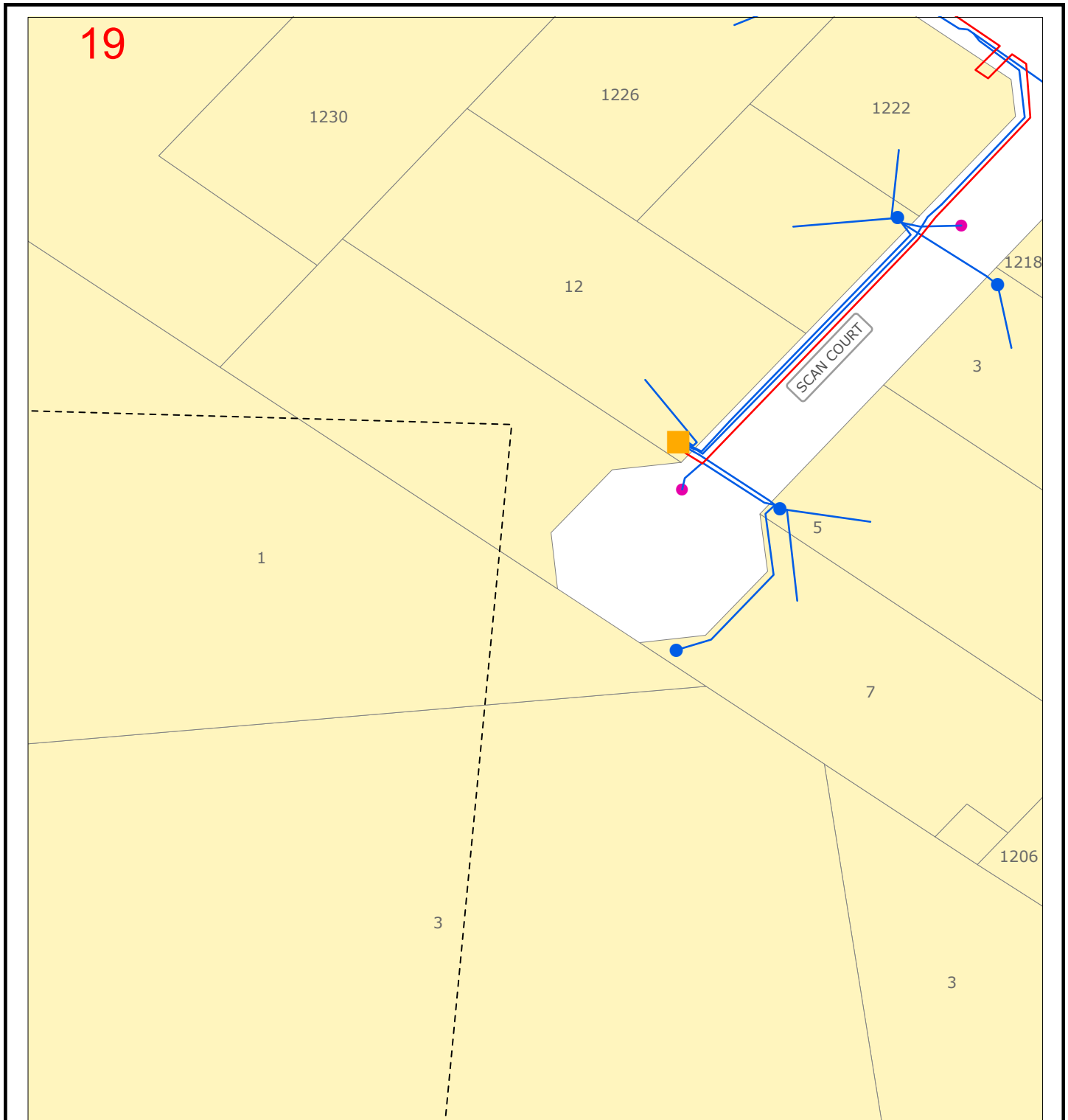
**LEGEND:**

Cable Exits		Cables					
	66kV/132kV		66kV/132kV		DBYD Requested Area		Fibre Optic Cable/Duct
	33kV		33kV		HV Switching Cubicle		Fibre Manhole/Pit
	19kV		19kV		Transformer Cubicle		Pilot Cable
	11kV		11kV		Cable Joint Bay		Pilot Manhole/Pit
	7.6kV		7.6kV		LV Switching Cubicle/Pit		Substation
	Not In Service		Not In Service		Service Pit/Pillar		Electricity Pole
	Low Voltage		Low Voltage		Earthing Grid		Light Column



A horizontal line segment with a bracket above it. Below the left end is the number 0, and below the right end is the number 0.009km.





Note: The presence of lighting columns and cable exits may indicate unidentified additional cables.

### LEGEND:

#### Cable Exits

- ▼ 66kV/132kV
- ▼ 33kV
- ▼ 19kV
- ▼ 11kV
- ▼ 7.6kV
- ▼ Not In Service
- ▼ Low Voltage

#### Cables

- 66kV/132kV
- 33kV
- 19kV
- 11kV
- 7.6kV
- Not In Service
- Low Voltage

DBYD Requested Area

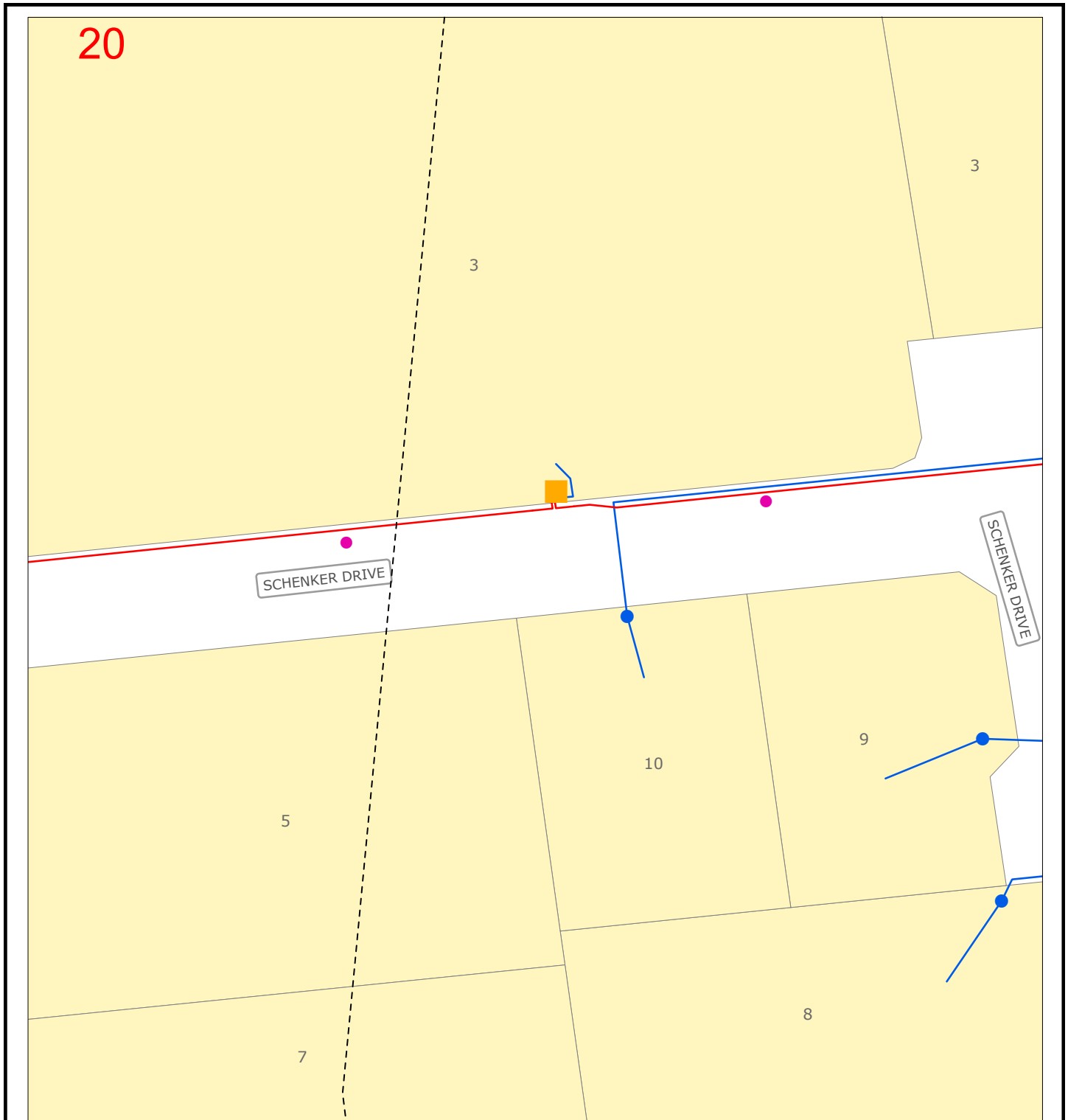
- HV Switching Cubicle
- Transformer Cubicle
- Cable Joint Bay
- LV Switching Cubicle/Pit
- Service Pit/Pillar
- ⊗ Earthing Grid

Fibre Optic Cable/Duct

- Fibre Manhole/Pit
- Pilot Cable
- Pilot Manhole/Pit
- Substation
- Electricity Pole
- Light Column



0 0.009km



Note: The presence of lighting columns and cable exits may indicate unidentified additional cables.

### LEGEND:

#### Cable Exits

- 66kV/132kV
- 33kV
- 19kV
- 11kV
- 7.6kV
- Not In Service
- Low Voltage

#### Cables

- 66kV/132kV
- 33kV
- 19kV
- 11kV
- 7.6kV
- Not In Service
- Low Voltage

DBYD Requested Area

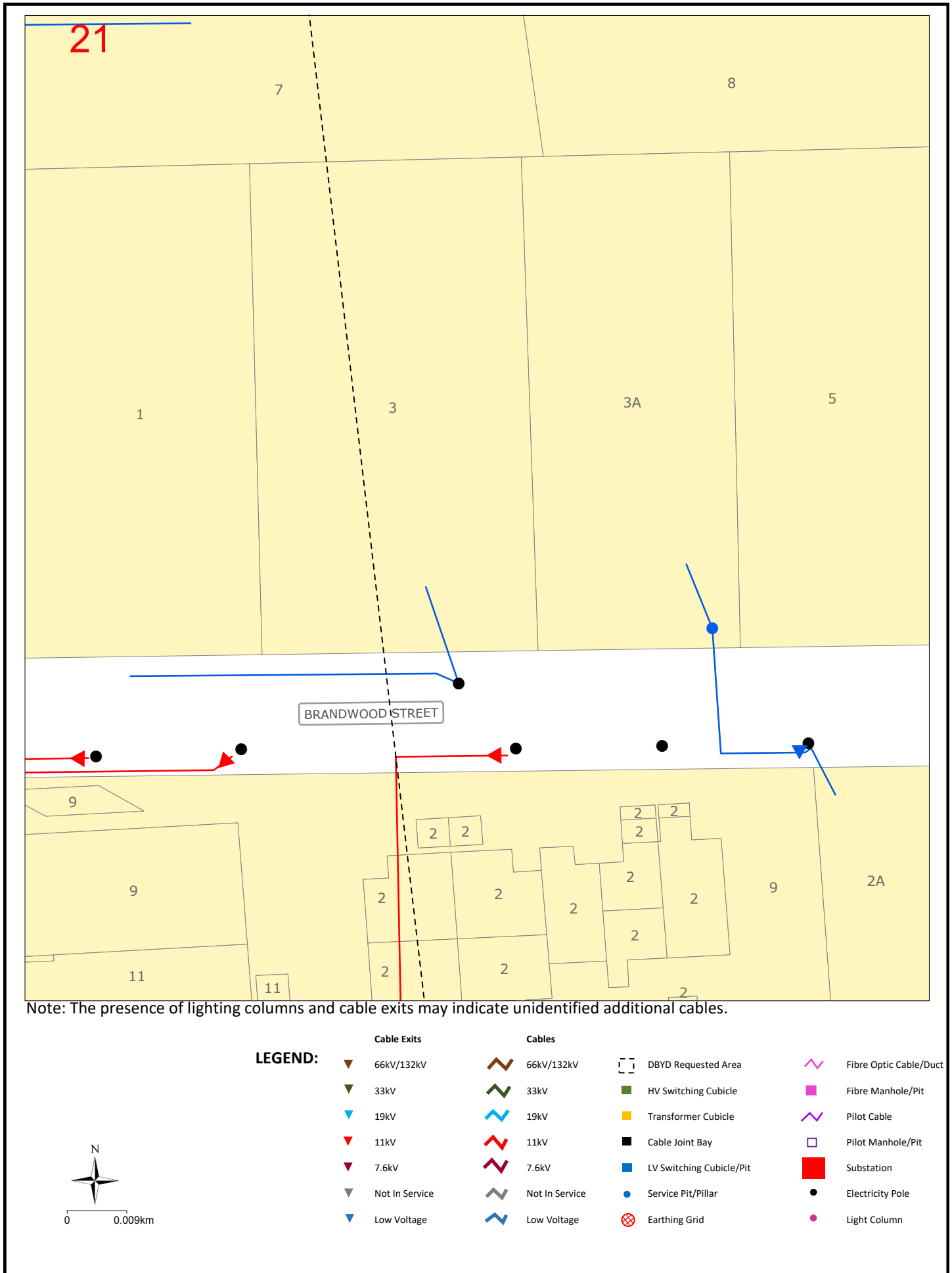
- HV Switching Cubicle
- Transformer Cubicle
- Cable Joint Bay
- LV Switching Cubicle/Pit
- Service Pit/Pillar
- Earthing Grid

Fibre Optic Cable/Duct

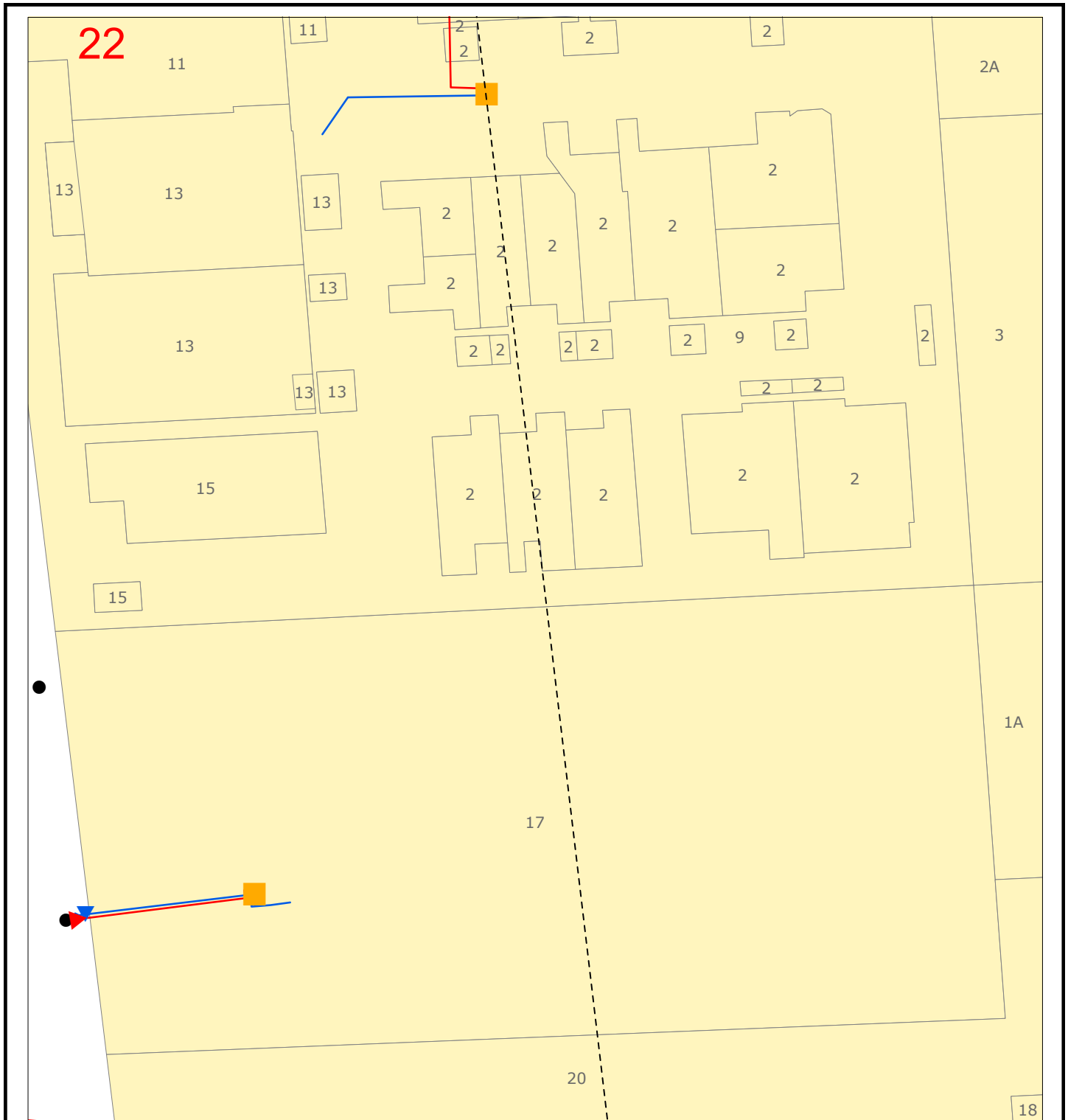
- Fibre Manhole/Pit
- Pilot Cable
- Pilot Manhole/Pit
- Substation
- Electricity Pole
- Light Column



0 0.009km



































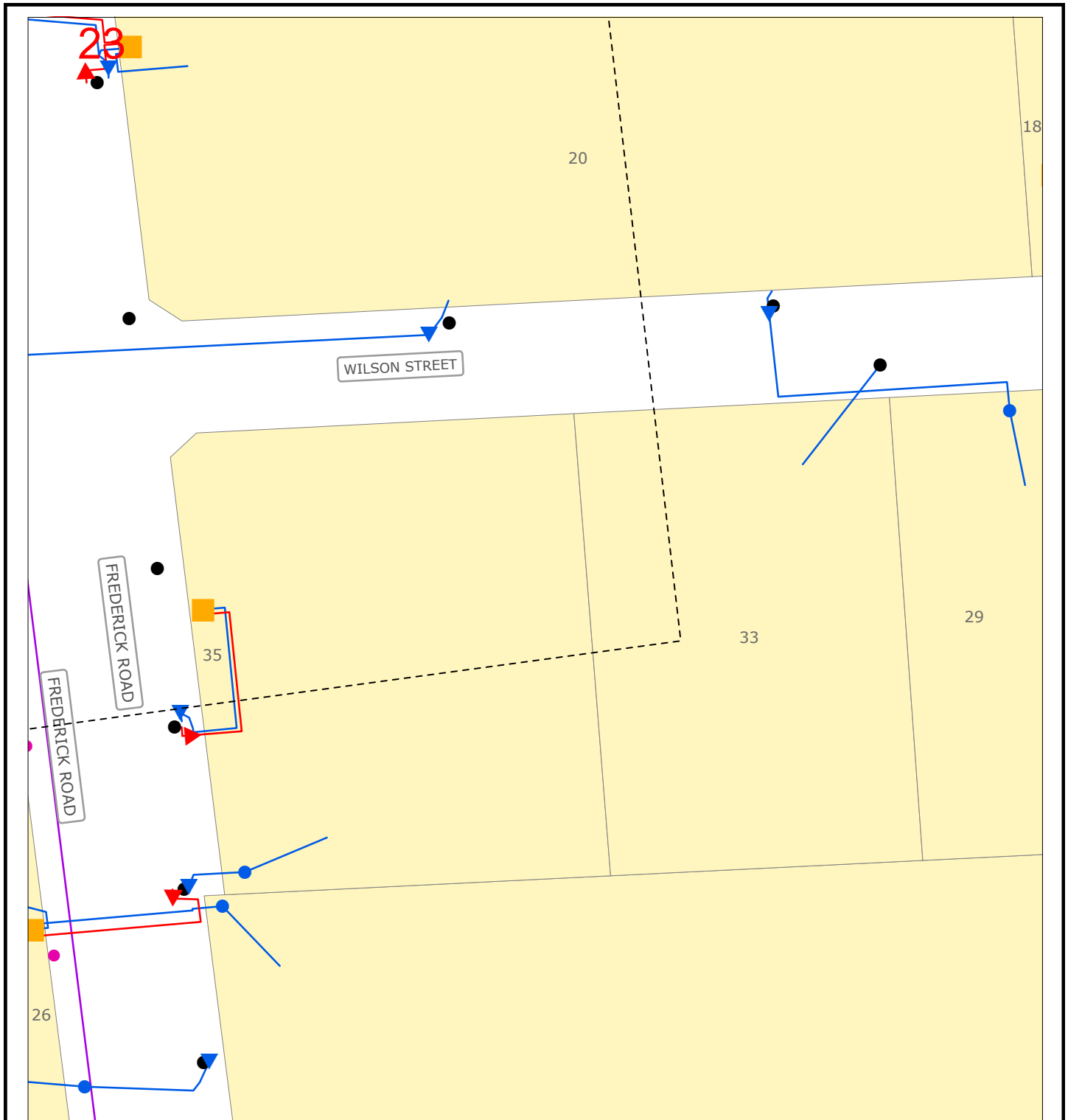
Note: The presence of lighting columns and cable exits may indicate unidentified additional cables.

**LEGEND:**

Cable Exits		Cables					
	66kV/132kV		66kV/132kV		DBYD Requested Area		Fibre Optic Cable/Duct
	33kV		33kV		HV Switching Cubicle		Fibre Manhole/Pit
	19kV		19kV		Transformer Cubicle		Pilot Cable
	11kV		11kV		Cable Joint Bay		Pilot Manhole/Pit
	7.6kV		7.6kV		LV Switching Cubicle/Pit		Substation
	Not In Service		Not In Service		Service Pit/Pillar		Electricity Pole
	Low Voltage		Low Voltage		Earthing Grid		Light Column



A horizontal line segment with a bracket above it. Below the left end is the number 0, and below the right end is the number 0.009km.



Note: The presence of lighting columns and cable exits may indicate unidentified additional cables.

**LEGEND:****Cable Exits**

- ▼ 66kV/132kV
- ▼ 33kV
- ▼ 19kV
- ▼ 11kV
- ▼ 7.6kV
- ▼ Not In Service
- ▼ Low Voltage

**Cables**

- 66kV/132kV
- 33kV
- 19kV
- 11kV
- 7.6kV
- Not In Service
- Low Voltage

--- DBYD Requested Area

- HV Switching Cubicle
- Transformer Cubicle
- Cable Joint Bay
- LV Switching Cubicle/Pit
- Service Pit/Pillar
- ⊗ Earthing Grid

~ Fibre Optic Cable/Duct

- Fibre Manhole/Pit
- ~ Pilot Cable
- Pilot Manhole/Pit
- Substation
- Electricity Pole
- Light Column



0 0.009km



## **Appendix G**

Stormwater Meeting Minutes and DBYD



# Meeting minutes

Date: 5.4.2022

Time: 1330

Location: Online - Teams

Meeting number: 01

Project: Novo West Lakes / Potentia

## Attendees:

NAME	COMPANY	INITIALS
Dan De Conno	Potentia	DDC
Jeff Zanker	FMG	JZ
Jordan Colbert	FMG	JTC
James Cursaro	City of Charles Sturt (CCS)	JC
Ryan Nelson	City of Charles Sturt (CCS)	RN

ITEM	DESCRIPTION	ACTION	DUE
<b>1.0</b>	<b>DISCHARGE</b>		
<b>1.1</b>	Preference for discharge is direct to West Lakes to avoid placing additional load on surrounding drains.		
<b>1.2</b>	CCS noted direct discharge to West Lakes would likely not require restriction of peak flows from the development. <b>CCS to confirm no restriction on peak flow / volume discharged directly into West Lakes</b>	<b>JC / RN (CCS)</b>	19.4.2022
<b>1.3</b>	Note: Some areas of the development which face Lochside Drive and Frederick Road may be practical to connect into the existing drainage networks within these roads. <b>CCS to confirm post development 1% AEP to be restricted to 0.2EY pre-development peak flows for discharge to Frederick / Lochside Drive.</b> Of particular interest, some ~300-600m <sup>2</sup> allotments have frontage to Lochside drive, we would request some dispensation be made on these allotments, i.e. a roof water detention tank is required, but 1% back to 0.2EY pre-development may not be feasible due to gap flow.	<b>JC / RN (CCS)</b>	19.4.2022
<b>1.4</b>	Key aspect to feasibility of stormwater drainage to the lake will be receiving tailwater levels within West Lakes. Lake levels are impacted by tides, and likely future climate changes. <b>CCS to provide predicted lake level (mAHD) as a basis for design</b>	<b>JC / RN (CCS)</b>	19.4.2022
<b>1.5</b>	An existing mass concrete stepped bank is present along the lakeside frontage / boundary. This is owned and operated by DIT who have historically been reasonably hesitant in the past to modify. May require stormwater outlet to be diverted through Council's reserve to the north and outletted to West Lakes via headwall at the beach adjacent. <b>RN to provide contact details for DIT representative (Leon Mase?)</b>	<b>RN</b>	19.4.2022

1.6	Targeting OL/s discharge from site for very frequent storms (refer 2.0 below)		
2.0	<b>WATER QUALITY</b>		
2.1	All parties keen to retain the majority of runoff generated from Very Frequent storms (i.e. all storms less than the 1EY or <i>greater aspiration</i> ) on site through various WSUD elements, i.e. tree inlet pits, permeable pavements, raingardens. <b>DDC to provide reference from discussions with SA Water on preferred WSUD elements</b>	DDC	19.4.2022
2.2	Achievement of the above should inherently result in water quality targets being met. Water quality is of high importance for the endorsement of this plan to Council		
2.3	Council would prefer to mitigate the need for proprietary water treatment systems (i.e. GPT).		
3.0	<b>OTHER</b>		
3.1	Note: Perched watertable believed to be present in the area (anecdotal from Council's works along the lakeside)		
3.2	Discussion on shallow groundwater; Desirable to manage site levels to keep SWD infrastructure out of saline groundwater, however CCS understand this may not be achievable in all locations and open to granting dispensation on this item if required.		
3.3	Note: recycled water is available in the area, but is owned and operated by Council. <b>Is there any information CCS can provide on recycled water requirements for this project?</b>		
3.4			

**Meeting closed: 1430**

**Next meeting: TBC**

**FMG Engineering**

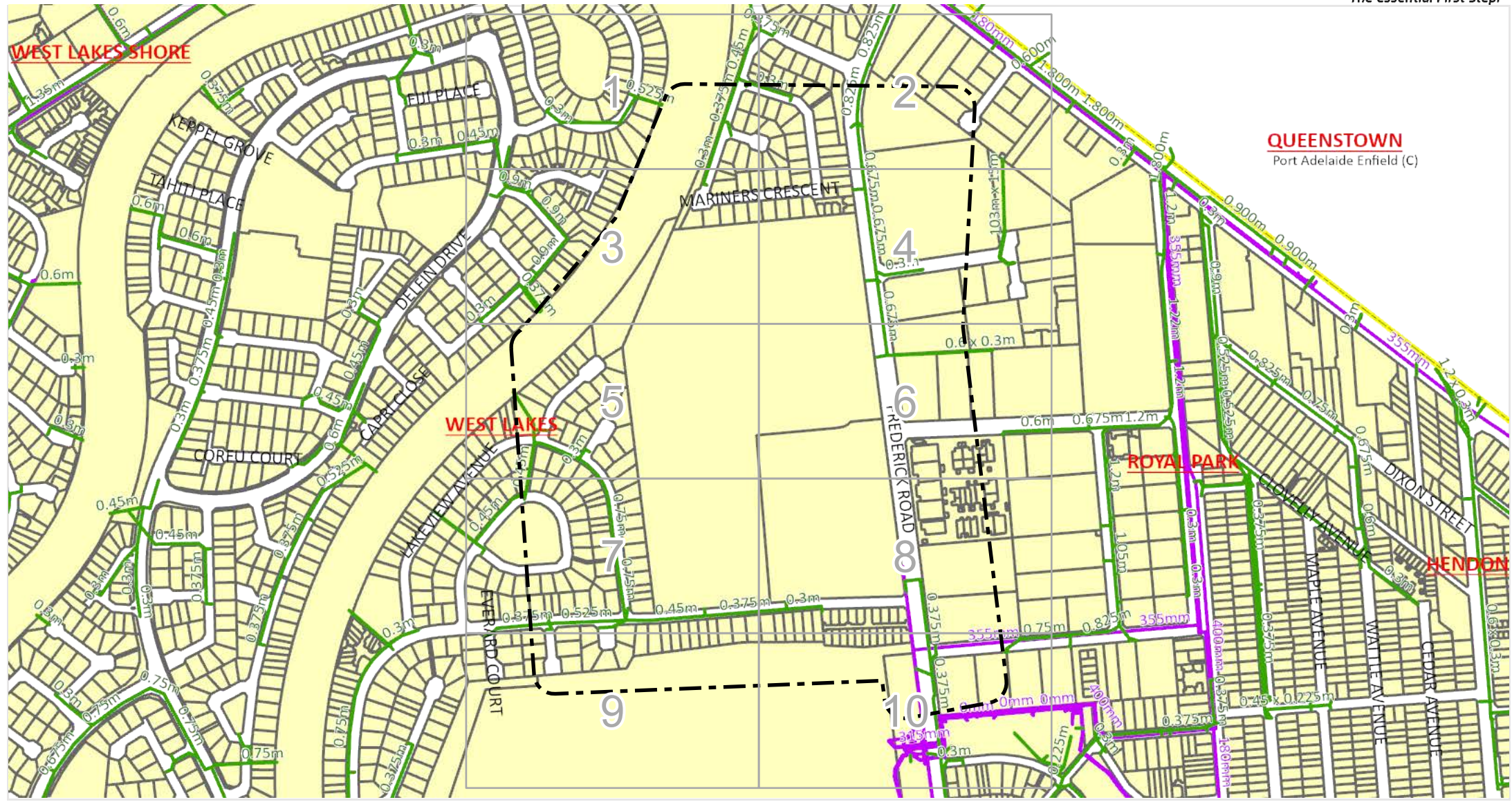
ABN 58 083 071 185

**FMG Research**


ABN 58 083 071 185

[fmgengineering.com.au](http://fmgengineering.com.au)





Legend | Scale: 1:7687 | Overview



SCAS\_62593\_001  
Gross Pollutant Trap

DBYD Enquiry Area

Stormwater Pits

Unconfirmed Pits

Stormwater Drains

Valve

Water Meter

RW Supply Main

RW Supply Connection

Communications & Electrical

Cadastre

Council Boundary

State Council Boundaries

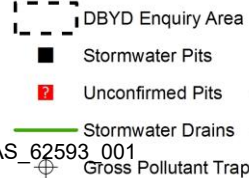
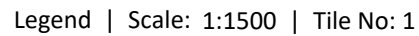


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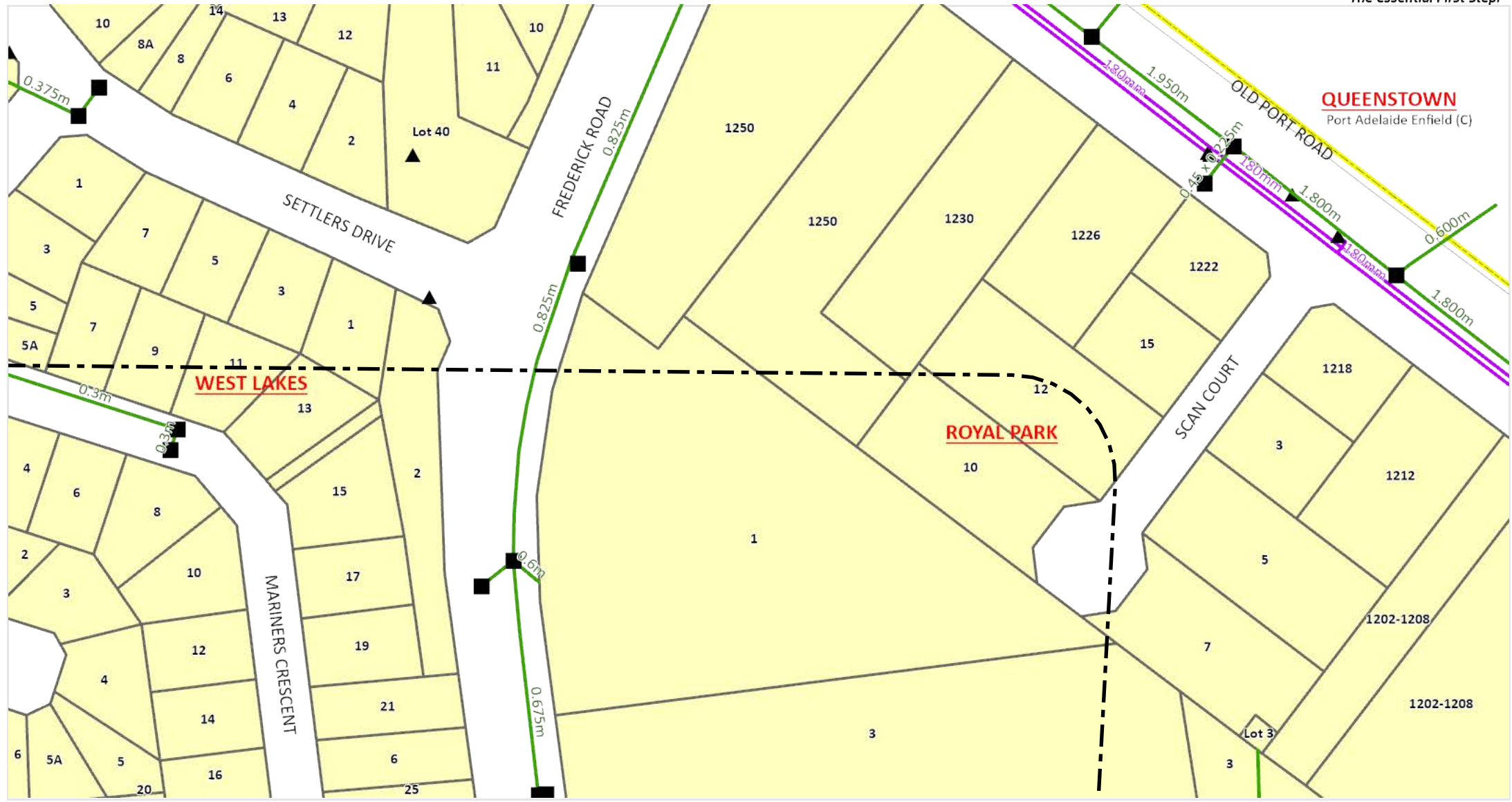


-  Communications & Electrical  
 Cadastre  
 Council Boundary  
 State Council Boundaries



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Sequence No: 209101394  
Job No: 31558262  
Location: 16 Frederick Road, West Lakes, SA 5021



Legend | Scale: 1:1500 | Tile No: 2

SCAS\_62593\_001  
Gross Pollutant Trap

DBYD Enquiry Area

Stormwater Pits

Unconfirmed Pits

Stormwater Drains

Valve

Water Meter

RW Supply Main

RW Supply Connection

Communications & Electrical

Cadastre

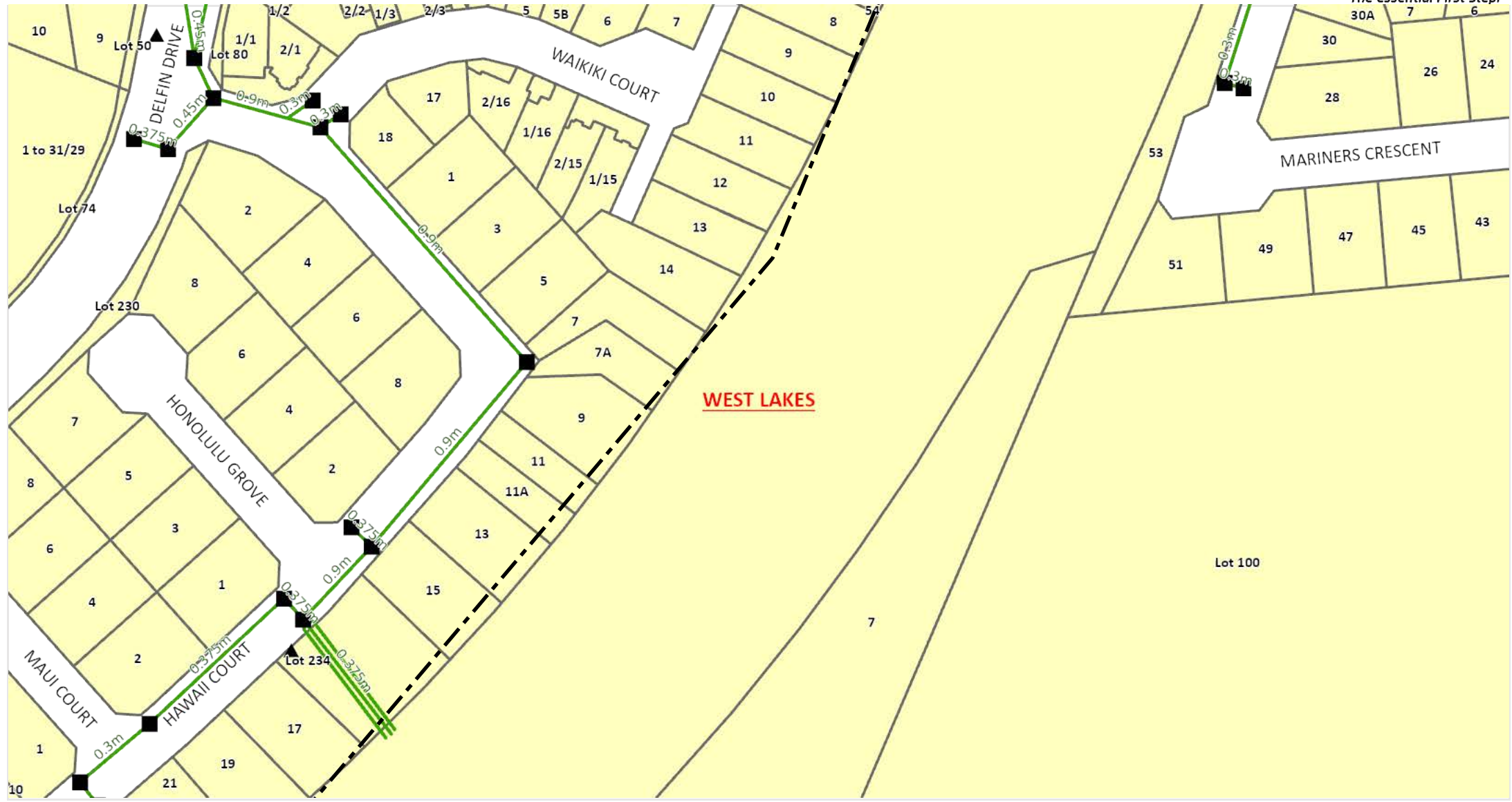
Council Boundary

State Council Boundaries




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Legend | Scale: 1:1500 | Tile No: 3



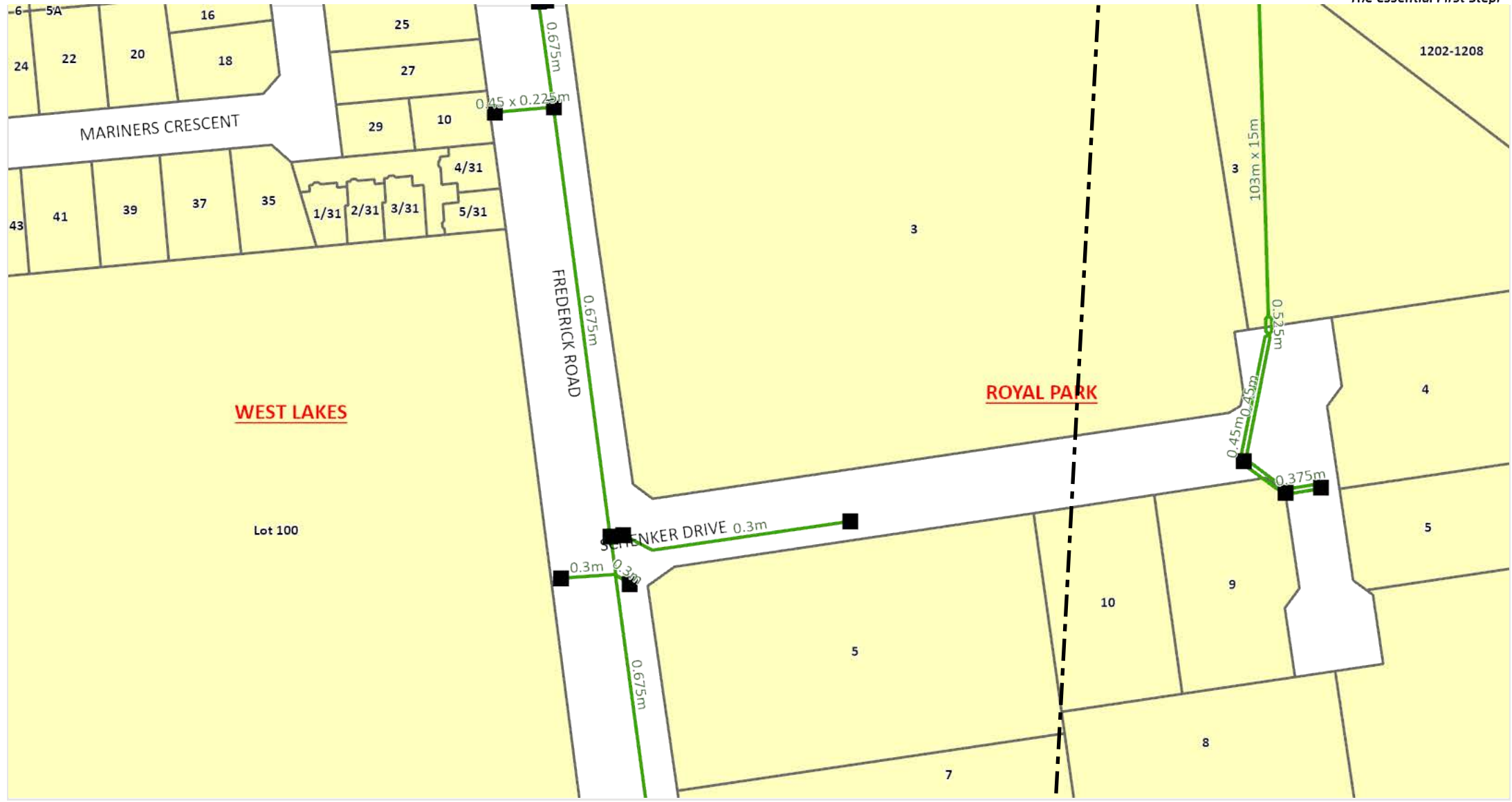
SCAS\_62593\_001  
Gross Pollutant Trap

DBYD Enquiry Area	Valve	Communications & Electrical
Stormwater Pits	Water Meter	Cadastre
Unconfirmed Pits	RW Supply Main	Council Boundary
Stormwater Drains	RW Supply Connection	State Council Boundaries




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Legend | Scale: 1:1500 | Tile No: 4

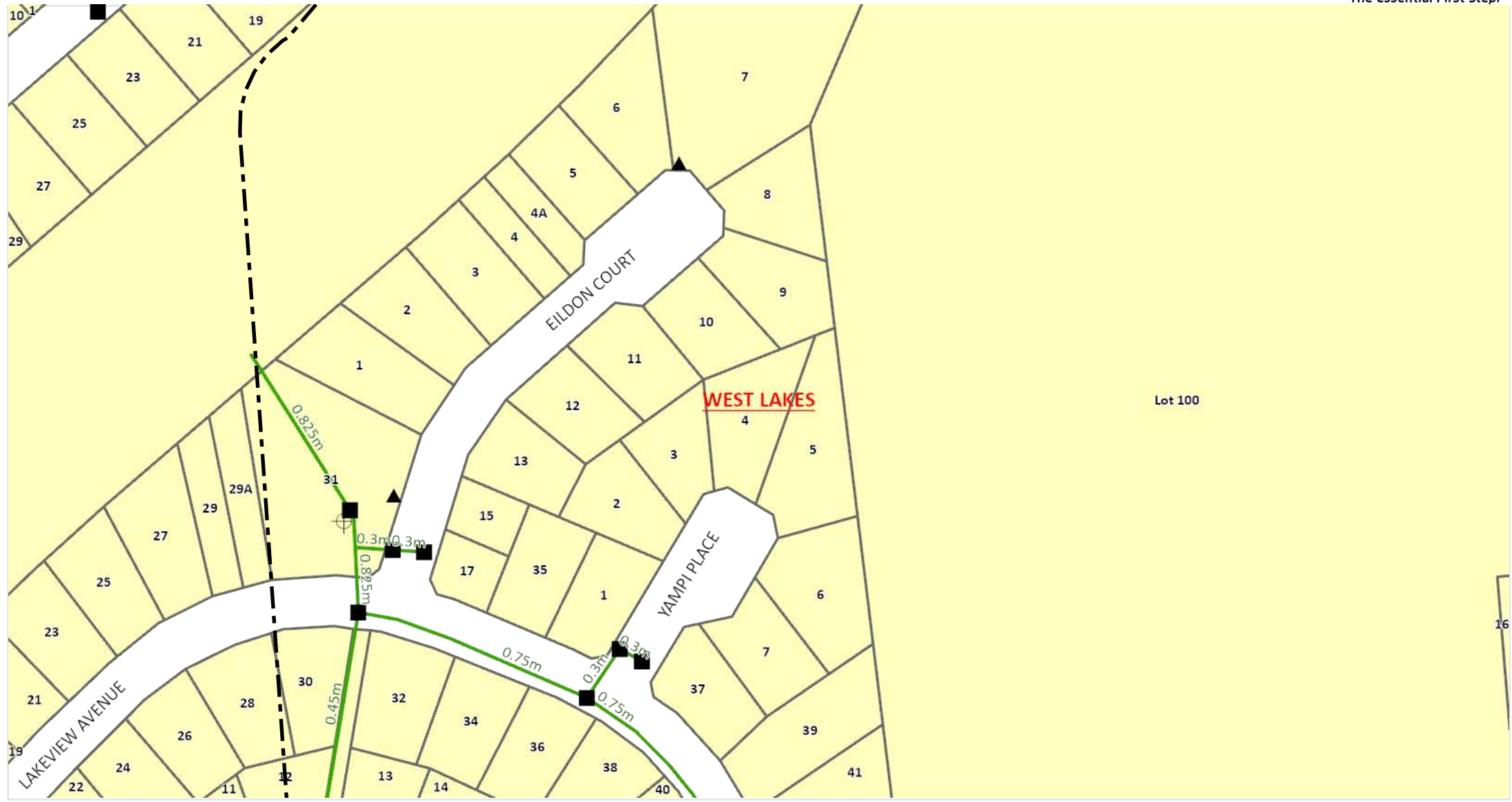


SCAS\_62593\_001  
Gross Pollutant Trap


	DBYD Enquiry Area		Valve		Communications & Electrical
	Stormwater Pits		Water Meter		Cadastre
	Unconfirmed Pits		RW Supply Main		Council Boundary
	Stormwater Drains		RW Supply Connection		State Council Boundaries















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Legend | Scale: 1:1500 | Tile No: 5



SCAS\_62593\_001  
Gross Pollutant Trap


 DBYD Enquiry Area	 Valve	 Communications & Electrical
 Stormwater Pits	 Water Meter	 Cadastre
 Unconfirmed Pits	 RW Supply Main	 Council Boundary
 Stormwater Drains	 RW Supply Connection	 State Council Boundaries



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Legend | Scale: 1:1500 | Tile No: 6



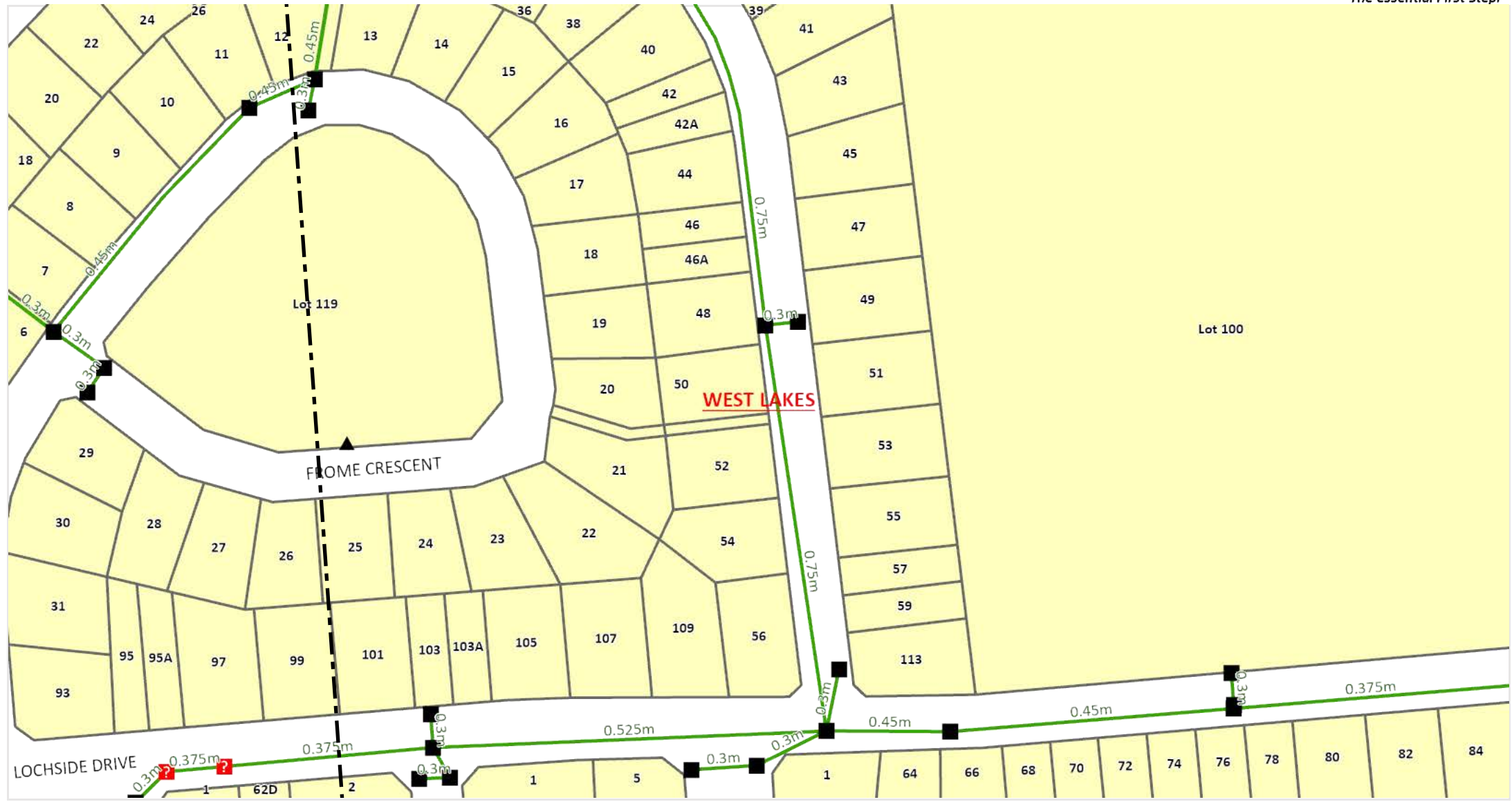
SCAS\_62593\_001  
 Gross Pollutant Trap

DBYD Enquiry Area	Valve	Communications & Electrical
Stormwater Pits	Water Meter	Cadastre
Unconfirmed Pits	RW Supply Main	Council Boundary
Stormwater Drains	RW Supply Connection	State Council Boundaries




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Legend | Scale: 1:1500 | Tile No: 7



SCAS\_62593\_001  
Gross Pollutant Trap

DBYD Enquiry Area

Stormwater Pits

Unconfirmed Pits

Stormwater Drains

Valve

Water Meter

RW Supply Main

RW Supply Connection

Communications & Electrical

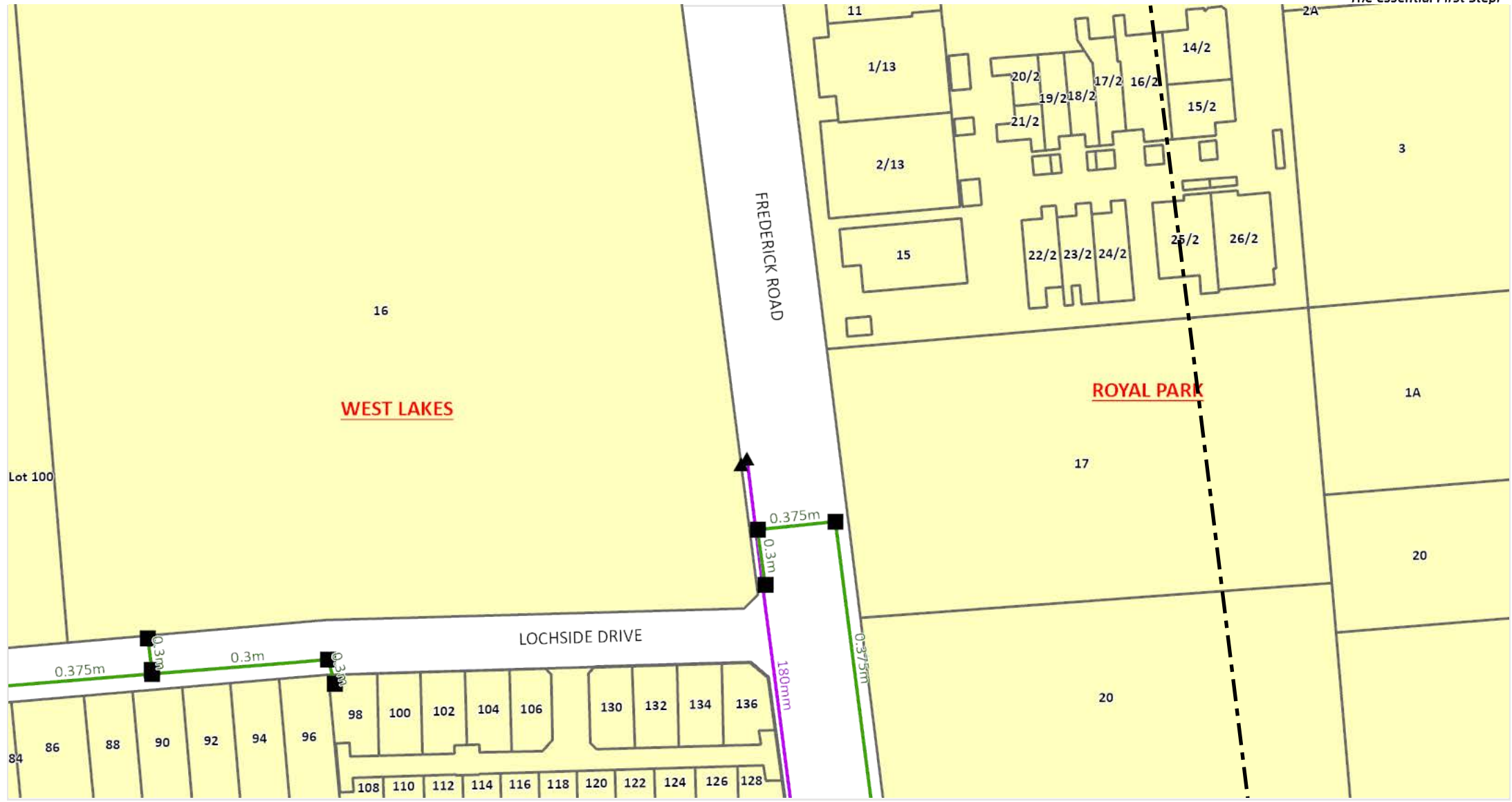
Cadastre

Council Boundary


State Council Boundaries



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Legend | Scale: 1:1500 | Tile No: 8



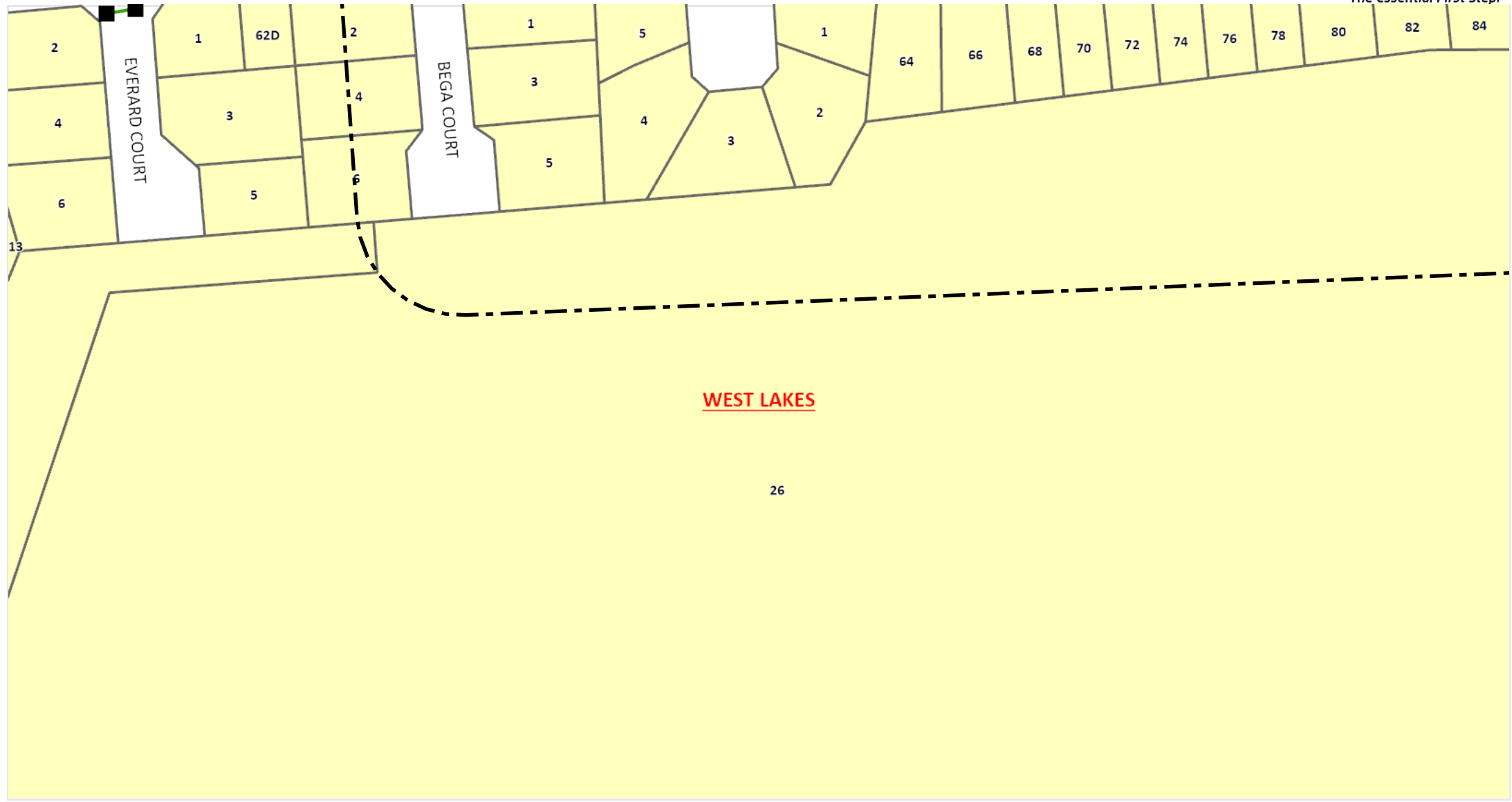
DBYD Enquiry Area	Valve	Communications & Electrical
Stormwater Pits	Water Meter	Cadastre
Unconfirmed Pits	RW Supply Main	Council Boundary
Stormwater Drains	RW Supply Connection	State Council Boundaries

SCAS\_62593\_001


Gross Pollutant Trap




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Legend | Scale: 1:1500 | Tile No: 9

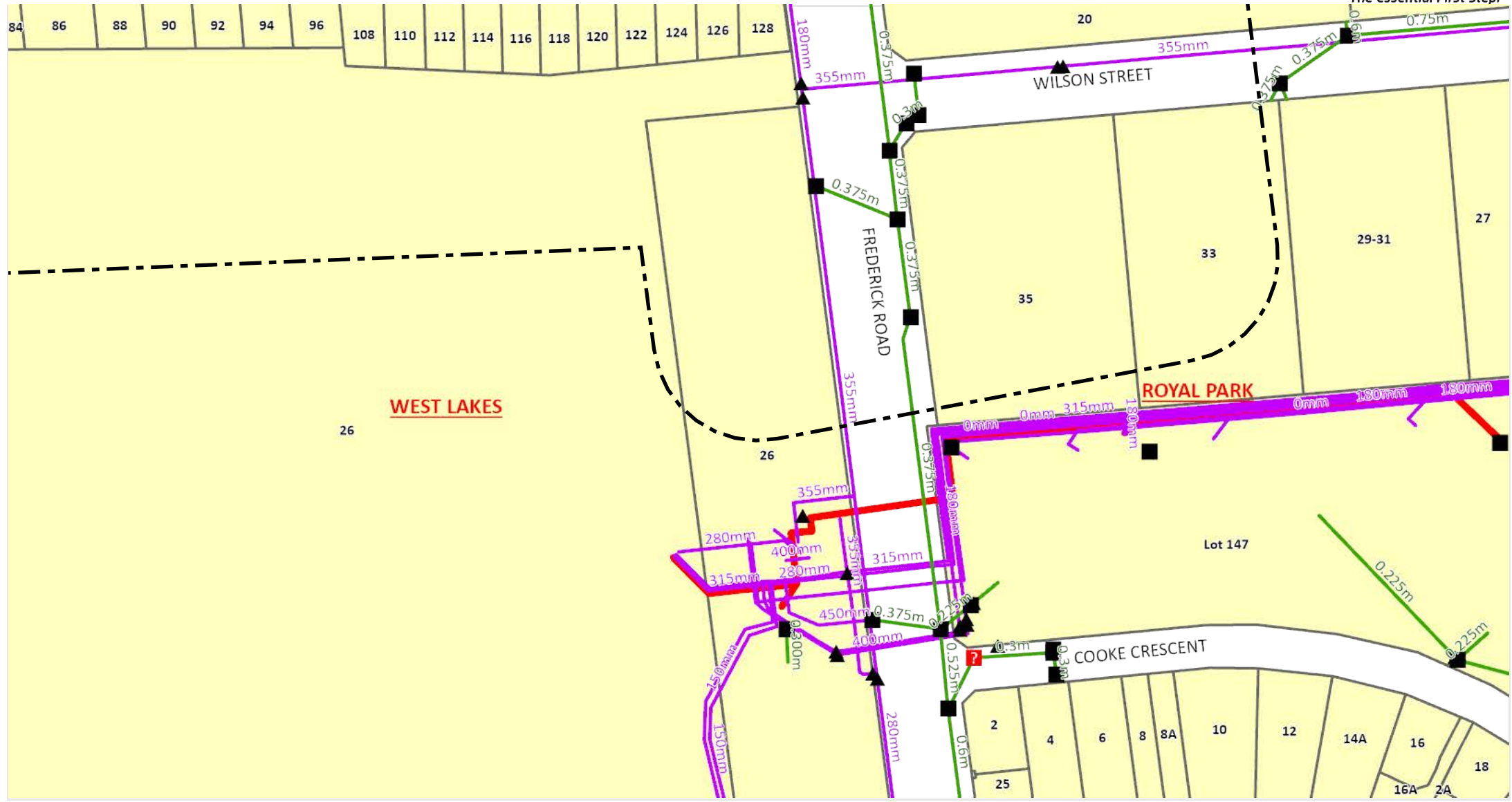


DBYD Enquiry Area	Valve	Communications & Electrical
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Legend | Scale: 1:1500 | Tile No: 10



SCAS\_62593\_001

DBYD Enquiry Area

Stormwater Pits

Unconfirmed Pits

Stormwater Drains

Gross Pollutant Trap

Valve

Water Meter

RW Supply Main

RW Supply Connection

Communications & Electrical

Cadastre

Council Boundary

State Council Boundaries



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## **16 Frederick Road West Lakes**

### **Environmental Noise Assessment**

A220135RP1 Revision C

Friday, 15 July 2022

## Document Information

<b>Project</b>	16 Frederick Road West Lakes
<b>Client</b>	Potentia Environment
<b>Report title</b>	Environmental Noise Assessment
<b>Project Number</b>	A220135

## Revision Table

<b>Report revision</b>	<b>Date</b>	<b>Description</b>	<b>Author</b>	<b>Reviewer</b>
0	19 April 2022	First Issue	James Tudor Tsourtos	Nick Henrys
A	6 May 2022	Response to comments	James Tudor Tsourtos	Nick Henrys
B	14 June 2022	Response to City of Charles Sturt comments	James Tudor Tsourtos	Nick Henrys
C	15 July 2022	Updated for new concept plan	James Tudor Tsourtos	Nick Henrys

## Glossary

A-weighting	A spectrum adaption that is applied to measured noise levels to represent human hearing. A-weighted levels are used as human hearing does not respond equally at all frequencies.
Characteristic	Associated with a noise source, means a tonal, impulsive, low frequency or modulating characteristic of the noise that is determined in accordance with the Guidelines for the use of the Environment Protection (Noise) Policy (Noise EPP) to be fundamental to the nature and impact of the noise.
Continuous noise level	A-weighted noise level of a continuous steady sound that, for the period over which the measurement is taken using fast time weighting, has the same mean square sound pressure as the noise level which varies over time when measured in relation to a noise source and noise-affected premises in accordance with the Noise EPP
Day	Between 7 am and 10 pm as defined in the Noise EPP
dB	Decibel—a unit of measurement used to express sound level. It is based on a logarithmic scale which means a sound that is 3 dB higher has twice as much energy. We typically perceive a 10 dB increase in sound as a doubling of loudness.
dB(A)	Units of the A-weighted sound level.
Frequency (Hz)	The number of times a vibrating object oscillates (moves back and forth) in one second. Fast movements produce high frequency sound (high pitch/tone), but slow movements mean the frequency (pitch/tone) is low. 1 Hz is equal to 1 cycle per second.
Indicative noise level	Indicative noise level determined under clause 5 of the Noise EPP.
L <sub>90</sub>	Noise level exceeded for 90 % of the measurement time. The L <sub>90</sub> level is commonly referred to as the background noise level.
L <sub>eq</sub>	Equivalent Noise Level—Energy averaged noise level over the measurement time.
L <sub>max</sub>	The maximum instantaneous noise level.
Night	Between 10.00 p.m. on one day and 7.00 a.m. on the following day as defined in the Noise EPP
Noise source	Premises or a place at which an activity is undertaken, or a machine or device is operated, resulting in the emission of noise
Quiet locality	A locality is a quiet locality if the Planning & Design Code provisions that make land use rules for the locality principally promote land uses that all fall within either or both of the following land use categories: (a) Residential; (b) Rural Living;



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## 1 Introduction

Resonate have been engaged by Potentia West Lakes Pty Ltd (Potentia) to complete a noise assessment for the land located at 16 Frederick Road, West Lakes, SA (Lot 100 and Lot 101). This report is intended to support a Planning & Design Code Amendment for the Affected Area.

The noise assessment is for the rezoning of the Affected Area to ensure compliance with the relevant requirements in light of the Affected Area's proximity to a State Maintained Road and the relationship between likely future retail activity and future residential use. The Affected Area is currently within an Infrastructure zone in the Planning & Design Code. This assessment investigates potential noise considerations associated with the rezoning including:

- Noise requirements arising from the Environmental Protection (Noise) Policy and the Planning & Design Code.
- The control of traffic noise to proposed noise sensitive land uses in accordance with Ministerial Building Standard MBS 010

## 2 Proposed development

### 2.1 Location

Figure 1 shows the location of the Affected Area of the Code Amendment. The Area is currently zoned as infrastructure. The noise logging location is also shown.



Figure 1 Affected Area, surrounding land uses and noise monitoring location

### 2.2 Proposed land use

A concept plan for the Area is shown in Appendix A. The concept plan includes:

- Mix of densities across the site with predominantly low to medium density dwellings (low rise – 1-2 storey) adjoining existing Waterfront Neighbourhood Zone.
- Medium rise (3-6 storey) medium density built form internal to the site.
- Mixed land use fronting Frederick Road.
- Reserve 'buffer' around previous Waste Water Treatment plant.

Resonate understand that there is a 20m easement adjacent to Frederick Road where development is not likely to occur. The noise monitoring position was located on this 20m easement. The nearest existing neighbouring noise source is the Port Adelaide Relift Pumping Station on Frederick Road (located on Lot 101).



## 3 Existing Environment

Noise measurements were taken to quantify the existing environment for the assessment of potential future noise impacts.

### 3.1 Details

Noise logging was undertaken at the location shown in Figure 1, between Thursday 24 March – Thursday 31 March, 2022.

### 3.2 Instrumentation

The noise measurements were taken with a calibrated Rion NL-42 sound level meter, which is a Type 1 instrument suitable for field and laboratory use. The sound level meter was calibrated both before and after the measurements using a Type 1 Brüel & Kjær 4231 sound level calibrator, and the calibration was found to have not drifted. Both the sound level meter and calibrator carry current calibration certificates from a NATA accredited laboratory. Copies of the calibration certificates are available on request.

### 3.3 Procedure

Noise measurements were undertaken in accordance with the following:

- The microphone of the sound level meter was at a height of approximately 1.2 metres above the ground and at least 3.5 metres away from any wall or facade.
- A wind shield was used during all measurements.
- Care was taken to avoid any effect on the measurement of extraneous noise.
- Noise measurements were undertaken for a period of 15 minutes.

BOM weather data from Adelaide Airport was assessed for wind and rain. Wind events > 5 m/s and rain events > 0.2 mm are excluded.

### 3.4 Results

The average results of the noise monitoring period are shown in Table 1. Plots showing all results for each day of the monitoring period are presented in Appendix B.

**Table 1 Average noise monitoring results for the period 24/03/22-31/03/22**

Period	$L_{eq,9hr}$ dB(A)
Day (7:00am – 10:00pm)	57
Night (10:00pm – 7:00am)	50

During the deployment and collection of the noise logger, the attending Resonate Consultant observed that noise at the monitoring location was dominated by road traffic. No other significant noise sources were observed.

### 3.5 Noise modelling

Noise modelling was conducted to predict the impact of Frederick Road traffic on the Affected Area. The noise monitoring location was used to calibrate the traffic noise source in the model. Predictions were completed for the night-time period only (10:00pm – 7:00am) to assess the suitability of MBS 010 requirements (for which only night-time criteria is relevant).

## 3.5.1 Modelling parameters

Noise emissions from site have been modelled in SoundPLAN Environmental Software v8.2 program, using ISO-9613-2:1996 standard for outdoor noise propagation. The model takes into consideration:

- air absorption
- ground effects
- downwind conditions, or, equivalently, propagation under a well-developed moderate ground-based temperature inversion, such as commonly occurs at night.

## 3.5.2 Predicted noise levels

A summary of the predicted noise levels for the night-time period for the Affected Area based on road traffic are shown in Appendix C. Note that the maximum predicted noise level at the 20m easement is  $L_{eq,9hr}$  50 dB(A), which is the calibrated level based on the noise monitoring.

## 3.6 Port Adelaide Relift Pump Station

Resonate Consultants were previously engaged to conduct attended noise measurements of the Port Adelaide Relift Pump Station (PARPS) within Lot 101 on the night of the 26 November 2018. Figure 2 shows the measurement locations and Table 2 shows the results of the measurements.



Figure 2 Measurement locations 26 November 2018, 11:00pm – 12:00am

**Table 2 Measurement results 26 November 2018, 11:00pm – 12:00am**

Measurement location	Measured noise level, dB(A)		
	L <sub>eq</sub>	L <sub>min</sub>	L <sub>max</sub>
A1	61	59	62
A2	47	46	49
A3	45	44	51
A4	36	34	45
A5	37	34	52
A6	41	39	48
A7	36	30	43

Noise measurements and noise modelling demonstrated that noise levels from the PARPS site do not exceed 40 dB(A) at the fence line of the PARPS site. PARPS operations have not expanded since 2018 to our knowledge.



## 4 Noise criteria

### 4.1 Planning & Design Code

#### 4.1.1 Zoning

The Code Amendment intends to replace the existing Infrastructure Zone with the Urban Renewal Neighbourhood Zone, Urban Neighbourhood zone or similar neighbourhood type zone, with ongoing investigations being undertaken to determine the most appropriate zoning. The adjacent land zones are Waterfront Neighbourhood; and Strategic Employment. The relevant Desired Outcomes for each zone is outlined in is outlined in Table 3, including for the existing use of the Affected Area, which is an Infrastructure zone.

**Table 3 Relevant Desired Outcomes**

Zone	Desired Outcome(s)	
Urban Renewal Neighbourhood	DO1	Housing and other land uses which no longer meet community preferences are replaced with new diverse housing options. Housing density increases, taking advantage of well-located urban land. Employment and community services will improve access to jobs, goods and services without compromising residential amenity.
Urban Neighbourhood	DO1	A mixed use area that: <ul style="list-style-type: none"> <li>a) provides a flexible policy framework for the redevelopment of urban areas in close proximity to high frequency public transport corridors or adjacent primary road corridors that have the potential to become activity generators</li> <li>b) provides for the high-quality design and integration of buildings and public realm in mixed use areas with walkable urban form, excellent provision for walking and cycling and active street frontages that encourage social interaction, positively contribute to public safety and vibrancy and promote active movement and public transport use</li> <li>c) provides a concentration of mixed use activity close to community focal points, such as a high frequency fixed transit stop, activity centre or high quality open space</li> <li>d) provides adaptable and flexible buildings that can accommodate changes in land use and respond to changing economic and social conditions and advances in technology</li> <li>e) transitions to a reduced scale and intensity at the zone boundary to maintain the amenity of residential properties located within adjoining zones.</li> </ul>
Waterfront Neighbourhood	DO1	A diverse range of housing which takes advantage of waterfront locations. Development enhances public access to waterfront areas. Dual aspect allotments incorporate designs to enhance the streetscape.
Infrastructure	DO1	The protection, provision, maintenance and expansion of infrastructure services and facilities that support orderly development and vehicular movements.
	DO2	Infrastructure services and facilities manage environmental impacts.
Strategic Employment	DO1	A range of industrial, logistical, warehousing, storage, research and training land uses together with compatible business activities generating wealth and employment for the state.

## 4.2 Interface between land uses

Interface between Land Uses is a General Development Policy that is relevant to the subject site. The relevant Assessment Provisions relating to noise are outlined in Table 4.

**Table 4 Relevant Assessment Provisions—Activities generating noise or vibration**

Relevant Assessment Provisions	
Desired Outcome	
DO1	Development is located and designed to mitigate adverse effects on or from neighbouring and proximate land uses.
Performance Outcome	Deemed-to-Satisfy Criteria / Designated Performance Feature
PO 1.1 Sensitive receivers are designed and sited to protect residents and occupants from adverse impacts generated by lawfully existing land uses (or lawfully approved land uses) and land uses desired in the zone.	DTS/DPF 1.1 None are applicable.
PO 1.2 Development adjacent to a site containing a sensitive receiver (or lawfully approved sensitive receiver) or zone primarily intended to accommodate sensitive receivers is designed to minimise adverse impacts.	DTS/DPF 1.2 None are applicable.
PO 4.1 Development that emits noise (other than music) does not unreasonably impact the amenity of sensitive receivers (or lawfully approved sensitive receivers).	DTS/DPF 4.1 Noise that affects sensitive receivers achieves the relevant Environment Protection (Noise) Policy criteria.

Relevant Assessment Provisions	
<p>PO 4.2</p> <p>Areas for the on-site manoeuvring of service and delivery vehicles, plant and equipment, outdoor work spaces (and the like) are designed and sited to not unreasonably impact the amenity of adjacent sensitive receivers (or lawfully approved sensitive receivers) and zones primarily intended to accommodate sensitive receivers due to noise and vibration by adopting techniques including:</p> <ul style="list-style-type: none"> <li>a) locating openings of buildings and associated services away from the interface with the adjacent sensitive receivers and zones primarily intended to accommodate sensitive receivers</li> <li>b) when sited outdoors, locating such areas as far as practicable from adjacent sensitive receivers and zones primarily intended to accommodate sensitive receivers</li> <li>c) housing plant and equipment within an enclosed structure or acoustic enclosure</li> <li>d) providing a suitable acoustic barrier between the plant and / or equipment and the adjacent sensitive receiver boundary or zone.</li> </ul>	<p>DTS/DPF 4.2</p> <p>None are applicable.</p>
<p>PO 4.3</p> <p>Fixed plant and equipment in the form of pumps and/or filtration systems for a swimming pool or spa are positioned and/or housed to not cause unreasonable noise nuisance to adjacent sensitive receivers (or lawfully approved sensitive receivers).</p>	<p>DTS/DPF 4.3</p> <p>The pump and/or filtration system ancillary to dwelling erected on the same site is:</p> <ul style="list-style-type: none"> <li>a) enclosed in a solid acoustic structure located at least 5m from the nearest habitable room located on an adjoining allotment</li> <li>or</li> <li>b) located at least 12m from the nearest habitable room located on an adjoining allotment.</li> </ul>
<p>PO 4.4</p> <p>External noise into bedrooms is minimised by separating or shielding these rooms from service equipment areas and fixed noise sources located on the same or an adjoining allotment.</p>	<p>DTS/DPF 4.4</p> <p>Adjacent land is used for residential purposes.</p>
<p>PO 4.5</p> <p>Outdoor areas associated with licensed premises (such as beer gardens or dining areas) are designed and/or sited to not cause unreasonable noise impact on existing adjacent sensitive receivers (or lawfully approved sensitive receivers).</p>	<p>DTS/DPF 4.5</p> <p>None are applicable.</p>



Relevant Assessment Provisions		
PO 4.6 Development incorporating music achieves suitable acoustic amenity when measured at the boundary of an adjacent sensitive receiver (or lawfully approved sensitive receiver) or zone primarily intended to accommodate sensitive receivers	DTS/DPF 4.6 Development incorporating music includes noise attenuation measures that will achieve the following noise levels:	
	<b>Assessment location</b>	<b>Music noise level</b>
	Externally at the nearest existing or envisaged noise sensitive location	Less than 8dB above the level of background noise ( $L_{90,15min}$ ) in any octave band of the sound spectrum ( $LOCT_{10,15} < LOCT_{90,15} + 8dB$ )

## 4.3 Environmental noise policy

As noted in DTS/DPF 4.1, environmental noise emissions from the subject site should comply with the *Environment Protection (Noise) Policy 2007* (Noise EPP).

The noise goals in the Noise EPP are based on the zoning of the area and the closest noise affected premises. The land uses primarily promoted by the zones are used to determine the environmental noise criteria with the indicative noise factors shown in Table 5 and Table 6. Note that the indicative noise factors in Table 5 are used where the noise source and noise affected premises falls within the same land use category (being only General Industry and Special Industry). In all other cases the indicative noise factors in Table 6 are to be used.

**Table 5 Excerpt from Noise EPP—Table 1(subclause(1)(a))**

Land use category	Indicative noise factor dB(A)	
	Day (7 am to 10 pm)	Night (10 pm to 7 am)
General industry	65	65
Special industry	70	60

**Table 6 Excerpt from Noise EPP—Table 2(subclause(1)(b))**

Land use category	Indicative noise factor dB(A)	
	Day (7 am to 10 pm)	Night (10 pm to 7 am)
Rural living	47	40
Residential	52	45
Rural industry	57	50
Light industry	57	50
Commercial	62	55
General industry	65	55
Special industry	70	60

Based on the likely zoning and the relevant Desired Outcomes for the proposed zones anticipated over the Affected Area and the adjacent receptors, the relevant criteria for new noise sources applicable at neighbouring receptors in each zone are outlined in Table 7 and Table 8. We have excluded receivers in the Infrastructure Zone and Strategic Employment Zone as these are unlikely to contain noise sensitive receivers. In accordance with Part 5 of the Noise EPP, the relevant criteria is the average of the relevant indicative noise factors less 5 dB(A).

**Table 7 Criteria for new noise sources located within in an Urban Neighbourhood or similar mixed-Use zone (commercial and residential land use)**

Site	Zone	Land use(s)	Criteria	
			Day (7 am to 10 pm)	Night (10 pm to 7 am)
Receivers in the Affected Area in a mixed-use zone	TBC	Residential & Commercial	52	45
Receivers in the Affected Area in a residential zone	TBC	Residential	50	43
Receivers in the existing Waterfront Neighbourhood Zone	Waterfront Neighbourhood	Residential	50	43

**Table 8 Criteria for new noise sources located within an Urban Renewal Neighbourhood or similar Neighbourhood-Type Zone (residential land use)**

Site	Zone	Land use(s)	Criteria	
			Day (7 am to 10 pm)	Night (10 pm to 7 am)
Receivers in the Affected Area in a mixed-use zone	TBC	Residential & Commercial	52	45
Receivers in the Affected Area in a residential zone	TBC	Residential	47	40
Receivers in the existing Waterfront Neighbourhood Zone	Waterfront Neighbourhood	Residential	47	40

Additionally, if the noise affected premises is situated in a 'quiet locality', being a Neighbourhood-Type Zone, a maximum noise criterion of  $L_{max}$  60 dB(A) at night, 10 pm to 7 am, is applicable.

Penalties can also be applied to a noise source for a variety of characteristics, such as impulsive, low frequency, modulating or tonal characters. For a characteristic penalty to be applied to a noise source it must be fundamental to the impact of the noise and dominate the overall noise impact. Application of the characteristic penalty is discussed in the noise emission assessment.

We note that under Part 5, Clause 20(6) of the Noise EPP, exceedance of the recommended criterion does not necessarily mean action is required under the Noise EPP. Some of the following matters should be considered when considering action:

- the amount by which the criterion is exceeded (in dB(A))
- the frequency and duration for which the criterion is exceeded
- the ambient noise that has a noise level similar to the predicted noise level
- the times of occurrence of the noise source
- the number of persons likely to be adversely affected by the noise source and whether there is any special need for quiet.



## 5 Noise Assessment

### 5.1 Noise emissions from potential future land uses

Based on Resonate's experience of environmental noise assessments for similar zones which anticipate mixed land uses, typical noise sources associated with commercial and residential development typically include (but are not limited to):

- Mechanical plant, such as airconditioning
- Noise associated with vehicle movements, such as carparking areas
- Loading dock areas for commercial premises, including heavy vehicle movements

In our experience, noise sources such as those defined above can be expected to comply with environmental noise criteria outlined in Table 6 and 7 at both existing and future noise sensitive development, using standard noise mitigation measures including:

- Location of noise sources away from the nearest receivers where practicable
- Noise barriers
- Selection of low noise mechanical plant and other equipment
- Use of attenuators where required.

The concept plan for the Affected Area generally places proposed mixed land use including potential commercial development fronting Frederick Road and away from existing neighbouring residential receivers in the Waterfront Neighbourhood zone. The exception is the north-east corner of the site, where the proposed mixed use area adjoins residences at 31 Mariners Crescent. This interface between land uses can be managed using the above standard noise mitigation measures where required. We also note that residences in this location are exposed to existing road traffic noise, which may lessen the impact of any new noise sources to some extent.

In areas further west from Frederick Road, existing receivers in the Waterfront Neighbourhood Zone are unlikely to be affected by noise impacts associated with rezoning of the Affected Area, since the anticipated land uses immediately adjacent are to be low to medium density residential, which is generally consistent with the existing land use.

It should also be noted that the existing Infrastructure zoning allows for significantly higher noise emissions from the Affected Area than those allowed for under a mixed use or Neighbourhood-Type zoning, in accordance with the Noise EPP.

### 5.2 Noise and Air Emissions Overlay

The *Noise and Air Emissions Overlay* contains planning policies to protect new noise and air quality sensitive development from noise and air emissions generated from major transport corridors (road and rail) and mixed land use.

Where a site is within a *Noise and Air Emissions Overlay noise attenuation area*, this triggers the application of Ministerial Building Standard MBS 010 - *Construction requirements for the control of external sound* for noise sensitive (Class 1, 2, 3, 4 or 9c) buildings. While MBS 010 applies at the building consent stage, it is also often invoked during the planning stage to demonstrate that a proposed development can meet relevant Planning & Design Code *Noise and Air Emissions Overlay* provisions.

#### 5.2.1 Road traffic noise

MBS 010 construction requirements start at Sound Exposure Category 1 (SEC 1) which is applicable to buildings exposed to average night time road or rail noise levels of 59 to 63 dB(A). Based on existing noise measurements

described in Section 3, both daytime and night time existing road traffic noise levels are below this threshold at a distance of 20m from Frederick Road, which is the closest location where noise sensitive development could feasibly occur (due to the 20m easement). Noise contours presented in Appendix C show road traffic noise levels decrease with distance from Frederick Road, noting that development of the Affected Area will introduce buildings that will further shield western parts of the site from any road traffic noise.

Based on the above, existing road traffic noise levels received at the site are generally low, and it is expected that standard facade constructions will result in appropriate internal road traffic noise levels for future noise sensitive developments.

Application of a *Noise and Air Emissions Overlay noise attenuation area* for the purpose of protecting the Affected Area from potential road traffic noise effects, is therefore not required and not recommended.

## 5.2.2 Mixed land use

MBS 010 also addresses potential noise impacts arising from mixed land uses. In particular it requires that all facades of noise sensitive land uses within a *noise attenuation area* and mixed use zone are constructed with acoustic treatment in accordance with SEC 1 requirements. The intent of this is both to protect residences from the potential impacts of elevated noise levels associated with non-residential land uses in a mixed use area, and also to allow for a greater extent of non-residential development to occur in noise sensitive areas, given noise sensitive receivers are required to have a degree of acoustic treatment to offset potential noise impacts.

Resonate understand that a *noise attenuation area*, as depicted by the *Noise and Air Emissions Overlay* under the Planning and Design Code, must be applied based on existing cadastral boundaries and there is no mechanism to apply it to only part of the Affected Area. We note that only limited areas of the Affected Area are intended to be mixed use. Application of the overlay therefore has the potential to impose unnecessary requirements for acoustic treatment in accordance with MBS 010 in areas of the site that are intended to be predominantly residential.

Potential noise issues associated with noise sensitive development in mixed use areas can be appropriately addressed through the relevant Interface Between Land Uses provisions of the Planning & Design Code, and the Noise EPP as required.

We therefore do not recommend application of a *Noise and Air Emissions Overlay noise attenuation area* to the site for the purposes of addressing mixed land use noise issues.

## 5.3 Other existing noise sources

As described in Section 3, noise from industrial activities on the eastern side of Frederick Road were not audible at the measurement position. Future noise sensitive development is therefore not anticipated to require any measures to address noise from these existing noise sources.

### 5.3.1 PARPS

Previous noise measurements conducted at or near the boundary of the PARPS site (Lot 101) indicate that the noise impact from the nearest infrastructure source is negligible compared to road traffic noise and less than 40 dB(A) at the within Lot 100.

Should the PARPS site operations be expanded in the future, SA Water would be required to conduct an acoustic assessment to demonstrate that potential noise emissions would meet the relevant Noise EPP requirements at neighbouring sites, including the affected area.

The Noise EPP criteria applicable to the affected area based on a residential or mixed use under the Code Amendment would be more stringent than criteria which currently apply to the affected area under the existing Infrastructure zoning. However, it should be noted that when the environmental noise assessment for the PARPS odour control plant was undertaken in 2018, SA Water were aware of the potential for Lot 100 to be redeveloped for residential purposes, and voluntarily adopted a night time noise limit of 40 dB(A) at the PARPS site boundary, consistent with a limit that would have applied if the affected area was already developed for residential purposes.

On this basis the proposed code amendment does not impose any additional restrictions on the ability for SA Water to expand the PARPS site, over and above what was already considered by SA Water to be appropriate and reasonable in 2018. In our experience, SA Water operate a large number of pump stations and the like in proximity to residential areas, and consistently provide a high standard of acoustic treatment to these facilities to ensure any potential noise issues are appropriately addressed.



## 6 Conclusion

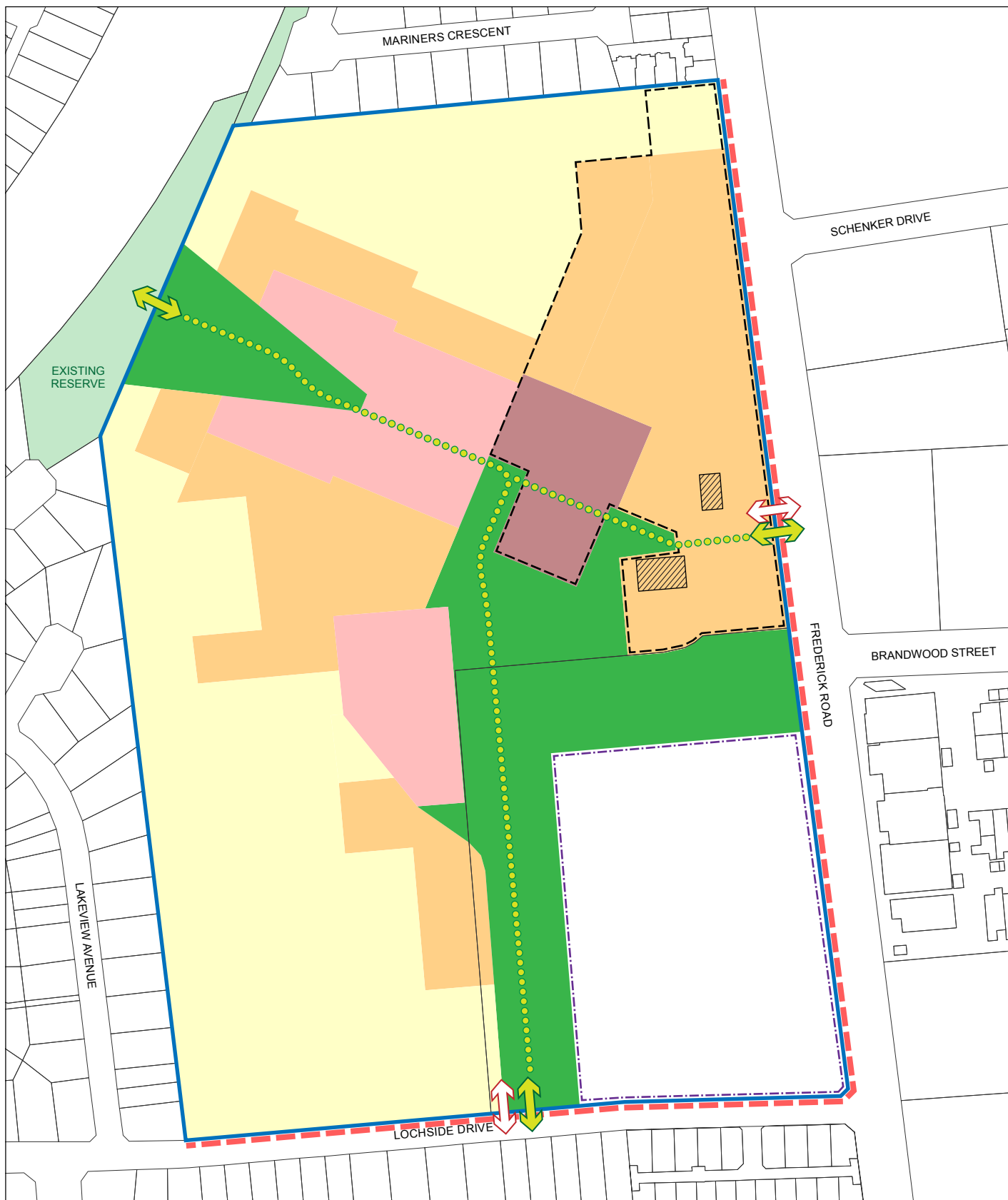
Resonate have completed a noise assessment for the Affected Area, to inform a proposed Planning & Design Code Amendment.

Existing noise levels were measured, and are dominated by road traffic from Frederick Road. Any other existing industrial or commercial activities are determined to have a negligible noise impact on the Affected Area. With the anticipated land use mix facilitated by the Code Amendment (as a mixture of commercial and residential), requirements arising from the Environmental Protection (Noise) Policy and the Planning & Design Code are expected to be appropriate for the control of noise emissions from new noise sources, to both existing and new noise sensitive receivers. The requirements can be expected to be achieved with standard noise mitigation measures.

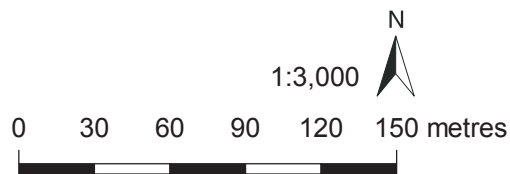
Application of a Noise and Air Emissions Overlay *noise attenuation area* is not recommended for the Affected Area due to relatively low road traffic noise levels below the threshold requiring any specific facade treatment in accordance with MBS 010. Potential noise issues associated with noise sensitive development in mixed use areas can be addressed through the relevant provisions of the Planning & Design Code and Noise EPP as required.



## Appendix A: Concept plan



- Concept Plan Boundary
- Mixed Use Transition Subzone
- Infrastructure Zone
- ↔ Indicative Pedestrian/Cycle Access
- Indicative Pedestrian/Cycle Network
- ↔ Indicative Vehicle Access
- Local Heritage Place
- Maximum 2 Storeys (8.5m)
- Maximum 3 Storeys (12.5m)
- Maximum 4 Storeys (16.5m)
- Maximum 5 Storeys (22m)
- Indicative Public Open Space
- Future verge widening for footpath and streetscaping



# Concept Plan X

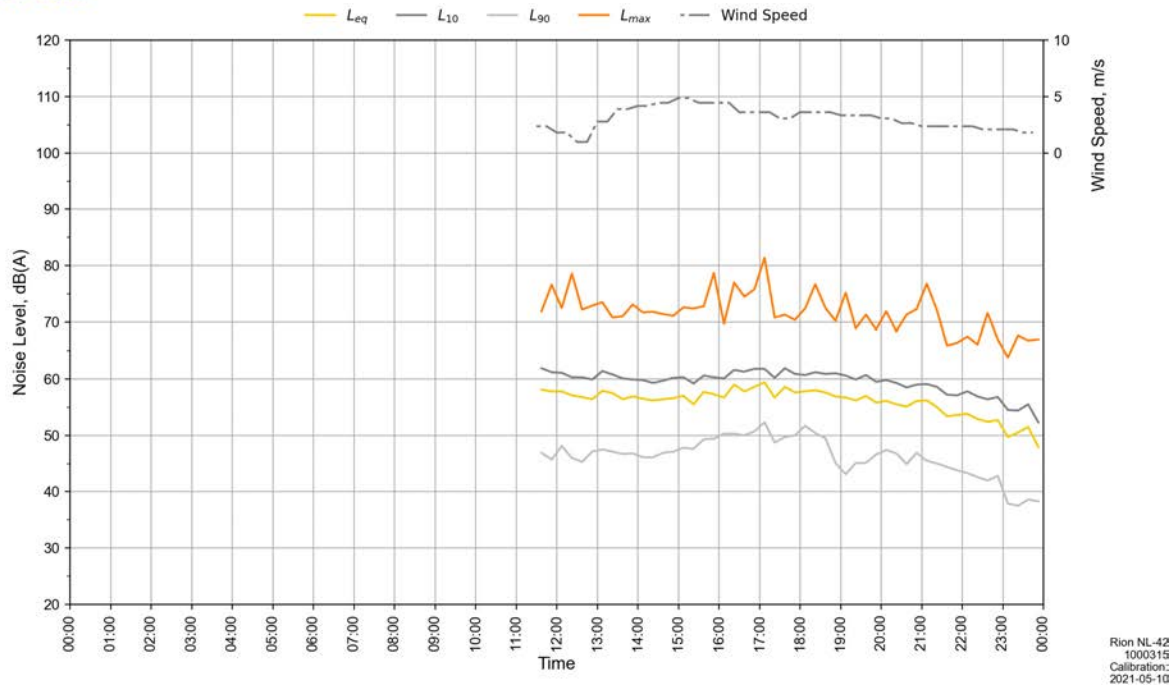
## WEST LAKES



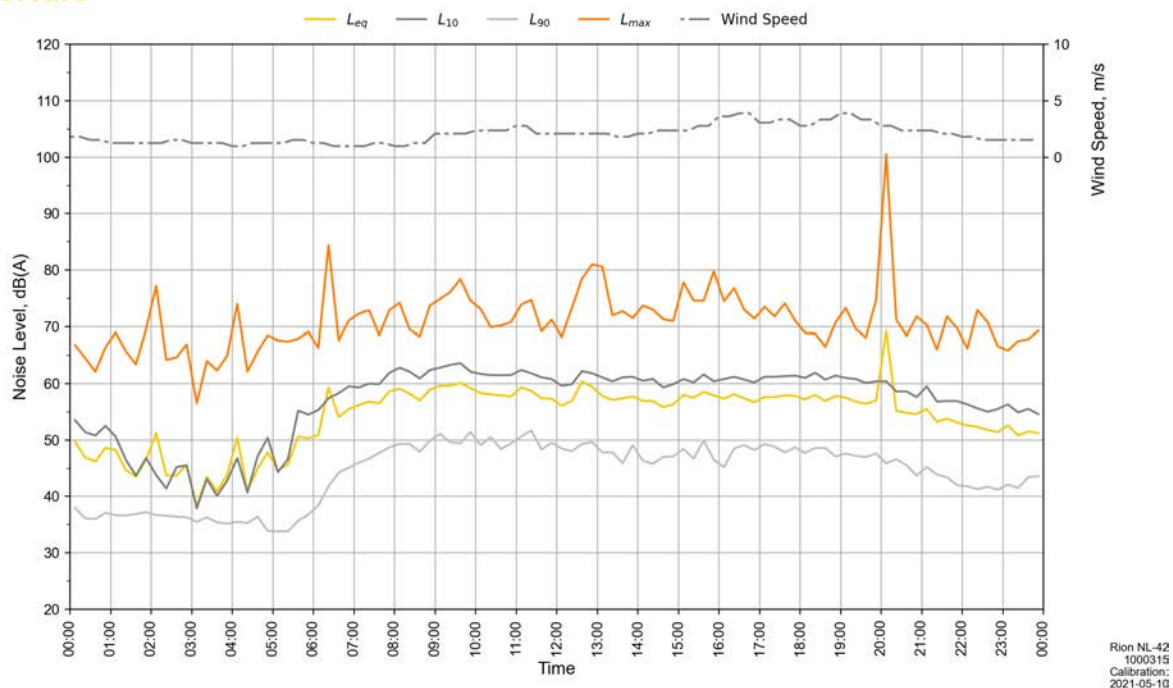


## Appendix B: Noise monitoring daily plots

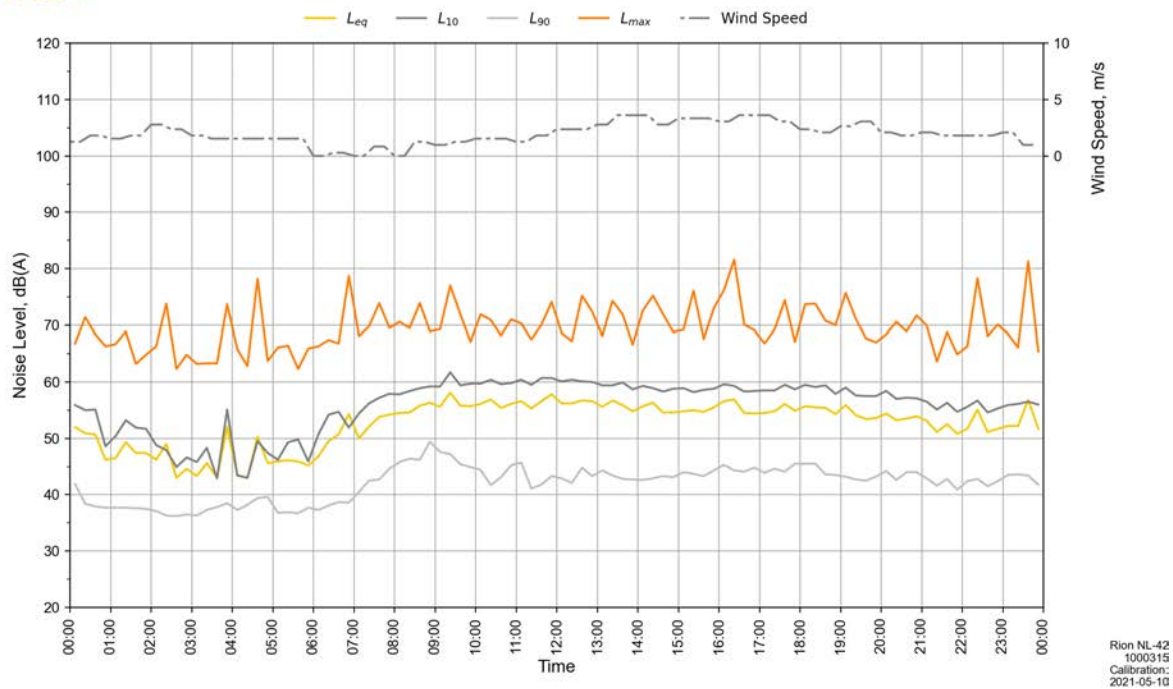
## 16 Frederick Road West Lakes - Thursday, 24 March 2022



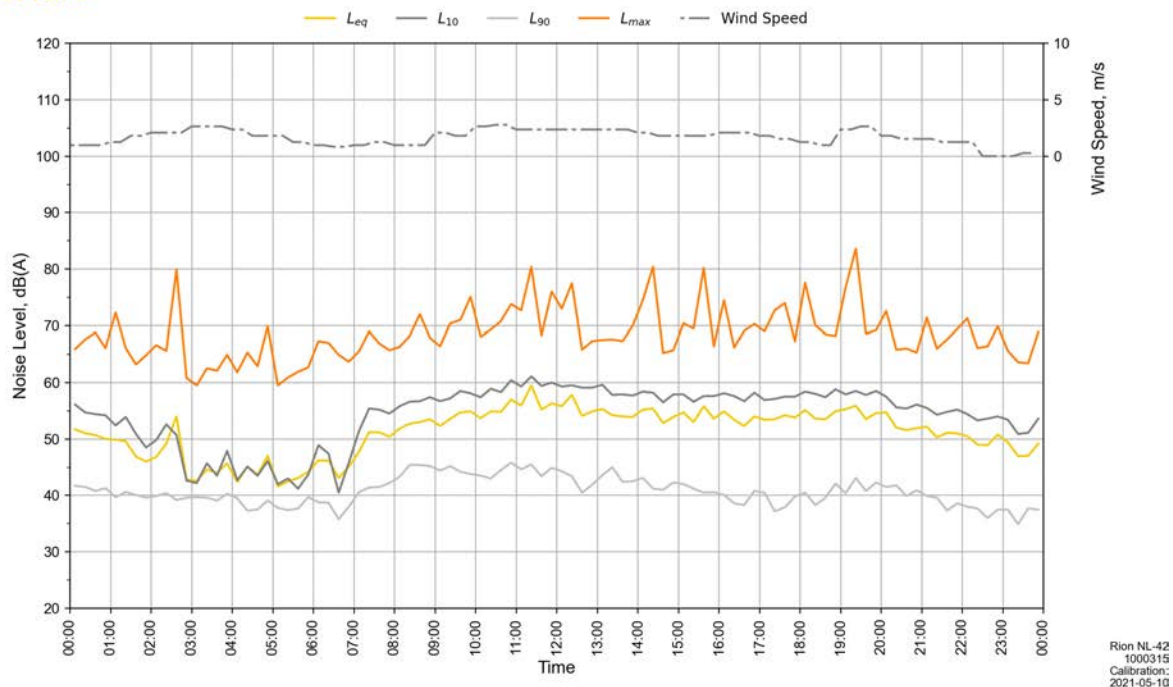
## 16 Frederick Road West Lakes - Friday, 25 March 2022



## 16 Frederick Road West Lakes - Saturday, 26 March 2022

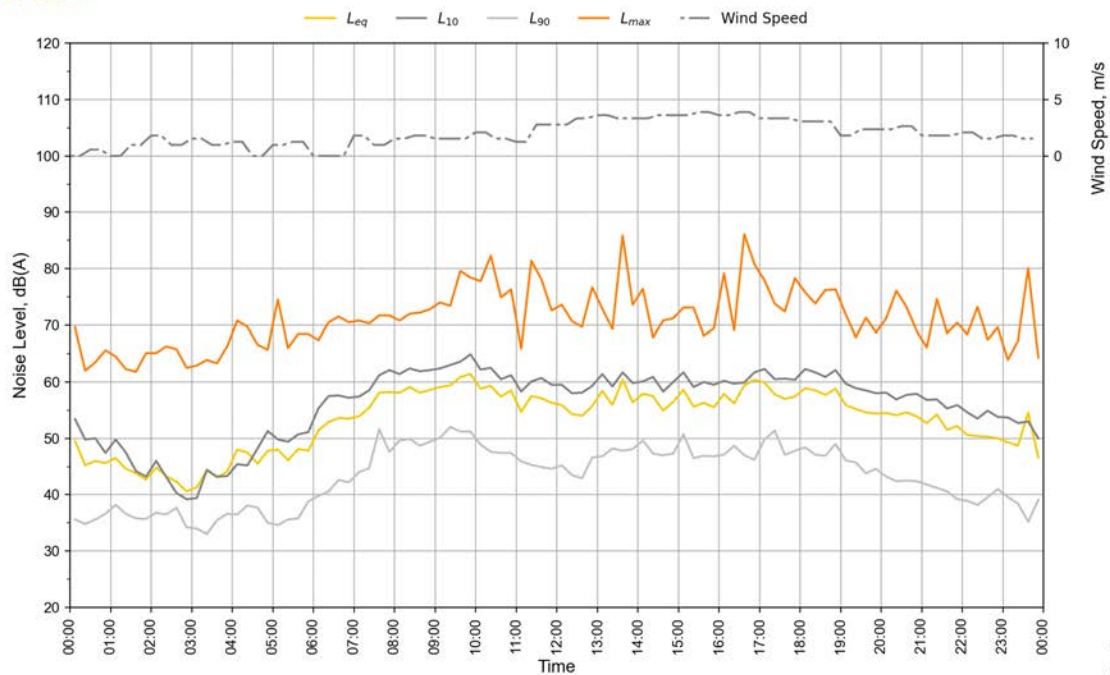


## 16 Frederick Road West Lakes - Sunday, 27 March 2022

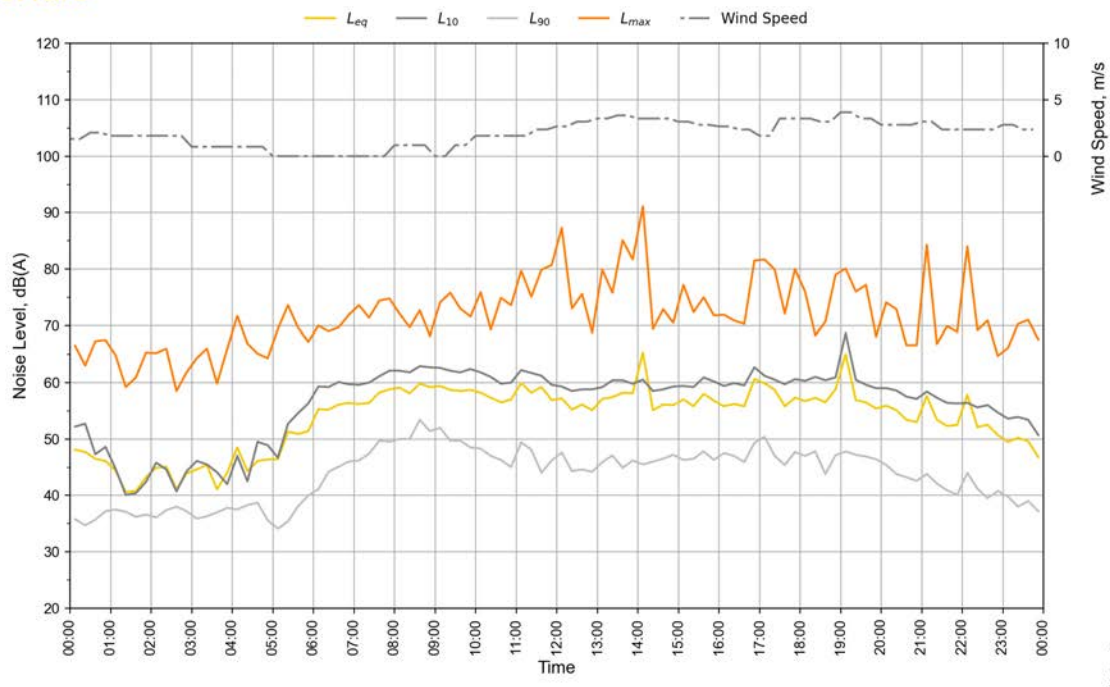




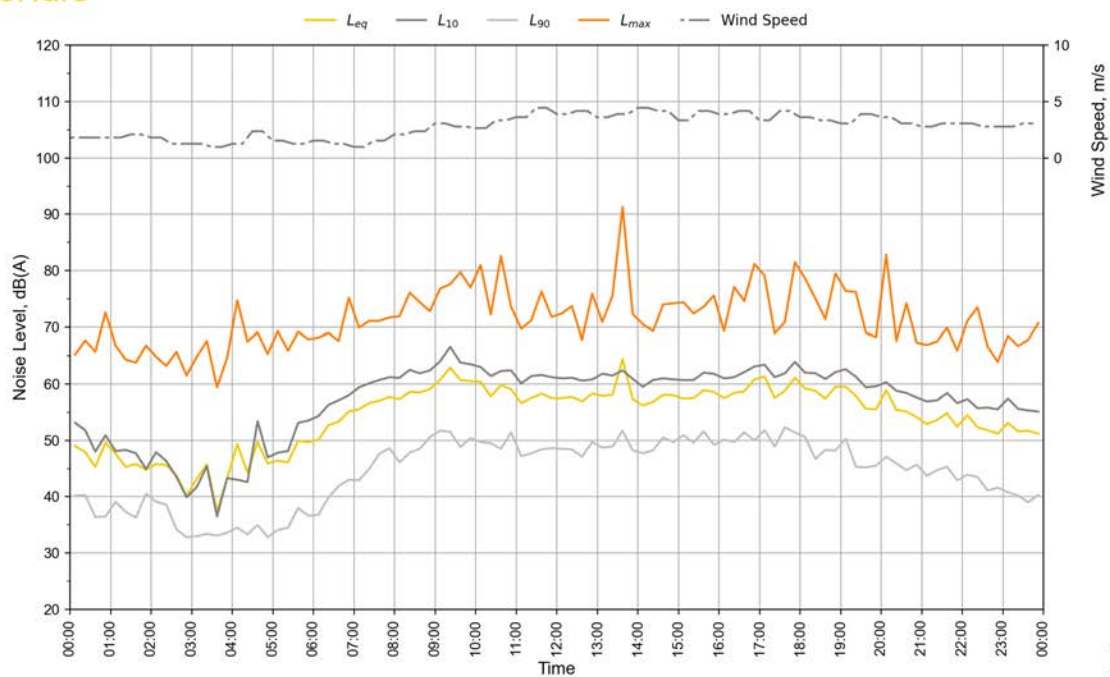
## 16 Frederick Road West Lakes - Monday, 28 March 2022



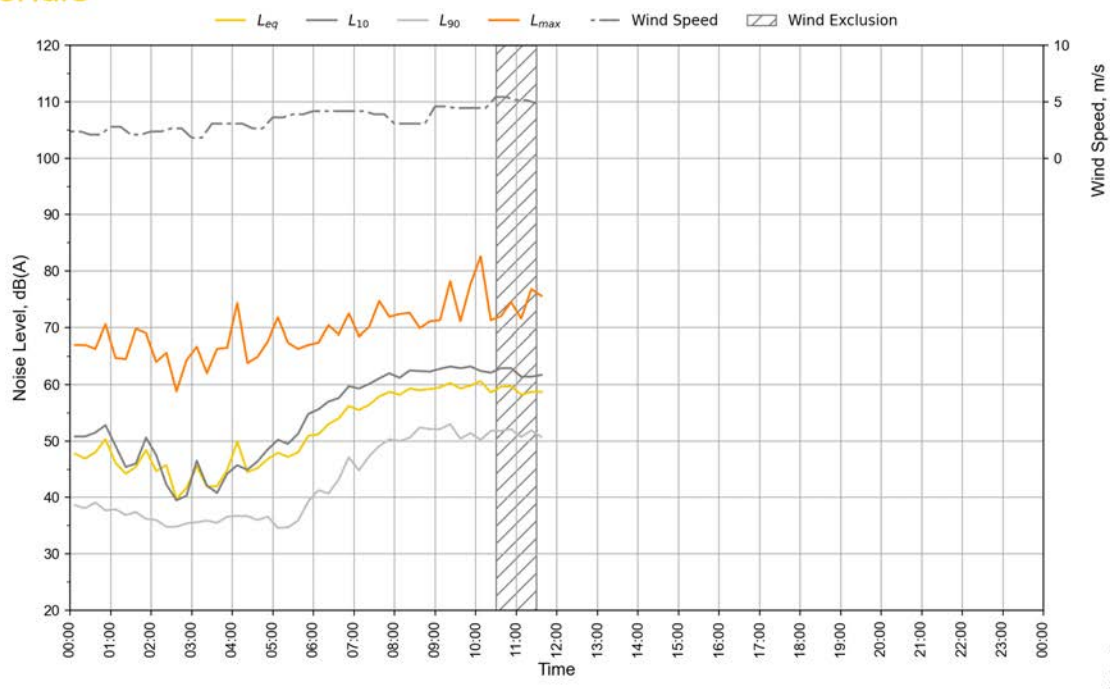
## 16 Frederick Road West Lakes - Tuesday, 29 March 2022



## 16 Frederick Road West Lakes - Wednesday, 30 March 2022



## 16 Frederick Road West Lakes - Thursday, 31 March 2022





## Appendix C: Noise modelling contour plot



## 16 Frederick Road, West Lakes

Predicted traffic noise levels  
Night-time period, 10pm-7am

Project: A220135  
Prepared by: James Tudor  
Reviewed by: Nick Henrys

--- Affected Area boundary

● Noise logging location

Noise contour levels, dB(A)

25

30

35

40

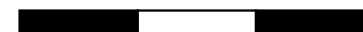
45

50

55



0 50 100 150 m



Resonate

DRAFT



# Preliminary Tree Assessment

Site: 16 Frederick Road, West Lakes (former SA  
Water WWTP)

Date: Wednesday, 27 July 2022

## ATS6658-FreRdPTA-R2



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Appendix A - Tree Assessment Methodology

Appendix B - Tree Assessment Findings

Appendix C - Mapping

Appendix D - Tree Assessment Summary

Report Reference Number: ATS6658-FreRdPTA-R2

Report prepared for  
Daniel De Conno - Potentia Environment

Author  
Marcus Lodge, Consulting Arborist, Arborman Tree Solutions Pty Ltd

## Executive Summary

Arborman Tree Solutions was engaged by Daniel De Conno - Potentia Environment to undertake Preliminary Tree Assessment of the trees within the identified survey area at 16 Frederick Road, West Lakes (former SA Water WWTP). The purpose of this assessment is to evaluate tree suitability for retention through a Tree Retention Rating system and provide Preliminary Tree Protection advice for trees to be retained. This assessment provides information in accordance with Australian Standard *AS4970-2009 Protection of trees on development sites* (AS4970-2009) and relevant legislation.

The assessment considered sixteen trees which are identified as a mix of various species as shown in Table 1 below. Only one tree, Tree 4, is potentially indigenous to the local area although it is unlikely it would have occurred naturally in this location, the remaining trees are all introduced species. The majority of trees are considered to be in Good to Fair overall condition and have extended useful life expectancies; however Tree 4 is dead with no opportunity for remediation.

The assessment has identified Trees 14-16, are Significant Trees, and Trees 2, 3 and 5-13, are Regulated Trees as defined in the *Planning, Development and Infrastructure Act 2016*. The remaining trees, Trees 1 and 4, are exempt from regulation; Tree 1 is within 10 metres of a dwelling and Tree 4 is dead. Significant and Regulated Trees should be preserved if they meet aesthetic and/or environmental criteria as described in the *Planning, Development and Infrastructure (General) Regulations 2017*. When assessed against the relevant 'Desired Outcomes', 'Performance Outcomes' and 'Designated Performance Features' none of the trees are considered to provide 'important' aesthetic and/or environmental benefit and as such their protection as Regulated/Significant Trees that prevents an otherwise reasonable and expected development is not warranted.

The assessment has identified Trees 1 and 5-13 as having a Moderate Retention Rating. These trees are worthy of consideration for retention if they can be adequately protected in an otherwise reasonable and expected development. The remaining trees, Trees 2-4 and 14-16, have a Low Retention Rating and design alteration to protect them, if they are in conflict, is not warranted.

It is recommended the design of any future development consider the extent of the TPZ of any trees identified for retention and determine if the encroachment can be reduced to ensure they are not impacted. The removal of these trees may be approved if it can be demonstrated that they are restricting an otherwise reasonable and expected development and alternative design solutions are not available to retain them.

## Brief

Arborman Tree Solutions was engaged by Daniel De Conno - Potentia Environment to undertake a Preliminary Tree Assessment of the trees within the identified survey area at 16 Frederick Road, West Lakes (former SA Water WWTP). The purpose of a Preliminary Tree Assessment is to evaluate trees' suitability for retention through a Tree Retention Rating system and provide Preliminary Tree Protection advice for trees to be retained.

In accordance with section 2.2 of the Australian Standard *AS4970-2009 Protection of trees on development sites* (2.2) the following information is provided:

- Identification of the species of each tree and assessment of their health and structure.
- Identification of the legislative status of trees as defined in the *Planning, Development and Infrastructure Act 2016 (PDI Act 201)*
- Tree Retention Rating for each tree, this has been applied to all trees regardless of legislative status.
- Identify the Tree Protection Zone

*Note: This report is intended to provide preliminary advice to assist with determining scope for development and guide design. The City Council may require further information to approve the removal of any Significant Trees/Regulated Trees.*

## Documents and Information Provided

The following information was provided for the preparation of this assessment

- Email instruction on scope of works
- Site Plan identifying the area to be assessed

## Method

A site inspection was undertaken on Wednesday, 19 January 2022. Trees in this report were mapped using TreePlotter software and assigned a unique tree number. Individual tree findings were recorded using the Tree Assessment Form (TAF©). Tree Health Indicator (THI©), Tree Structure Assessment (TSA©) and Useful Life Expectancy (ULE), were assessed using the methodology described in Appendix A. Legislative Status was identified for all trees controlled under the relevant legislation.

Each tree's suitability for retention was determined by reviewing principles under the *PDI Act 2016* or relevant authority and applying these findings in the Tree Retention Rating (TRR©) method, as described within Appendix A. Tree Protection Zones were calculated using the Australian Standard *AS4970-2009* (Section 3.2). Mapping was performed using GIS and CAD software.

*Limitations: Tree management options such as pruning, soil amelioration, pathogen treatment are not part of this report; these should be considered in relation to any proposed development.*



## Site Location

Figure 1: Survey Area - 16 Frederick Road, West Lakes (former SA Water WWTP)



## Assessment

Arborman Tree Solutions was engaged by Daniel De Conno - Potentia Environment to undertake Preliminary Tree Assessment of the trees within the identified survey area at 16 Frederick Road, West Lakes (former SA Water WWTP). The purpose of this assessment is to evaluate tree suitability for retention through a Tree Retention Rating system and provide Preliminary Tree Protection advice for trees to be retained. This assessment provides information in accordance with Australian Standard AS4970-2009 *Protection of trees on development sites* (AS4970-2009) and relevant legislation.

### Tree Assessment

The assessment considered sixteen trees which are identified as a mix of various species as shown in Table 1 below. Only one tree, Tree 4, is potentially indigenous to the local area although it is unlikely it would have occurred naturally in this location, the remaining trees are all introduced species. The majority of trees are considered to be in Good to Fair overall condition and have extended useful life expectancies; however Tree 4 is dead with no opportunity for remediation.

Table 1 – Tree Identification

Botanic Name	Common Name	Number of Trees	Origin	Tree Number
<i>Agonis flexuosa</i>	Willow Myrtle	3	Native	14-16
<i>Allocasuarina verticillata</i>	Drooping Sheoak	1	Indigenous	4
<i>Corymbia citriodora</i>	Lemon Scented Gum	1	Native	1
<i>Eucalyptus botryoides</i>	Southern Mahogany or Bangalay	1	Native	3
<i>Phoenix canariensis</i>	Canary Island Date Palm	10	Exotic	2 and 5-13

Findings on individual tree health and condition is presented in Appendix B - Tree Assessment Findings.

*Agonis flexuosa* (Willow Myrtle) is an evergreen tree growing to approximately 10 metres in height with a broad spreading crown supported on multiple trunks. This species is a native of southwestern Western Australia where it mainly grows as understorey in the tall Tuart, *Eucalyptus gomphocephala*, forests. As a multiple trunked species Willow Myrtle is very susceptible to forming included bark unions, which can be structurally unsound. As with many other West Australian species this tree was popular in the 1970-80's however it has fallen out of favour in recent times due to poor structure and relative unsuitability for use as a street tree.

*Allocasuarina verticillata* (Drooping Sheoak) is a small to medium tree reaching 4-10 metres in height with a rounded crown and drooping or pendulous branch ends and foliage. The tree is dioecious having separate male and female plants with the female plants producing a distinctive and relatively large cone. This species is an important food source for the Glossy Black Cockatoo and is protected where these birds are present.

*Corymbia citriodora* (Lemon Scent Gum) is a tall, graceful tree usually 20-30 metres in ornamental plantings, although significantly taller (40 metres or more) in its natural habitat. It prefers medium to sandy loams or well-drained gravels with additional irrigation during the drier seasons. Lemon Scent Gum is most suited to parks, large gardens and avenues where it is able to grow to its full potential unhindered by the constraints of generally smaller urban blocks. Indigenous to central Queensland Lemon Scent Gum has become popular throughout many areas of Australia and is relatively common in Adelaide. This species has developed a reputation as a tree likely to drop branches, this reputation appears to be related to stock of poor genetic quality which is prone to forming included bark unions and therefore has a higher than average incidence of limb failure; modern seed collection and nursery reproduction practices are eliminating this as a problem.

*Eucalyptus botryoides* (Southern Mahogany) is a fast growing short lived medium sized to tall gum that in its natural environment grows to between 10 and 40 metres depending on the site conditions and forest density. This species is indigenous to the eastern Victoria coast up to and including the NSW south coast. Whilst it manages to grow rapidly in South Australia, it rarely reaches its potential due to the lower rainfall and relatively poor soil conditions. As a result, it can become stressed and susceptible to infestation by borers. Southern

Mahogany also has a reputation for dropping branches, this is mainly associated with ended weighted poorly tapered branches and/or epicormic regrowth from lopped trees. Unfortunately, due to the tree's form remedial pruning options to mitigate this problem are not usually available. Due to this the use of this species in high target frequency areas is not recommended.

*Phoenix canariensis* (Canary Island Date Palm ) originates from The Canary Islands is widely cultivated for its large stately appearance of single, upright, thick trunk topped with a crown of stiff fronds 2-4 metres long with sharp spines at their bases. Flowers are inconspicuous giving way to more obvious orange/yellow date like ornamental fruits ripening in early summer. As with many palms, and similar plants, *Phoenix canariensis* is well suited to transplanting with numerous examples of them being successfully moved throughout the state and interstate. Canary Island Date Palm is used in many entrance statements, median plantings and parkland strips and can form impressive plantings.

### **Legislative Assessment**

The assessment has identified Trees 14-16, are Significant Trees, and Trees 2, 3 and 5-13, are Regulated Trees as defined in the *Planning, Development and Infrastructure Act 2016*. The remaining trees, Trees 1 and 4, are exempt from regulation; Tree 1 is within 10 metres of a dwelling and Tree 4 is dead. Significant and Regulated Trees should be preserved if they meet aesthetic and/or environmental criteria as described in the *Planning, Development and Infrastructure (General) Regulations 2017*. When assessed against the relevant 'Desired Outcomes', 'Performance Outcomes' and 'Designated Performance Features' none of the trees are considered to provide 'important' aesthetic and/or environmental benefit and as such their protection as Regulated/Significant Trees that prevents an otherwise reasonable and expected development is not warranted.

Table 2 - Legislative Status

Legislative Status	Number of Trees	Tree Numbers
Significant	3	14-16
Regulated	11	2, 3 and 5-13
Exempt	2	1 and 4

### **Retention Assessment**

Trees that provide an environmental and/or aesthetic contribution to the area, are in good condition will achieve a High or Moderate Retention Rating and conservation of these trees is encouraged. Trees that do not provide this contribution and/or are in poor condition will achieve a Low Retention Rating; these trees will display one or more of the following or similar attributes:

- are in poor condition due to health and/or structural decline,
- have poor form that impacts their aesthetic value,
- provide limited environmental and/or aesthetic benefit,
- are a short lived species and/or have a short Useful Life Expectancy,
- represent a material risk to persons or property,
- are identified as causing or threatening to cause substantial damage to a structure of value,

The assessment has identified Trees 1 and 5-13 as having a Moderate Retention Rating. It is my opinion, as Regulated/Significant Trees with a Moderate Retention Rating, whilst these trees partially meet the attributes described within the *Planning, Development and Infrastructure Act 2016*, they do not do so to a level that identifies them as important trees; they are however worthy of consideration for retention if they can be adequately protected in an otherwise reasonable and expected development.

The remaining trees, Trees 2-4 and 14-16, have a Low Retention Rating and should not form a constraint to an otherwise reasonable and expected development.



Table 3 - Retention Rating

Retention Rating	Number of Trees	Tree Numbers
Moderate	10	1 and 5-13
Low	6	2-4 and 14-16

### Tree Protection Assessment

Australian Standard AS4970-2009 *Protection of trees on development sites* prescribes the use of a Tree Protection Zone (TPZ) as the principle means of protecting trees throughout the development process. If encroachment is required within any TPZ, the Project Arborist should be consulted to identify impacts and recommend mitigation measures. The Tree Protection Zones should be used to inform any future development of the site, maintaining these areas as open space. The Tree Protection Zone radii are included in Table 4 and Appendix D - Tree Assessment Summary.

The Tree Protection Zone radii for these trees, as measured from the centre of the trunk, have been calculated and are shown below in Table 1; alterations to the area around these trees should be restricted in accordance with the guidelines of AS4970-2009.

Table 4 – Tree Protection Zones

Tree Number	TPZ Radius (metres)	Tree Number	TPZ Radius (metres)	Tree Number	TPZ Radius (metres)
1	6.38	7	4.00	13	3.50
2	3.50	8	4.00	14	9.76
3	6.38	9	4.00	15	11.29
4	N/A	10	4.00	16	10.70
5	4.00	11	3.50		
6	4.00	12	3.50		

## Conclusion

The assessment has identified Trees 1 and 5-13 as having a Moderate Retention Rating. These trees are worthy of consideration for retention if they can be adequately protected in an otherwise reasonable and expected development. The remaining trees, Trees 2-4 and 14-16, have a Low Retention Rating and design alteration to protect them, if they are in conflict, is not warranted.

It is recommended the design of any future development consider the extent of the TPZ of any trees identified for retention and determine if the encroachment can be reduced to ensure they are not impacted. The removal of these trees may be approved if it can be demonstrated that they are restricting an otherwise reasonable and expected development and alternative design solutions are not available to retain them.

The Regulated or Significant Trees require Development Approval prior to any tree damaging activity occurring. This includes development activities within the TPZ, tree removal and potentially pruning.

A Project Arborist should be appointed to assist in the design around trees to be retained; the development impacts and tree protection requirements are to be included in a Development Impact Report and a Tree Protection Plan as identified in Australian Standard *AS4970 2009 Protection of trees on development sites*.

Thank you for the opportunity to provide this report. Should you require further information, please contact me and I will be happy to be of assistance.

Yours sincerely



**MARCUS LODGE**

***Senior Consulting Arboriculturist***

***Australian Arborist License AL11***

***Diploma in Arboriculture***

***International Society of Arboriculture – Tree Risk Assessment***

***VALID Tree Risk Assessment (VALID) – 2018 and 2021***

***Native Vegetation Council Trained Arborist 2019***



## Definitions

<b>Circumference:</b>	trunk circumference measured at one metre above ground level. This measurement is used to determine the status of the tree in relation to the <i>Planning, Development and Infrastructure Act 2016</i> .
<b>Diameter at Breast Height (DBH):</b>	trunk diameter measured at 1.4 metres above ground level used to determine the Tree Protection Zone as described in Australian Standard AS4970-2009 <i>Protection of trees on development sites</i> .
<b>Diameter at Root Buttress (DRB):</b>	trunk diameter measured just above the root buttress as described in Australian Standard AS4970-2009 <i>Protection of trees on development sites</i> and is used to determine the Structural Root Zone.
<b>Tree Damaging Activity</b>	Tree damaging activity includes those activities described within the <i>Planning, Development and Infrastructure Act 2016</i> such as removal, killing, lopping, ringbarking or topping or any other substantial damage such as mechanical or chemical damage, filling or cutting of soil within the TPZ. Can also include forms of pruning above and below the ground.
<b>Tree Protection Zone (TPZ):</b>	area of root zone that should be protected to prevent substantial damage to the tree's health.
<b>Structural Root Zone (SRZ):</b>	calculated area within the tree's root zone that is considered essential to maintain tree stability.
<b>Project Arborist</b>	A person with the responsibility for carrying out a tree assessment, report preparation, consultation with designers, specifying tree protection measures, monitoring and certification. The Project Arborist must be competent in arboriculture, having acquired through training, minimum Australian Qualification Framework (AQTF) Level 5, Diploma of Horticulture (Arboriculture) and/or equivalent experience, the knowledge and skills enabling that person to perform the tasks required by this standard.
<b>Important:</b>	<p>The following definition of important was described by Commissioner Nolan of the Environment, Resource and Development Court in the case of <i>Savoy Developments Pty Ltd v Town of Gawler</i> [2013] SAERDC 32.</p> <p><i>"In my view, for habitat to be raised to the level of 'important' (as sought by Objective 2(d)), it must be beyond that likely to be expected in any mature tree of indigenous origins – that is, it is beyond the normal level that might be expected or that it is so unique or special that it may be considered important. From the evidence before me I do not consider the trees to provide "important habitat for native fauna"."</i></p> <p>This definition of important, whilst in this case relating to Habitat Value, has been related when looking at all Objectives that use the term "Important".</p>
<b>Notable:</b>	The <i>Planning, Development and Infrastructure Act 2016</i> and local Development Plan also use the term "notable" when assessing the visual contribution of a tree. The Environment, Resource and Development Court does not appear to have defined the term "notable" as applied in the <i>Planning, Development and Infrastructure Act 2016</i> however, when researching definitions it is clear that this term bears equal or similar weight as the term "important" and as such for a tree to be "notable" it has to have a similar level of attributes to an important tree. When compared to a typical example of the species for a tree to be described as "notable" it would also be considered to be a noteworthy, remarkable, outstanding, momentous, memorable, impressive, extraordinary or an exceptional example of the species or of greater importance in regard to its value as a visual element than other similar sized example of the species.
<b>PDI Act 2016:</b>	the <i>Planning, Development and Infrastructure Act 2016</i> and associated <i>Planning, Development and Infrastructure (General) Regulations 2017</i> includes provisions for the control of Regulated and Significant Trees within the 18 metropolitan Adelaide councils, townships in the Adelaide Hills Council and parts of the Mount Barker Council; these provisions do not apply in areas outside of these councils.
<b>Regulated Tree:</b>	is recognised as any tree in the prescribed council areas with a trunk circumference of two metres or more. In the case of trees with multiple trunks, those with trunks with a total circumference of two metres or more and an average circumference 625 mm or more. The circumference is measured at a point one metre above natural ground level.
<b>Significant Tree:</b>	The <i>Planning, Development and Infrastructure Act 2016</i> identifies a Significant Tree as any tree in Metropolitan Adelaide or townships in the Adelaide Hills Council or parts of the Mount Barker Council with a trunk circumference of three metres or more. In the case of trees with multiple trunks, those with trunks with a total circumference of three metres or more and an average circumference 625 mm or more. The circumference is measured at a point one metre above natural ground level.
<b>Unregulated or Exempt Tree:</b>	unregulated and/or exempt trees have a trunk circumference of less than two metres and/or are excluded from control due to species, proximity to a structure or other reason as defined in the <i>Planning, Development and Infrastructure (General) Regulations 2017</i> .
<b>Native Vegetation Act 1991:</b>	Native vegetation refers to any naturally occurring local plant species that is indigenous to South Australia, from small ground covers and native grasses to large trees and water plants. It also includes naturally occurring regrowth and in certain circumstances, dead trees. In some circumstances, the management of native vegetation is protected by legislation.

## References

- Australian Standard AS4970–2009 ***Protection of trees on development sites***: Standards Australia.
- Matheny N. Clark J. 1998: ***Trees and Development a Technical Guide to Preservation of Trees During Land Development***. International Society of Arboriculture, Champaign, Illinois, USA.
- Dunster J.A., Smiley E.T., Metheny N. and Lilly S. 2013. ***Tree Risk Assessment Manual***. International Society of Arboriculture, Champaign, Illinois USA.



## Appendix A - Tree Assessment Methodology

## Tree Assessment Form (TAF©)

Record	Description
<b>Tree</b>	In botanical science, a tree is a perennial plant which consists of one or multiple trunks which supports branches and leaves. Trees are generally taller than 5 metres and will live for more than ten seasons, with some species that live for hundreds or thousands of seasons.
<b>Genus and Species</b>	<p>Botanical taxonomy of trees uses the binominal system of a genus and species, often there are subspecies and subgenus as well as cultivars. When identifying tree species, identification techniques such as assessing the tree's form, flower, stem, fruit and location are used. Identifying the right species is critical in assessing the tree's legalisation and environmental benefit. All efforts are made to correctly identify each tree to species level, where possible.</p> <p>Genus is the broader group to which the tree belongs e.g. <i>Eucalyptus</i>, <i>Fraxinus</i> and <i>Melaleuca</i>. Species identifies the specific tree within the genus e.g. <i>Eucalyptus camaldulensis</i>, <i>Fraxinus griffithi</i> or <i>Melaleuca styphelioides</i>. Trees will also be assigned the most commonly used Common Name. Common Names are not generally used for identification due to their nonspecific use, i.e. <i>Melia azedarach</i> is commonly known as White Cedar in South Australia but is also called Chinaberry Tree, Pride of India, Bead-tree, Cape Lilac, Syringa Berrytree, Persian Lilac, and Indian Lilac; equally similar common names can refer to trees from completely different Genus e.g. Swamp Oak, Tasmanian Oak and English Oak are from the <i>Casuarina</i>, <i>Eucalyptus</i> and <i>Quercus</i> genus's respectively.</p>
<b>Height</b>	Tree height is estimated by the arborist at the time of assessment. Tree height is observed and recorded in the following ranges; <5m, 5-10m, 10-15m and >20m.
<b>Spread</b>	Tree crown spread is estimated by the arborist at the time of assessment and recorded in the following ranges <5m, 5-10m, 10-15m, 15-20m, >20m.
<b>Health</b>	Tree health is assessed using the Arborman Tree Solutions - Tree Health Assessment Method that is based on international best practice.
<b>Structure</b>	Tree structure is assessed using Arborman Tree Solutions - Tree Structure Assessment Method that is based on international best practice.
<b>Tree Risk Assessment</b>	Tree Risk is assessed using Tree Risk Assessment methodology. The person conducting the assessment has been trained in the International Society of Arboriculture Tree Risk Assessment Qualification (TRAQ), Quantified Tree Risk Assessment (QTRA) and/or VALID Tree Risk Assessment (VALID). Refer to the Methodology within the report for additional information.
<b>Legislative Status</b>	Legislation status is identified through the interpretation of the <i>Development Act 1993</i> , the <i>Natural Resource Management Act 2004</i> , the <i>Native Vegetation Act 1991</i> and/or any other legislation that may apply.
<b>Mitigation</b>	Measures to reduce tree risk, improve tree condition, remove structural flaws, manage other conditions as appropriate may be recommended in the form of pruning and is listed in the Tree Assessment Findings (Appendix B). Tree pruning is recommended in accordance with AS4373-2007 <i>Pruning amenity trees</i> where practicable. Where measures to mitigate risk is not possible and the risk is unacceptable, then tree removal or further investigation is recommended.

## Useful Life Expectancy (ULE)

ULE Rating	Definition
Surpassed	The tree has surpassed its Useful Life Expectancy. Trees that achieve a surpassed ULE may do so due to poor health, structure or form. Additionally, trees that are poorly located such as under high voltage powerlines or too close to structures may also achieve a surpassed ULE. Trees that achieve this status will be recommended for removal as there are no reasonable options to retain them.
<10 years	The tree displays either or both Poor Health and/or Structure and is considered to have a short Useful Life Expectancy of less than ten years. Some short-lived species such as <i>Acacia sp.</i> may naturally achieve a short ULE.
>10 years	The tree displays Fair Health or Structure and Good Health or Structure and is considered to have a Useful Life Expectancy of ten years or more. Trees identified as having a ULE of >10, will require mitigation such as pruning, stem injections or soil amelioration to increase their ULE.
>20 years	The tree displays Good Health and Structure and is considered to have an extended Useful Life Expectancy of more than twenty years.

## Maturity (Age)

Age Class	Definition
Senescent	The tree has surpassed its optimum growing period and is declining and/or reducing in size. May be considered as a veteran in relation to its ongoing management. Tree will have generally reached greater than 80% of its expected life expectancy.
Mature	A mature tree is one that has reached its expected overall size, although the tree's trunk is still expected to continue growing. Tree maturity is also assessed based on species; as some trees are much longer lived than others. Tree will have generally reached 20-80% of its expected life expectancy.
Semi Mature	A tree which has established but has not yet reached maturity. Normally tree establishment practices such as watering will have ceased. Tree will generally not have reached 20% of its expected life expectancy.
Juvenile	A newly planted tree or one which is not yet established in the landscape. Tree establishment practices such as regular watering will still be in place. Tree will generally be a newly planted specimen up to five years old; this may be species dependant.

## Tree Health Assessment (THA©)

Category	Description
Good	Tree displays normal vigour, uniform leaf colour, no or minor dieback (<5%), crown density (>90%). When a tree is deciduous, healthy axillary buds and typical internode length is used to determine its health. A tree with good health would show no sign of disease and no or minor pest infestation was identified. The tree has little to no pest and/or disease infestation.
Fair	Tree displays reduced vigour abnormal leaf colour, a moderate level of dieback (<15%), crown density (>70%) and in deciduous trees, reduced axillary buds and internode length. Minor pest and/or disease infestation potentially impacting on tree health. Trees with fair health have the potential to recover with reasonable remedial treatments.
Poor	Tree displays an advanced state of decline with low or no vigour, chlorotic or dull leaf colour, with high crown dieback (>15%), low crown density (<70%) and/or in deciduous trees, few or small axillary buds and shortened internode length. Pest and or disease infestation is evident and/or widespread. Trees with poor health are highly unlikely to recover with any remedial treatments; these trees have declined beyond the point of reversal.
Dead	The tree has died and has no opportunity for recovery.



## Tree Structural Assessment (TSA©)

Category	Description
Good	Little to no branch failure observed within the crown, well-formed unions, no included bark, good branch and trunk taper present, root buttressing and root plate are typical. Trees that are identified as having good health display expected condition for their age, species and location.
Fair	The tree may display one or more of the following a history of minor branch failure, included bark unions may be present however, are stable at this time, acceptable branch and trunk taper present, root buttressing and root plate are typical. Trees with fair structure will generally require reasonable remediation methods to ensure the tree's structure remains viable.
Poor	History of significant branch failure observed in the crown, poorly formed unions, unstable included bark unions present, branch and/or trunk taper is abnormal, root buttressing and/or root plate are atypical.
Failed	The structure of the tree has or is in the process of collapsing.

## Tree Form Assessment (TFA©)

Category	Description
Good	Form is typical of the species and has not been altered by structures, the environment or other trees.
Fair	The form has minor impacts from structures, the environment or adjacent trees which has altered its shape. There may be slight phototropic response noted or moderate pruning which has altered the tree's form.
Poor	The tree's form has been substantially impacted by structures, the environment, pruning or other trees. Phototropic response is evident and unlikely to be corrected.
Atypical	Tree form is highly irregular due to structures or other trees impacting its ability to correctly mature. Extreme phototropic response is evident; or the tree has had a substantial failure resulting in its poor condition, or extensive pruning has altered the tree's form irreversibly.

## Priority

Category	Description
Low	Identified works within this priority should be carried out within 12 months.
Medium	Identified works within this priority should be carried out within 6 months.
High	Identified works within this priority should be carried out within 3 months.
Urgent	Identified works within this priority should be carried out immediately. Works within this priority rating will be brought to attention of the responsible person at the time of assessment.

## Tree Retention Rating (TRR)

The Tree Retention Rating is based on a number of factors that are identified as part of the standard tree assessment criteria including Condition, Size, Environmental, Amenity and Special Values. These factors are combined in a number of matrices to provide a Preliminary Tree Retention Rating and a Tree Retention Rating Modifier which combine to provide a Tree Retention Rating that is measurable, consistent and repeatable

### Preliminary Tree Retention Rating

The Preliminary Tree Retention Rating is conducted assessing Tree Health and Structure to give an overall Condition Rating and Height and Spread to give an overall Size Rating. The following matrices identify how these are derived.

Condition Matrix				
Structure	Health			
	Good	Fair	Poor	Dead
Good	C1	C2	C3	C4
Fair	C2	C2	C3	C4
Poor	C3	C3	C4	C4
Failed	C4	C4	C4	C4

Size Matrix					
Spread	Height				
	>20	15-20	10-15	5-10	<5
>20	S1	S1	S1	S2	S3
15-20	S1	S1	S2	S3	S3
10-15	S1	S2	S2	S3	S4
5-10	S2	S3	S3	S4	S5
<5	S3	S3	S4	S5	S5

The results from the Condition and Size Matrices are then placed in the Preliminary Tree Retention Rating Matrix.

Preliminary Tree Retention Rating				
Size	Condition			
	C1	C2	C3	C4
S1	High	Moderate	Low	Low
S2	Moderate	Moderate	Low	Low
S3	Moderate	Moderate	Low	Low
S4	Moderate	Moderate	Low	Low
S5	Low	Low	Low	Low

The Preliminary Tree Retention Rating gives a base rating for all trees regardless of other environmental and/or amenity factors and any Special Value considerations. The Preliminary Tree Retention Rating can only be modified if these factors are considered to be of high or low enough importance to warrant increasing or, in a few cases, lowering the original rating.

### Tree Retention Rating Modifier

The Preliminary Tree Retention Rating is then qualified against the recognised Environmental and Amenity benefits that trees present to the community thereby providing a quantitative measure to determine the overall Tree Retention Rating. Data is collected in relation to Environmental and Amenity attributes which are compared through a set of matrices to produce a Tree Retention Rating Modifier.

Environmental Matrix				
Origin	Habitat			
	Active	Inactive	Potential	No Habitat
Indigenous	E1	E1	E2	E3
Native	E1	E2	E3	E3
Exotic	E2	E3	E3	E4
Weed	E3	E3	E4	E4

Amenity Matrix				
Character	Aesthetics			
	High	Moderate	Low	None
Important	P1	P1	P2	P3
Moderate	P1	P2	P3	P3
Low	P2	P3	P3	P4
None	P3	P3	P4	P4

Tree Retention Rating Modifier				
Amenity	Environment			
	E1	E2	E3	E4
P1	High	High	Moderate	Moderate
P2	High	Moderate	Moderate	Moderate
P3	Moderate	Moderate	Moderate	Moderate
P4	Moderate	Moderate	Moderate	Low

### Tree Retention Rating

The results of the Preliminary Tree Retention Rating and the Tree Retention Rating Modifier matrices are combined in a final matrix to give the actual Tree Retention Rating.

Tree Retention Rating Matrix			
Tree Retention Rating Modifier	Preliminary Tree Retention Rating		
	High	Moderate	Low
High	Important	High	Moderate
Moderate	High	Moderate	Low
Low	Moderate	Low	Low



## **Special Value Trees**

There are potentially trees that have Special Value for reasons outside of normal Arboricultural assessment protocols and therefore would not have been considered in the assessment to this point; to allow for this a Special Value characteristic that can override the Tree Retention Rating can be selected. Special Value characteristics that could override the Tree Retention Rating would include factors such as the following:

### *Cultural Values*

Memorial Trees, Avenue of Honour Trees, Aboriginal Heritage Trees, Trees planted by Dignitaries and various other potential categories.

### *Environmental Values*

Rare or Endangered species, Remnant Vegetation, Important Habitat for rare or endangered wildlife, substantial habitat value in an important biodiversity area and various other potential categories.

Where a tree achieves one or more Special Value characteristics the Tree Retention Rating will automatically be overridden and assigned the value of Important.

## **Tree Retention Rating Definitions**

- |                  |   |
|------------------|---|
| <b>Important</b> | These trees will in all instances be required to be retained within any future development/redevelopment. It is highly unlikely that trees that achieve this rating would be approved for removal or any other tree damaging activity. Trees will be either remnant, or naturally occurring species with environmental value, will have active hollows and be in good overall condition.  |
| <b>High</b>      | These trees will in most instances be required to be retained within any future development/redevelopment. It is unlikely that trees that achieve this rating would be approved for removal or any other tree damaging activity. Trees will be either remnant, or naturally occurring species with environmental value but are starting to decline or will be a planted native and have active hollows and be in good condition. Or may provide a high aesthetic contribution to an area and be in good overall condition   |
| <b>Moderate</b>  | Trees with a moderate retention rating provide limited environmental benefit and amenity to the area. These trees may be semi mature or exotic species with limited environmental value. Moderate trees may also be large trees that display fair overall condition.  |
| <b>Low</b>       | These trees may not be considered suitable for retention in a future development/redevelopment. These trees will either be young trees that are easily replaced. or in poor overall condition. Trees in this category do not warrant special works or design modifications to allow for their retention. Trees in this category are likely to be approved for removal and/or other tree damaging activity in an otherwise reasonable and expected development. Protection of these trees, where they are identified to be retained, should be consistent with Australian Standard AS4970-2009 <i>Protection of trees on development sites</i> . |

## Appendix B - Tree Assessment Findings

## Lemon Scented Gum

Inspected:	18 January 2022
Height:	10-15 metres
Spread:	10-15 metres
Health:	Good
Structure:	Good
Form:	Fair
Trunk Circumference:	>2 metres
Useful Life Expectancy:	>20 years
Tree Protection Zone:	6.38 metres



### Observations

The health and structure of this tree indicate it is in good overall condition and has adapted to its local environment.

### Legislative Status

Exempt

This tree is within 10 metres of a dwelling or inground swimming pool and is therefore exempt from control under the Planning, Development and Infrastructure Act 2016.

### Retention Rating

Moderate

This tree has a Moderate Retention Rating and could be considered for retention if it can be protected. It is likely that tree damaging activity, including removal, will only be approved if it is shown that alternative design solutions are not available.



## Canary Island Date Palm

Inspected:	18 January 2022
Height:	5-10 metres
Spread:	5-10 metres
Health:	Good
Structure:	Good
Form:	Good
Trunk Circumference:	>2 metres
Useful Life Expectancy:	>20 years
Tree Protection Zone:	3.50 metres



### Observations

The health and structure of this tree indicate it is in good overall condition and has adapted to its local environment. The trunk circumference has been estimated as existing dead palm fronds make accurate measurement difficult.

### Legislative Status

Regulated

This tree has a trunk circumference greater than two metres and is not subject to any exemption from regulation and therefore it is identified as a Regulated Tree as defined in the Planning, Development and Infrastructure Act 2016.

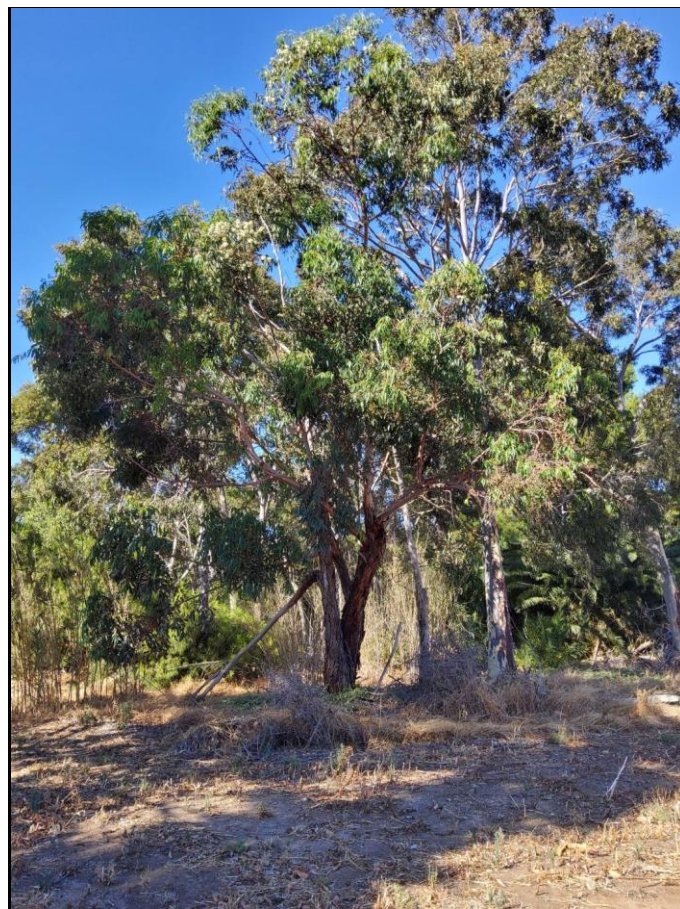
### Retention Rating

Low

This tree has a Low Retention Rating and should not form a material constraint to the redevelopment of this site. Tree damaging activity, including removal, is likely to be approved as part of an otherwise reasonable development.

## Southern Mahogany or Bangalay

Inspected:	18 January 2022
Height:	5-10 metres
Spread:	5-10 metres
Health:	Good
Structure:	Fair
Form:	Fair
Trunk Circumference:	>2 metres
Useful Life Expectancy:	>10 years
Tree Protection Zone:	6.38 metres



### Observations

This tree is considered to be fair overall condition due to the structure displaying a moderate level of decay, branch failure and stable included bark. The tree also has a slightly increased volume of deadwood however this has not affected its overall health rating.

### Legislative Status

Regulated

This tree has a trunk circumference greater than two metres and is not subject to any exemption from regulation and therefore it is identified as a Regulated Tree as defined in the Planning, Development and Infrastructure Act 2016.

### Retention Rating

Low

This tree has a Low Retention Rating and should not form a material constraint to the redevelopment of this site. Tree damaging activity, including removal, is likely to be approved as part of an otherwise reasonable development.



Drooping Sheoak

Inspected:	18 January 2022
Height:	<5 metres
Spread:	<5 metres
Health:	Dead
Structure:	Fair
Form:	Fair
Trunk Circumference:	>3 metres
Useful Life Expectancy:	Surpassed
Tree Protection Zone:	Not applicable

Observations

This tree is dead with no opportunity for remediation.



Legislative Status	Exempt
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This tree is exempt from control under the Planning, Development and Infrastructure Act 2016.

Retention Rating	Low
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This tree has a Low Retention Rating and should not form a material constraint to the redevelopment of this site. Tree damaging activity, including removal, is likely to be approved as part of an otherwise reasonable development.



## Canary Island Date Palm

Inspected:	18 January 2022
Height:	5-10 metres
Spread:	5-10 metres
Health:	Good
Structure:	Good
Form:	Good
Trunk Circumference:	>2 metres
Useful Life Expectancy:	>20 years
Tree Protection Zone:	4.00 metres



### Observations

The health and structure of this tree indicate it is in good overall condition and has adapted to its local environment.

### Legislative Status

Regulated

This tree has a trunk circumference greater than two metres and is not subject to any exemption from regulation and therefore it is identified as a Regulated Tree as defined in the Planning, Development and Infrastructure Act 2016.

### Retention Rating

Moderate

This tree has a Moderate Retention Rating and could be considered for retention if it can be protected. It is likely that tree damaging activity, including removal, will only be approved if it is shown that alternative design solutions are not available.

## Canary Island Date Palm

Inspected:	18 January 2022
Height:	5-10 metres
Spread:	5-10 metres
Health:	Good
Structure:	Good
Form:	Good
Trunk Circumference:	>2 metres
Useful Life Expectancy:	>20 years
Tree Protection Zone:	4.00 metres

### Observations

The health and structure of this tree indicate it is in good overall condition and has adapted to its local environment.



Legislative Status	Regulated
Retention Rating	Moderate

This tree has a trunk circumference greater than two metres and is not subject to any exemption from regulation and therefore it is identified as a Regulated Tree as defined in the Planning, Development and Infrastructure Act 2016.

This tree has a Moderate Retention Rating and could be considered for retention if it can be protected. It is likely that tree damaging activity, including removal, will only be approved if it is shown that alternative design solutions are not available.



## Canary Island Date Palm

Inspected:	18 January 2022
Height:	5-10 metres
Spread:	5-10 metres
Health:	Good
Structure:	Good
Form:	Good
Trunk Circumference:	>2 metres
Useful Life Expectancy:	>20 years
Tree Protection Zone:	4.00 metres

### Observations

The health and structure of this tree indicate it is in good overall condition and has adapted to its local environment.



### Legislative Status

Regulated

This tree has a trunk circumference greater than two metres and is not subject to any exemption from regulation and therefore it is identified as a Regulated Tree as defined in the Planning, Development and Infrastructure Act 2016.

### Retention Rating

Moderate

This tree has a Moderate Retention Rating and could be considered for retention if it can be protected. It is likely that tree damaging activity, including removal, will only be approved if it is shown that alternative design solutions are not available.



## Canary Island Date Palm

Inspected:	18 January 2022
Height:	5-10 metres
Spread:	5-10 metres
Health:	Good
Structure:	Good
Form:	Good
Trunk Circumference:	>2 metres
Useful Life Expectancy:	>20 years
Tree Protection Zone:	4.00 metres



### Observations

The health and structure of this tree indicate it is in good overall condition and has adapted to its local environment.

### Legislative Status

Regulated

This tree has a trunk circumference greater than two metres and is not subject to any exemption from regulation and therefore it is identified as a Regulated Tree as defined in the Planning, Development and Infrastructure Act 2016.

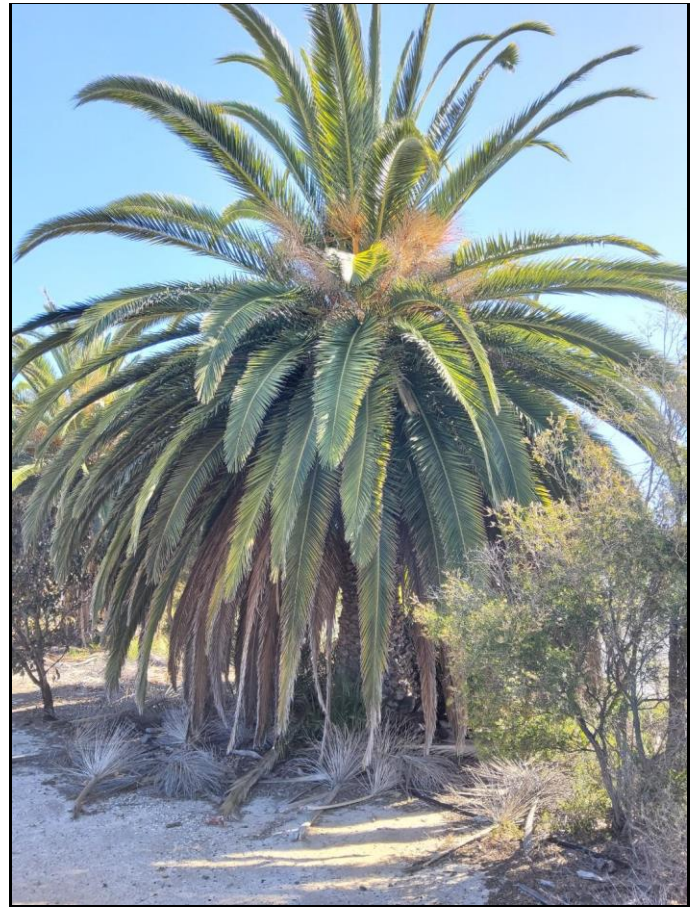
### Retention Rating

Moderate

This tree has a Moderate Retention Rating and could be considered for retention if it can be protected. It is likely that tree damaging activity, including removal, will only be approved if it is shown that alternative design solutions are not available.

## Canary Island Date Palm

Inspected:	18 January 2022
Height:	5-10 metres
Spread:	5-10 metres
Health:	Good
Structure:	Good
Form:	Good
Trunk Circumference:	>2 metres
Useful Life Expectancy:	>20 years
Tree Protection Zone:	4.00 metres



### Observations

The health and structure of this tree indicate it is in good overall condition and has adapted to its local environment.

### Legislative Status

Regulated

This tree has a trunk circumference greater than two metres and is not subject to any exemption from regulation and therefore it is identified as a Regulated Tree as defined in the Planning, Development and Infrastructure Act 2016.

### Retention Rating

Moderate

This tree has a Moderate Retention Rating and could be considered for retention if it can be protected. It is likely that tree damaging activity, including removal, will only be approved if it is shown that alternative design solutions are not available.



## Canary Island Date Palm

Inspected:	18 January 2022
Height:	5-10 metres
Spread:	5-10 metres
Health:	Good
Structure:	Good
Form:	Good
Trunk Circumference:	>2 metres
Useful Life Expectancy:	>20 years
Tree Protection Zone:	4.00 metres

### Observations

The health and structure of this tree indicate it is in good overall condition and has adapted to its local environment.



### Legislative Status

Regulated

This tree has a trunk circumference greater than two metres and is not subject to any exemption from regulation and therefore it is identified as a Regulated Tree as defined in the Planning, Development and Infrastructure Act 2016.

### Retention Rating

Moderate

This tree has a Moderate Retention Rating and could be considered for retention if it can be protected. It is likely that tree damaging activity, including removal, will only be approved if it is shown that alternative design solutions are not available.



## Canary Island Date Palm

Inspected:	18 January 2022
Height:	10-15 metres
Spread:	5-10 metres
Health:	Good
Structure:	Good
Form:	Good
Trunk Circumference:	>2 metres
Useful Life Expectancy:	>20 years
Tree Protection Zone:	3.50 metres

### Observations

The health and structure of this tree indicate it is in good overall condition and has adapted to its local environment.



### Legislative Status

Regulated

This tree has a trunk circumference greater than two metres and is not subject to any exemption from regulation and therefore it is identified as a Regulated Tree as defined in the Planning, Development and Infrastructure Act 2016.

### Retention Rating

Moderate

This tree has a Moderate Retention Rating and could be considered for retention if it can be protected. It is likely that tree damaging activity, including removal, will only be approved if it is shown that alternative design solutions are not available.

## Canary Island Date Palm

Inspected:	18 January 2022
Height:	5-10 metres
Spread:	5-10 metres
Health:	Good
Structure:	Good
Form:	Good
Trunk Circumference:	>2 metres
Useful Life Expectancy:	>20 years
Tree Protection Zone:	3.50 metres

### Observations

The health and structure of this tree indicate it is in good overall condition and has adapted to its local environment.



### Legislative Status

Regulated

This tree has a trunk circumference greater than two metres and is not subject to any exemption from regulation and therefore it is identified as a Regulated Tree as defined in the Planning, Development and Infrastructure Act 2016.

### Retention Rating

Moderate

This tree has a Moderate Retention Rating and could be considered for retention if it can be protected. It is likely that tree damaging activity, including removal, will only be approved if it is shown that alternative design solutions are not available.

## Canary Island Date Palm

Inspected:	18 January 2022
Height:	5-10 metres
Spread:	5-10 metres
Health:	Good
Structure:	Good
Form:	Good
Trunk Circumference:	>2 metres
Useful Life Expectancy:	>20 years
Tree Protection Zone:	3.50 metres

### Observations

The health and structure of this tree indicate it is in good overall condition and has adapted to its local environment.



### Legislative Status

Regulated

This tree has a trunk circumference greater than two metres and is not subject to any exemption from regulation and therefore it is identified as a Regulated Tree as defined in the Planning, Development and Infrastructure Act 2016.

### Retention Rating

Moderate

This tree has a Moderate Retention Rating and could be considered for retention if it can be protected. It is likely that tree damaging activity, including removal, will only be approved if it is shown that alternative design solutions are not available.



## Willow Myrtle

Inspected:	18 January 2022
Height:	5-10 metres
Spread:	5-10 metres
Health:	Fair
Structure:	Fair
Form:	Fair
Trunk Circumference:	>3 metres
Useful Life Expectancy:	<10 years
Tree Protection Zone:	9.76 metres



### Observations

This tree is considered to be fair overall condition due to the moderately reduced foliage density and the presence of stable included bark in the primary structure.

### Legislative Status

Significant

This tree has a trunk circumference greater than three metres and is not subject to any exemption from regulation and therefore it is identified as a Significant Tree as defined in the Planning, Development and Infrastructure Act 2016.

### Retention Rating

Low

This tree has a Low Retention Rating and should not form a material constraint to the redevelopment of this site. Tree damaging activity, including removal, is likely to be approved as part of an otherwise reasonable development.

## Willow Myrtle

Inspected:	18 January 2022
Height:	5-10 metres
Spread:	5-10 metres
Health:	Fair
Structure:	Fair
Form:	Fair
Trunk Circumference:	>3 metres
Useful Life Expectancy:	<10 years
Tree Protection Zone:	11.29 metres



### Observations

This tree is considered to be fair overall condition due to the moderately reduced foliage density and the presence of stable included bark in the primary structure.

### Legislative Status

Significant

This tree has a trunk circumference greater than three metres and is not subject to any exemption from regulation and therefore it is identified as a Significant Tree as defined in the Planning, Development and Infrastructure Act 2016.

### Retention Rating

Low

This tree has a Low Retention Rating and should not form a material constraint to the redevelopment of this site. Tree damaging activity, including removal, is likely to be approved as part of an otherwise reasonable development.



## Willow Myrtle

Inspected:	18 January 2022
Height:	5-10 metres
Spread:	5-10 metres
Health:	Fair
Structure:	Fair
Form:	Fair
Trunk Circumference:	>3 metres
Useful Life Expectancy:	<10 years
Tree Protection Zone:	10.70 metres



### Observations

This tree is considered to be fair overall condition due to the moderately reduced foliage density and the presence of stable included bark in the primary structure.

### Legislative Status

Significant

This tree has a trunk circumference greater than three metres and is not subject to any exemption from regulation and therefore it is identified as a Significant Tree as defined in the Planning, Development and Infrastructure Act 2016.

### Retention Rating

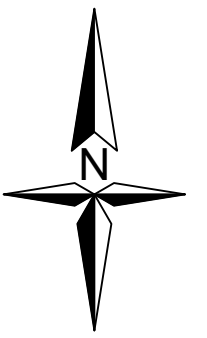
Low

This tree has a Low Retention Rating and should not form a material constraint to the redevelopment of this site. Tree damaging activity, including removal, is likely to be approved as part of an otherwise reasonable development.



## Appendix C - Mapping





### Legislative Status

- S Significant
- R Regulated
- E Exempt
- U Unregulated

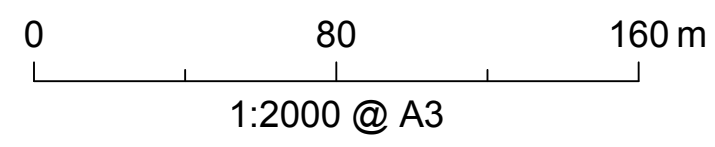
### Retention Rating

- Important
- High
- Moderate
- Low

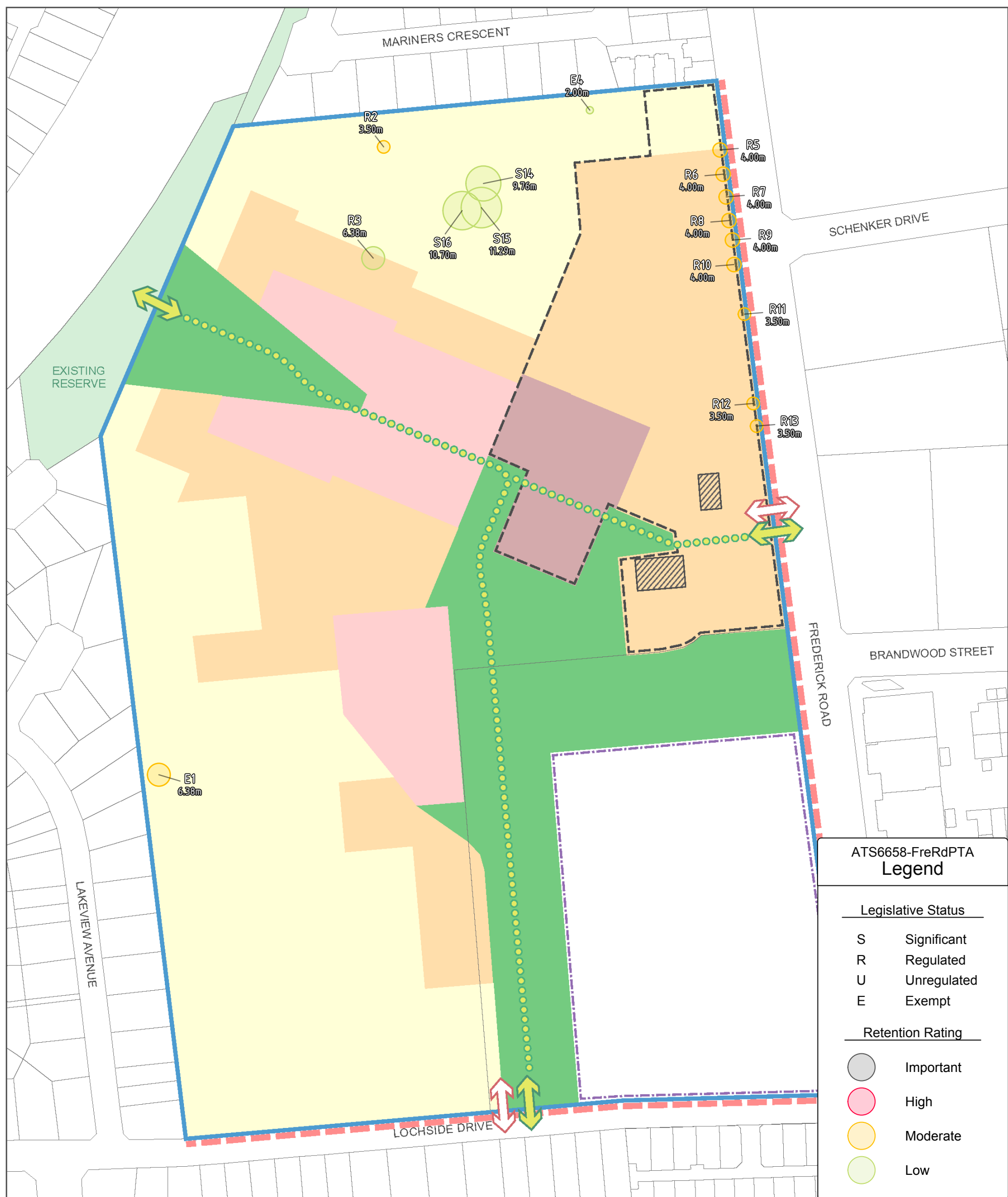
Date: 25/01/2022  
 Ref: ATS6658-FreRdPTA  
 Arborman Tree Solutions  
 23 Aberdeen Street  
 Port Adelaide SA 5015  
 0418 812 967  
[www.arborman.com.au](http://www.arborman.com.au)

## Preliminary Tree Assessment

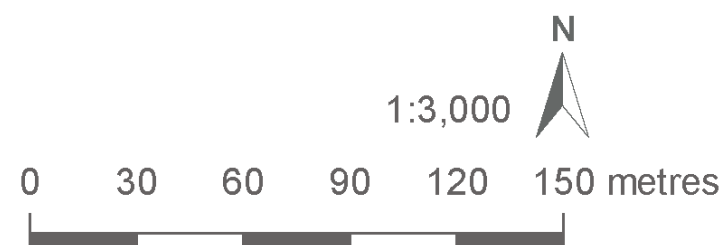
### 16 Frederick Road, West Lakes (former SA Water WWTP)







- Concept Plan Boundary
- Mixed Use Transition Subzone
- Infrastructure Zone
- Indicative Pedestrian/Cycle Access
- Indicative Pedestrian/Cycle Network
- Indicative Vehicle Access
- Local Heritage Place
- Maximum 2 Storeys (8.5m)
- Maximum 3 Storeys (12.5m)
- Maximum 4 Storeys (16.5m)
- Maximum 5 Storeys (22m)
- Indicative Public Open Space
- Future verge widening for footpath and streetscaping



# Concept Plan X

## WEST LAKES



## Appendix D - Tree Assessment Summary

# Tree Assessment Summary

Tree Number	Botanic Name	Legislative Status	Retention Rating	TPZ Radius	Observations
1	<i>Corymbia citriodora</i>	Exempt	Moderate	6.38 metres	The health and structure of this tree indicate it is in good overall condition and has adapted to its local environment.
2	<i>Phoenix canariensis</i>	Regulated	Low	3.50 metres	The health and structure of this tree indicate it is in good overall condition and has adapted to its local environment. The trunk circumference has been estimated as existing dead palm fronds make accurate measurement difficult.
3	<i>Eucalyptus botryoides</i>	Regulated	Low	6.38 metres	This tree is considered to be fair overall condition due to the structure displaying a moderate level of decay, branch failure and stable included bark. The tree also has a slightly increased volume of deadwood however this has not affected its overall health rating.
4	<i>Allocasuarina verticillata</i>	Exempt	Low	Not applicable	This tree is dead with no opportunity for remediation.
5	<i>Phoenix canariensis</i>	Regulated	Moderate	4.00 metres	The health and structure of this tree indicate it is in good overall condition and has adapted to its local environment.
6	<i>Phoenix canariensis</i>	Regulated	Moderate	4.00 metres	The health and structure of this tree indicate it is in good overall condition and has adapted to its local environment.
7	<i>Phoenix canariensis</i>	Regulated	Moderate	4.00 metres	The health and structure of this tree indicate it is in good overall condition and has adapted to its local environment.
8	<i>Phoenix canariensis</i>	Regulated	Moderate	4.00 metres	The health and structure of this tree indicate it is in good overall condition and has adapted to its local environment.

# Tree Assessment Summary

Tree Number	Botanic Name	Legislative Status	Retention Rating	TPZ Radius	Observations
9	<i>Phoenix canariensis</i>	Regulated	Moderate	4.00 metres	The health and structure of this tree indicate it is in good overall condition and has adapted to its local environment.
10	<i>Phoenix canariensis</i>	Regulated	Moderate	4.00 metres	The health and structure of this tree indicate it is in good overall condition and has adapted to its local environment.
11	<i>Phoenix canariensis</i>	Regulated	Moderate	3.50 metres	The health and structure of this tree indicate it is in good overall condition and has adapted to its local environment.
12	<i>Phoenix canariensis</i>	Regulated	Moderate	3.50 metres	The health and structure of this tree indicate it is in good overall condition and has adapted to its local environment.
13	<i>Phoenix canariensis</i>	Regulated	Moderate	3.50 metres	The health and structure of this tree indicate it is in good overall condition and has adapted to its local environment.
14	<i>Agonis flexuosa</i>	Significant	Low	9.76 metres	This tree is considered to be fair overall condition due to the moderately reduced foliage density and the presence of stable included bark in the primary structure.
15	<i>Agonis flexuosa</i>	Significant	Low	11.29 metres	This tree is considered to be fair overall condition due to the moderately reduced foliage density and the presence of stable included bark in the primary structure.
16	<i>Agonis flexuosa</i>	Significant	Low	10.70 metres	This tree is considered to be fair overall condition due to the moderately reduced foliage density and the presence of stable included bark in the primary structure.