



# Donnybrook Precinct Structure Plan

## Utilities Servicing and Infrastructure Assessment

Project Number: CG130061

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## Executive Summary

Cardno has been commissioned by the Metropolitan Planning Authority to investigate and report on the feasibility of servicing development in Donnybrook Precinct (PSP 1067). Services investigated are main drainage, drinking water, recycled water, sewerage, electricity, gas and telecommunications.

Investigations have determined that the infrastructure required to cater for the proposed development of the Donnybrook Precinct can be provided based on the strategies prepared for the precinct by the relevant authorities.

The following significant constraints regarding development of the Precinct have been identified for consideration:

- Timing of strategic water supply infrastructure works which are required for the development and are not currently programmed for early construction.
- Existing transmission gas pipeline passing north-south through the site and the associated 35 metre wide easement, with two proposed citygate pressure reducing stations, one proposed south of Donnybrook Road and the other one potentially located within the Precinct, and the adjoining buffer zone with development type restrictions.
- Land required to be reserved for stormwater retarding basins and wetlands
- Land required for the water supply distribution mains along Donnybrook Road, and a booster pump station.
- Congestion of utility services in Donnybrook Road and especially crossing the north-south railway at Donnybrook Road.

## 1 Introduction

The Metropolitan Planning Authority (MPA) is overseeing the preparation of a Precinct Structure Plan for Donnybrook (PSP 1067). To assist in this process, MPA has engaged Cardno to investigate and report on the requirements for the provision of services infrastructure to cater for new urban development in Donnybrook Precinct.

As a part of this investigation, we have reviewed existing services asset information and liaised with the relevant authorities regarding servicing strategies to cater for the development of the land in question.

Services assessed are sewerage, potable water, recycled water, electricity, gas, telecommunications, and general stormwater management and drainage.

This report summarises the outcomes of this investigation.

## 2 Site Description

The area under consideration for the Precinct Structure Plan is within the City of Whittlesea (predominately) and the Shire of Mitchell. It is defined in the west by the Melbourne-Sydney Railway, in the south by Donnybrook Road, and in the north by the Outer Metropolitan Ring Road (E6) reservation. The eastern boundary is approximately north-south in alignment and follows current title boundaries but is approximately midway between the railway and Merriang Road.



The approved Lockerbie PSP adjoins to the west of the railway line. Adjoining to the east is the Woodstock PSP (PSP1096) assessed separately by Cardno.

The Donnybrook PSP Precinct is approximately 1067 hectares in gross area.

Existing land use is predominately agricultural and grazing.

### **3 Development Proposal**

The primary proposed land use of the Donnybrook Precinct is residential. It is expected that the precinct will eventually accommodate over 7500 residential lots. There will be local town centres, community hub facilities, active recreation, passive reserves and conservation areas. The Donnybrook Principal Town Centre is expected to be the main commercial centre although this is located in the adjacent Lockerbie Precinct.

The northern part of the Donnybrook Precinct from Merri Creek north to the Precinct boundary along the E6, which lies within the Shire of Mitchell, is identified in the Northern Growth Corridor Plan as "potential urban". The PSP for Donnybrook will need to confirm intended use of this land. The MPA's draft future urban structure plan of May 2014 conceives of low density residential development of the area to around 300 dwellings.

### **4 Services Infrastructure**

Service infrastructure requirements for each service within the Precinct are outlined within the following sections.

The general servicing strategy and any service infrastructure which may require specific land provision or which will impact on the nature of the adjoining development has been identified. Otherwise the local reticulation of services is generally assumed to occur within normal road reserve widths in accordance with normal practice.

#### **4.1 Main Drainage**

Melbourne Water is the responsible authority for the provision of main drainage for Donnybrook Precinct.

Donnybrook Precinct lies predominately within the Merri Creek catchment and the Lockerbie East Development Services Scheme (DSS6508). The Scheme is currently (July 2014) in the consultation period and is expected to be finalised by Melbourne Water shortly. Land north of Merri Creek is subject to the finalised Beveridge East Development Services Scheme (DSS 6513). Drainage planning for the southernmost areas of the precinct (Langley Park Drive DSS) is yet to be concluded.

Initial investigation has identified the need for 3 retarding basins and wetlands. The plan in Annex 2 shows the proposed location of these facilities. Initial scheme pipe and channel alignments have been determined by Melbourne Water which are tentative and subject to alteration

A strip of land adjoining Donnybrook Road forms part of Darebin Creek North catchment and is not included the Lockerbie East Development Services Scheme. Part of the land to the north of Merri Creek, while still within the Merri Creek catchment, is also excluded from the Lockerbie East Scheme. It is expected that additional Schemes will be prepared to cover these areas prior to development commencing.

Melbourne Water Planning for DSS6508 is shown in Annex 2. Retarding basins and wetlands shown in Annex 2 are approximate only and subject to change.

## 4.2 Yarra Valley Water Strategy

Yarra Valley Water (YVW) is the water and sewerage provider for the Donnybrook Precinct. There are no current YVW water or sewerage assets within the Precinct.

YVW is currently preparing strategies for sewerage, water supply and recycled water servicing for the entire Northern (Hume Highway) Corridor of which Donnybrook forms a part. The strategies form the basis of a five year Water Plan recently approved by the Essential Services Commission (ESC). The strategy plans have been published on the YVW website as “Kalkallo” and “Hume” Infrastructure Plans. Local updates specific to the Donnybrook and Woodstock Precincts have recently been prepared by YVW and are reproduced in Annexes 3, 4 and 5. These plans are more up to date than the plans currently on the YVW website.

While Yarra Valley Water has identified the assets required to service the Northern Corridor, it has not finalised all asset sizes or the land requirements for these assets.

The timing of the construction of the various elements will be determined in part by development demand. The Water Plan will programme works into 5 year periods e.g. 2013-2017, 2018-2022 etc. Most of the assets required for Donnybrook Precinct will not be included in the 2013-2017 Plan.

The strategic assets will be classified as “shared assets” and therefore YVW funded. However, bring-forward charges will be levied on the developer where the assets are required ahead of the YVW Infrastructure Works Programme to service a particular development. Under new ESC guidelines the developer must pay a bring-forward charge for assets which need to be constructed earlier than YVW programming. The bring forward or incremental financing charge is calculated by

$$IFC = (1 - [1 / (1+r)^n]) \times \text{cost of capital being provided sooner than planned}$$

where:

r = estimated pre-tax WACC

n = the number of years the asset is required sooner than planned.

In summary, full development of this and adjoining precincts will require very extensive capital works by Yarra Valley Water possibly partly funded by bring-forward contributions by developers. Works will require coordination with the YVW development programme.

Developers will be required to pay New Customer Contributions dependent on the lot area, which are set by the ECC as follows (New Urban Growth Boundary Zone): which are assessed as follows for 2013-14 financial year:

*Lots smaller than 450 m<sup>2</sup>*

Water	\$705.21
Sewer	\$705.21
Recycled water	\$640.64

*Lots larger than 450 m<sup>2</sup>*

Water	\$1320.23
Sewer	\$1320.23
Recycled water	\$640.64

### 4.2.1 Potable Water

Yarra Valley Water’s proposed strategy for the Northern Corridor includes provision for Donnybrook Precinct.

The closest existing water main to the precinct is at the corner of Brookville Drive and Donnybrook Road, approximately 1.8 km west of the south west boundary of the Precinct. This main is in any case not adequate to service the Precinct although some interim servicing of initial development may be possible.

Yarra Valley Water's servicing strategy is to construct supply tanks on Bald Hill within the adjacent Lockerbie precinct to the west which is the highest point in the region. Land for the tank has not yet been purchased. The tanks will be charged by a feeder main from Yan Yean Reservoir to the east and this feeder main, tentative diameter 900 mm, must traverse the Donnybrook Precinct from east to west. This main has been tentatively located in a proposed pipe reserve along the northern fringe of the Precinct bordering the OMR.

An additional smaller reservoir on Hayes Hill in the adjacent Woodstock Precinct to the east has also been proposed although visual amenity considerations have not yet been resolved.

Distribution mains will also be required to service the Precinct, from Bald Hill south to Donnybrook Road, along the Donnybrook Road frontage including a rail crossing, and within the development.

**These works are not included within the 5 year plan and the estimated period for construction is 2018-2023. Early development of the Donnybrook Precinct will be dependent on bringing forward the programming of the initial Bald Hill tank and the Yan Yean-Bald Hill feeder main.**

An interim arrangement to service initial development within the Precinct using a connection to the 600mm diameter water main at Brookville Drive may be investigated. Modelling by Yarra Valley Water will be required to determine the available capacity in this system but available capacity would be competed for by neighbouring precincts. Adoption of this system as an interim supply would also require early construction of the water main along Donnybrook Road constituting 1.8 km of main west of the railway including a crossing of Merri Creek, crossing the railway as well as the length from the railway to the point of commencement of development to bring an interim supply to the site. In a letter to MPA dated 2 August 2013, YVW estimated that this system could cater for an initial 500 lots. The actual number would depend on many factors including competition from development in other precincts.

Pipeline alignments shown on YVW strategy plans should be regarded as tentative and would be adjusted to coincide with road alignments. Significant pipelines are shown in Annex 3 and are

- Yan Yean to Bald Hill transfer main, tentatively 900mm diameter, location adjacent to OMR at northern fringe of precinct. Conservation issues may need to be addressed. Main is likely to require a pipe reserve.
- Bald Hill to Hayes Hill transfer main, traversing the site, tentatively 450mm diameter, likely to require pipe reserve,
- East-west distribution main, tentatively 525 mm diameter, along Donnybrook Road alignment but not crossing railway at Donnybrook Road.
- Second east west distribution main, tentatively 300-375mm diameter, along Donnybrook Road alignment including rail crossing.
- East-west distribution main, tentatively 300-450mm diameter, approximately 1.6 km north of Donnybrook Road. Location probably in road reserve and location will be adjusted to match road layout. Access to rail reserve for crossing is required.
- North-south distribution main, tentatively 600mm diameter, between Hayes Hill and Donnybrook Road. May be within Donnybrook Precinct or may be in Woodstock Precinct to the east. Location will be shared with the pipe reserve required for recycled water (4.2.2).

Land allocation will be required to allow for water supply assets. Currently YVW planning is not yet at the point where these land requirements can be quantified, however the increased road reserve widths is unlikely to exceed 2 metres for single feeder water mains. Where a dedicated Pipe Reserve is required this will need to be confirmed by YVW, and the alignment considered through the site. The size of the pipe reserve is not known but pipe reserves can be as wide as 20 metres.

The Yarra Valley Water strategy also requires a booster pumping station along the boundary of the Donnybrook and Woodstock precincts. This is required for servicing of land higher than 256 metres AHD – i.e. the northern portion of the Precinct only, coloured cream and labelled “DONNYBROOK PB DW ZONE” in the plan in Annex 3. The booster pumping station will not be needed for development of the southern part of the Precinct. The location indicated on the YVW strategy plan is preliminary and it is not definite whether the pump station will be in Donnybrook or Woodstock precinct. This pumping station will require some land allocation including a buffer zone. The size of the buffer zone is not yet known but a radius of 50 metres may be indicative. There may be scope to have the buffer zone coincide with other land uses such as passive recreation.

Yarra Valley Water is considering early installation of the distribution main along Donnybrook Road, from Brookville Drive to Hayes Hill, in conjunction with the APA gas main works. If installed this main will provide for the ultimate solution as well as facilitating the interim supply arrangement for initial development.

Yarra Valley Water is installing a scheme to augment the drinking water supplies with treated water from storm water harvesting. Construction of this system is currently proceeding near the Hume Freeway/Donnybrook Road intersection at Kalkallo.

An extract from the YVW Water Supply Strategy Plan covering the Donnybrook and Woodstock Precincts is attached in Annex 3.

#### **4.2.2 Recycled Water**

The Precinct is within a Class A Recycled Water mandated area. Developers will be required to provide dual pipe systems to all allotments.

Yarra Valley Water proposes to supply Class A recycled water to the development area. This water would be treated sewage from the Kalkallo Sewerage Treatment Plant (refer to 4.2.3) pumped to a recycled water tank on Bald Hill. There is also provision to augment this supply with a pipeline from Mount Ridley Tank to the south.

Transfer mains from the sewerage treatment plant to Bald Hill, and from Bald Hill to the Precinct, will be required.

A reservoir is planned on Hayes Hill in the adjacent Woodstock Precinct and a booster pumping station is planned which would be located along the east boundary of the Donnybrook Precinct. Whether the location of the pump station is within the Donnybrook or Woodstock precincts is not yet determined. It is expected that the land for the potable and recycled water booster stations would be shared. The pump station would be required for development of land higher than 256 metres AHD – i.e. the northern portion of the Precinct only.

Internal distribution mains include

- A 300mm main on an east west alignment approximately 1.6km north of Donnybrook Road, in a road reserve
- 375mm transfer main from Kalkallo STB to Hayes Hill Reservoir, requiring a pipe reserve along a north south alignment and along Donnybrook Road
- 300-375mm distribution main along Donnybrook Road, in the road reserve

The works are generally programmed for the 2018-2023 period. In the event of allotments being released prior to availability of Class A recycled water, a temporary cross connection from the drinking water system would be required. Delays in the availability of Class A recycled water or the external infrastructure should not be a constraint on development timing.

An extract from the YVW Recycled Water Supply Strategy Plan covering the Donnybrook and Woodstock Precincts is attached in Annex 4.



### 4.2.3 Sewerage Reticulation

Yarra Valley Water's proposed sewerage strategy for the Northern Corridor includes provision for Donnybrook precinct.

Elements of the YVW strategy critical to serving Donnybrook PSP are:

- Amaroo Branch Sewer (tentatively 1500mm diameter) is proposed to transfer sewage south located parallel with the railway alignment to existing development in the Craigieburn area and thereby connect with the greater Melbourne system. The Amaroo Branch Sewer is to be included in the current 5 year plan (up to 2017) and is expected to be constructed within 3-5 years. The Amaroo Branch Sewer will not be sized to provide capacity for total sewerage disposal for the Corridor.
- Kalkallo Sewerage Treatment Plant is proposed to be located approximately 1km south of the Donnybrook Road and east of the railway line. The plant will service all land in the Corridor north of Donnybrook Road extending north as far as Wallan. The purpose of the plant is to remove volume from ultimate sewer discharges and, utilising sewer mining and treatment, create flows for local distribution to allotments as Class A recycled water. Balance of flows including solids will be discharged to the Amaroo Branch Sewer

The Kalkallo Sewerage Treatment Plant is not included in the proposed YVW 5 year plan and the estimated date for construction is 5-10 years. Actual construction date is likely to be determined by development demand.

Although the long term sewer strategy requires the Kalkallo Treatment Plant, some degree of development can take place utilising the Amaroo Branch Sewer temporarily as the sewerage outlet.

- Lockerbie Branch Sewer (tentatively 975mm diameter) will be located west of the railway line and extend north from Donnybrook Road to service the northern part of Lockerbie and provide sewerage service to developments further north, as well as relieving existing sewerage systems in Wallan, Beveridge and Mandalay. The Lockerbie Branch Sewer is not included in the proposed YVW five year plan but timing may be advanced by development in the Lockerbie PSP. This sewer is not relevant to the servicing of the southern portion of Donnybrook Precinct but will be required to service the northern part (area north of Merri Creek).

The following elements will be required within Donnybrook Precinct, none of which are in the current 5 year programme:

- Branch sewer along most of the length of Donnybrook Road
- Internal branch sewers
- Development within the precinct north of Merri Creek will require a further railway crossing as well as availability (to that point) of the Lockerbie Branch Sewer.

To create a typical gravity-fed sewerage system, development would preferably commence in the south west corner of the precinct and proceed progressively east and north. If the development order is different to this (for example due to land parcels under different ownership), either temporary facilities or sewers through undeveloped land may be required.

An extract from the YVW Sewer Strategy Plan for Kalkallo and detail for Donnybrook-Woodstock are attached in Annex 5.

## 4.3 Electricity Supply

SP Ausnet is the responsible authority for the provision of electricity supply facilities to Donnybrook.

SP Ausnet has provided its 30 year strategy plan for the area. The strategy plan includes a zone substation adjacent to the Precinct, south of Donnybrook Road and west of Merriang Road. The location indicated is not within the Precinct, but due to the preliminary nature of SP Ausnet's planning the location must be regarded as tentative.

A network of underground high voltage cables, typically located within road reserves, and kiosk substations located in small reserves (typically 5 metres by 3 metres) will be extended across the precinct to provide the backbone of the electricity supply network for development.

As an interim measure, it is expected that the existing 22kV overhead supply along Donnybrook Road and the existing Kalkallo substation, can provide electrical supply to initial development. Upgrade of this alignment to 66kV in the near future is planned and ultimate development provision of a further two 22kV supply lines (three 22kV lines and one 66kV line are ultimately required).

SP Ausnet does not support undergrounding of 66kV lines. If undergrounding is required, e.g. for aesthetic reasons, the cost would need to be borne by other parties.

An extract from SP Ausnet's current network planning is shown in Annex 6.

#### **4.4 Gas Supply**

APA Group is the responsible authority for the provision of gas supply facilities to Donnybrook Precinct.

An existing APA transmission high pressure gas main (Keon Park-Wodonga West transmission main, 300mm diameter) traverses the Donnybrook Precinct from north to south. It is mostly located in an existing 35 metre wide easement (Annex 7). A short section is in the adjoining Woodstock Precinct. Development configurations will need to take account of the easement and pipeline alignment.

The 35 metre easement is unavailable to development due to APA requirements to access the easement and pipeline for maintenance and future upgrades. Additionally a buffer or "measurement length" will be required on either side of the easement. The eventual form of development within the buffer is likely to be restricted to meet the Australian Standard AS 2885 for pipelines and will be determined through the precinct structure planning process with input from APA and Energy Safe Victoria.

Gas reticulation to the local development requires a pressure reduction station or citygate to be installed on the APA high pressure gas main. APA Group has planned to install this in the vicinity of the Donnybrook Road crossing and have advised the location is likely to be on the south side of Donnybrook Rd.

APA has indicated that a second citygate is required within the Donnybrook precinct to service Donnybrook and adjacent precincts. An indicative area for the citygate and buffer zone, advised by APA would be in the order of 50m by 50m, the actual location is yet to be determined by APA.

A proposed 300mm diameter east / west distribution gas main is to be constructed by APA along Donnybrook Rd, initially required to service the Merrifield development to the west. APA has advised the distribution main is to be located on the north side of Donnybrook Road and is required by late 2014.

#### **4.5 Telecommunications**

NBN Co. will be the provider of last choice of telecommunications facilities to the Precinct with Donnybrook identified as being within the NBN 'fibre footprint' and where development is expected to exceed 100 premises. NBN Co does not release planning information except in response to specific development applications.

Developers within the precinct will be required to install pit and pipe infrastructure as a part of their subdivisional works with the installation of fibre optic cable to be carried out by NBN Co. including any backhaul works connecting to the external NBN Co. network.

Developers also have the option of alternative arrangements for fibre optic systems with other telecommunications providers.

There are currently two 100 mm Telstra conduits located in the road reserve along Donnybrook Road. These provide for local services to existing properties and the existing cables are unlikely to be of value for subdivisional development. Telstra has indicated that four 100 mm conduits will ultimately be required for servicing with fibre optic if Telstra is engaged as the service provider.

## **4.6 Whittlesea City Council**

Whittlesea City Council (WCC) is responsible for the portion of the precinct south of Merri Creek.

WCC requirements include the provision of communications conduit. WCC has advised that this requirement would be satisfied by a formal agreement with NBN Co for each development.

## **4.7 Mitchell Shire Council**

Mitchell Shire Council is responsible for the portion of the precinct north of Merri Creek.

Council advises there are no evident services or infrastructure within these areas and that, also given that these areas are now within the metropolitan development growth area Council would have no plans to place any major infrastructure in these areas in the foreseeable future.

# **5 Staging and Order of Development**

For the non-gravity-based services, it is expected that services will become available at the Donnybrook Road frontage. Road networks and development will extend northward from Donnybrook Road.

For sewerage and drainage, which are gravity controlled, development would best commence at the south west corner in the area of the Donnybrook Hotel. If this does not occur, sewerage and drainage connections through undeveloped land will be required in advance of development to service the initial development areas.

Water supply for the whole area, including precincts to the west, will depend on construction of the supply tanks at Bald Hill and the Yan Yean-Bald Hill pipeline through the Donnybrook Precinct. This will necessitate a pipeline reserve, whether an internal road or dedicated Pipe Track, being locked in at an early stage.

For the area north of Merri Creek, the servicing strategy will be determined by the road access to bring services to the area. Sewerage provision for this area will also be dependent on the development of the northern part of the adjacent Lockerbie Precinct.

# **6 Service locations in Donnybrook Road**

## **6.1 Donnybrook Road east of Donnybrook Hotel**

Space for provision of utility services in Donnybrook Road has been identified as a significant concern. Existing services in Donnybrook Road are 22kV overhead electricity, and Telstra conduits. Provision will need to be made for additional 22kV and 66kV electricity, telecommunications, gas, drinking water, and recycled water mains and sewers as well as street lighting.

There is very limited space on the north side of the existing carriageway for these services. Location of utility services under the carriageway is generally opposed by the utility companies, VicRoads and Council. Location on the south side of the carriageway is not practicable because VicRoads has yet to acquire the future road widening into private property and in some cases would require removal of existing buildings.

A possible solution is the creation of a service corridor along the northern boundary. Some or all of the utility services would be constructed in this corridor. In the long term this land would become either tree reserve, lot setback or local service road, so there would be no loss of developable land. Estimated minimum width of the corridor is 6 metres.

A proposed layout scheme for the services in Donnybrook Road is shown in Annex 8.

## **6.2 Rail crossing**

At the existing level crossing, space for provision of utility services is even more limited due to:

The existing Donnybrook Hotel constrains utility services from encroaching outside the road reserve on the north side

Future VicRoads overpass constrains utility services from encroaching outside the road reserve on the south side

Existing VicTrack boom gate supports prevent service installation in the road reserve but clear of carriage way. Clearance to VicTrack assets needs to be preserved.

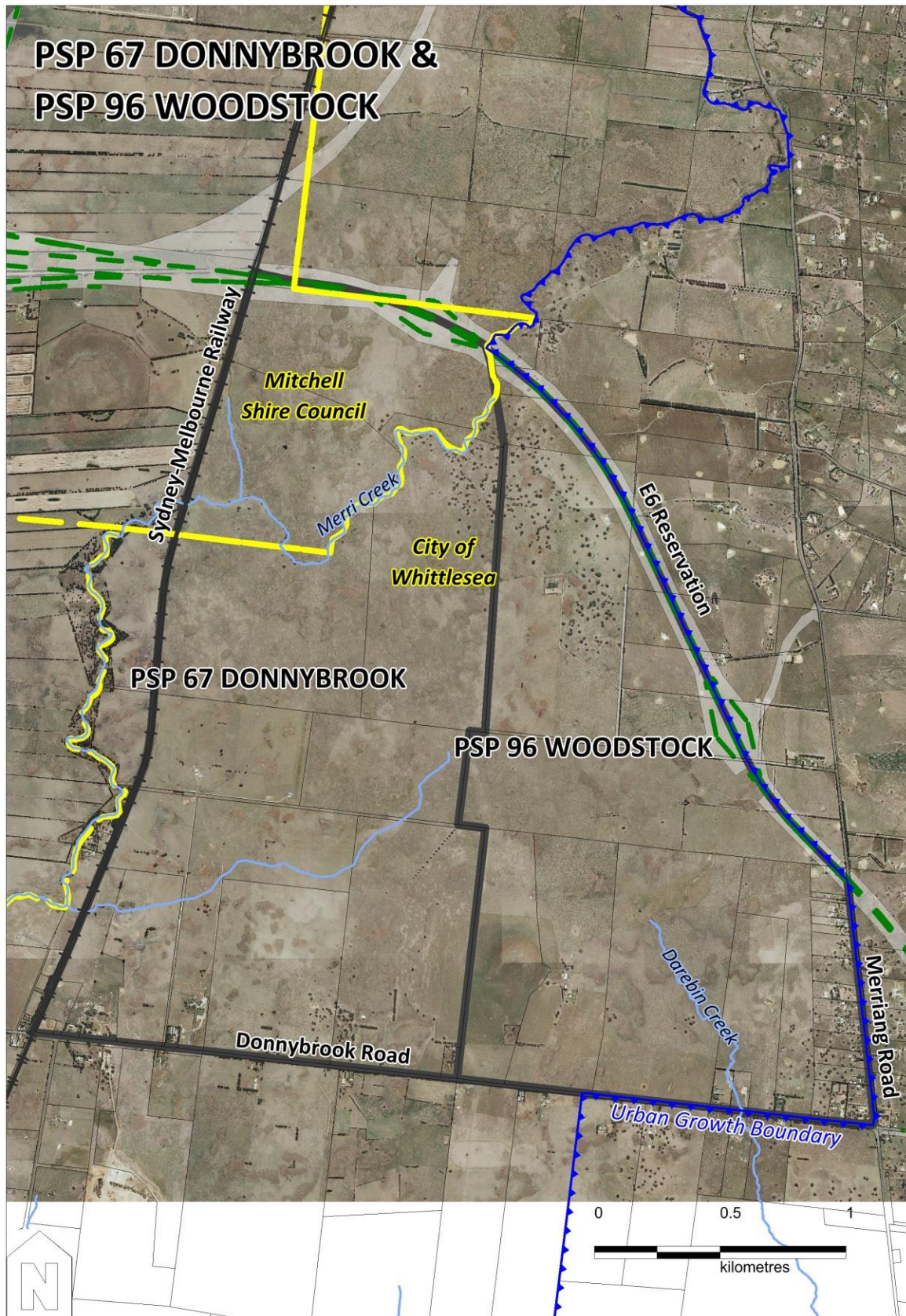
At the crossing it will be necessary to install most of the utility services under the road carriageway, extending to east of the Donnybrook Hotel building. This will mean significantly increased costs for installation due to traffic management and restoration costs, as well as difficulties with future maintenance. However there is no realistic alternative available.

A proposed layout scheme for the services at the railway crossing is shown in Annex 9.

East of the hotel building the service locations would transition to those in Annex 8.

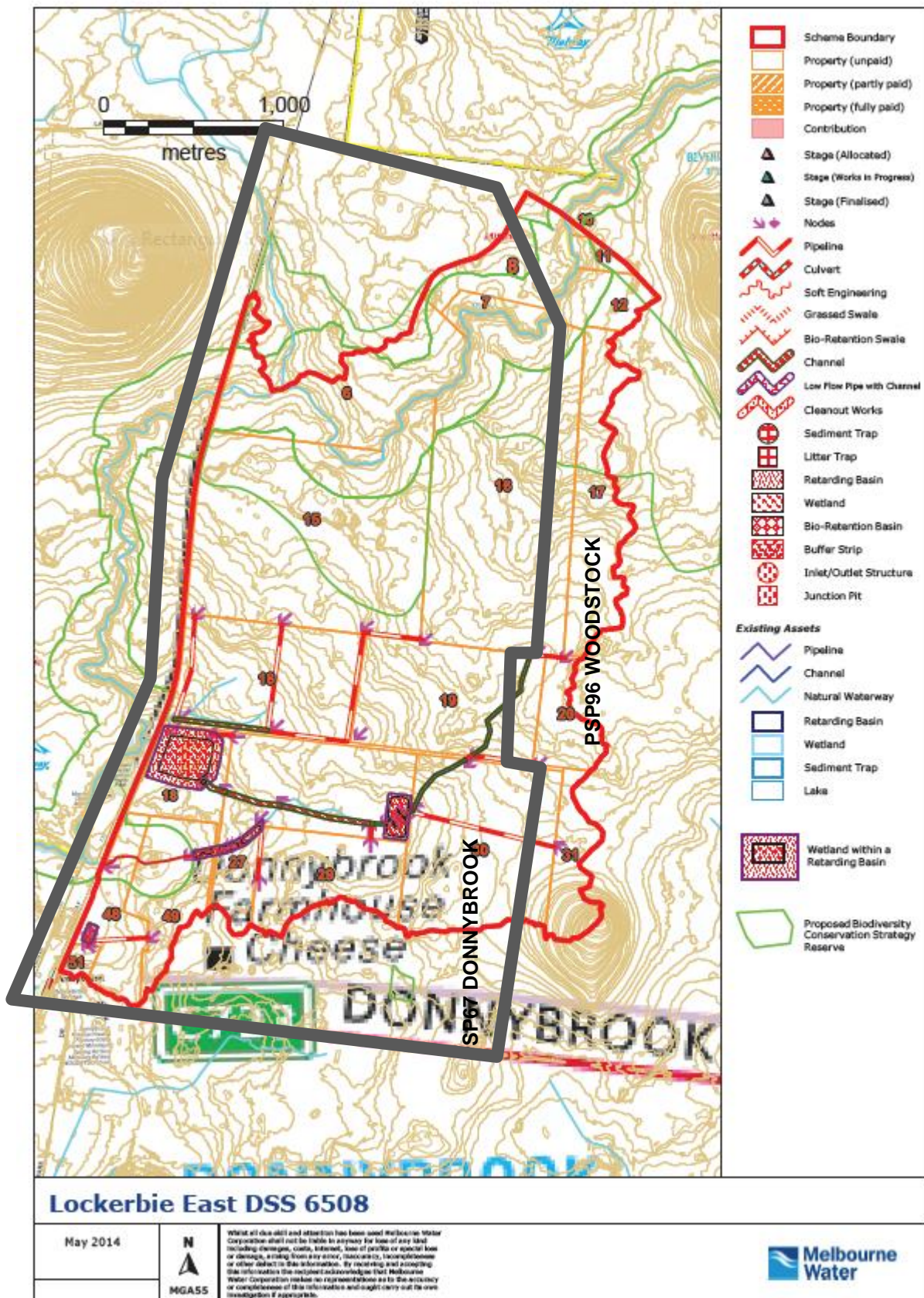
# **Annex 1: Precinct Plan**





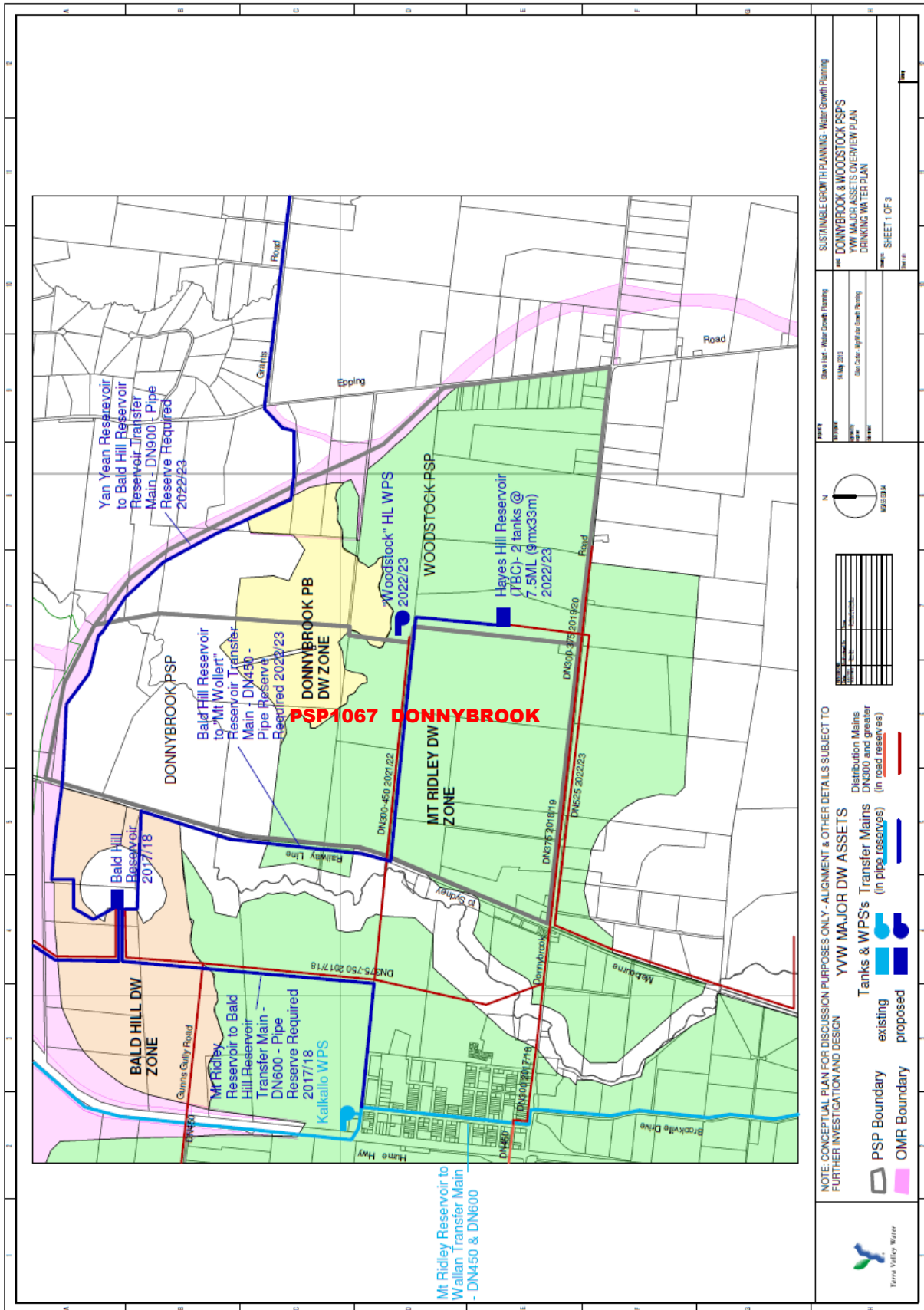
## **Annex 2: Melbourne Water draft planning**





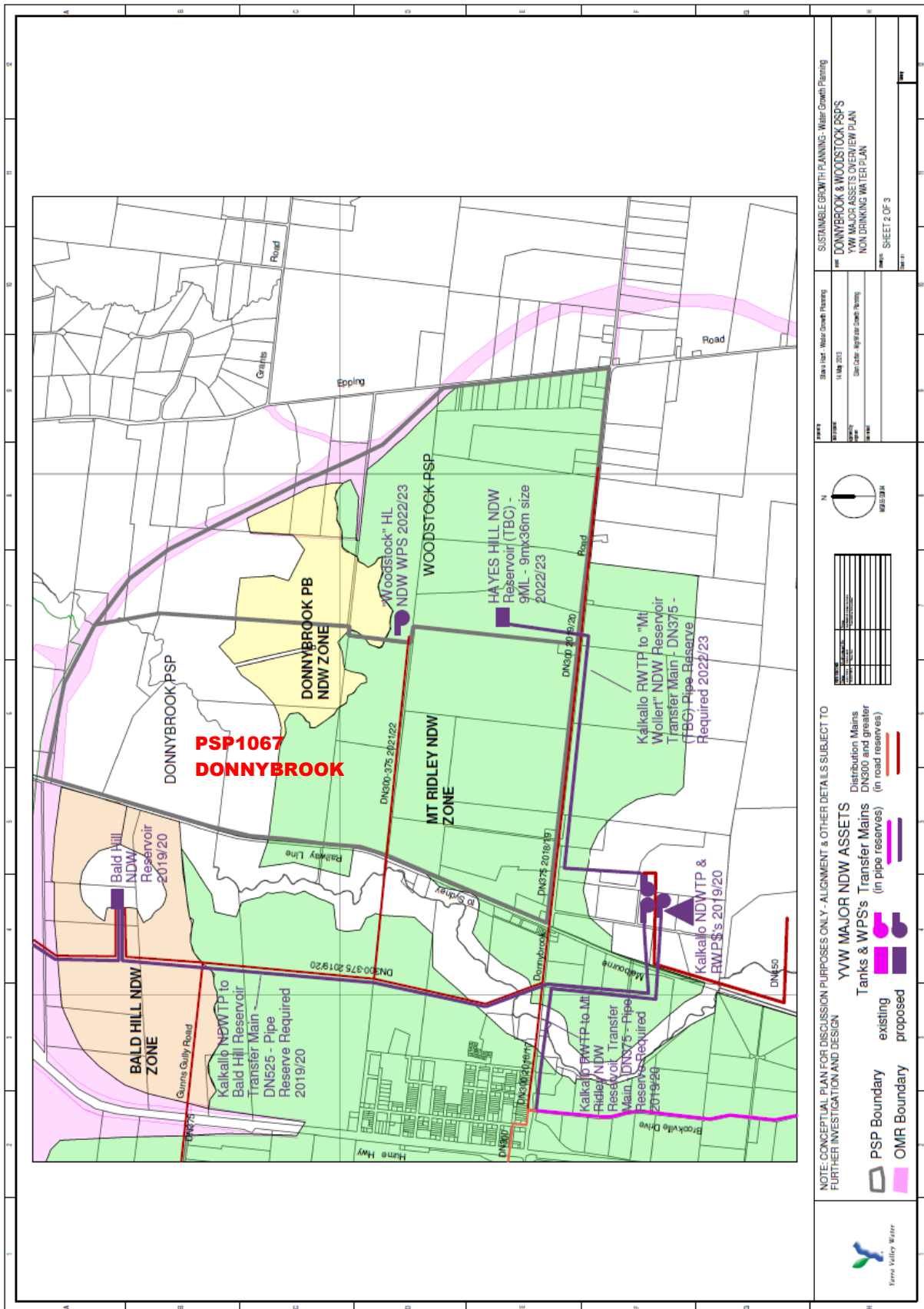
Donnybrook Precinct Boundary

**Annex 3:**  
**Yarra Valley Water**  
**Potable Water Supply Strategy Plan**  
**Donnybrook and Woodstock**

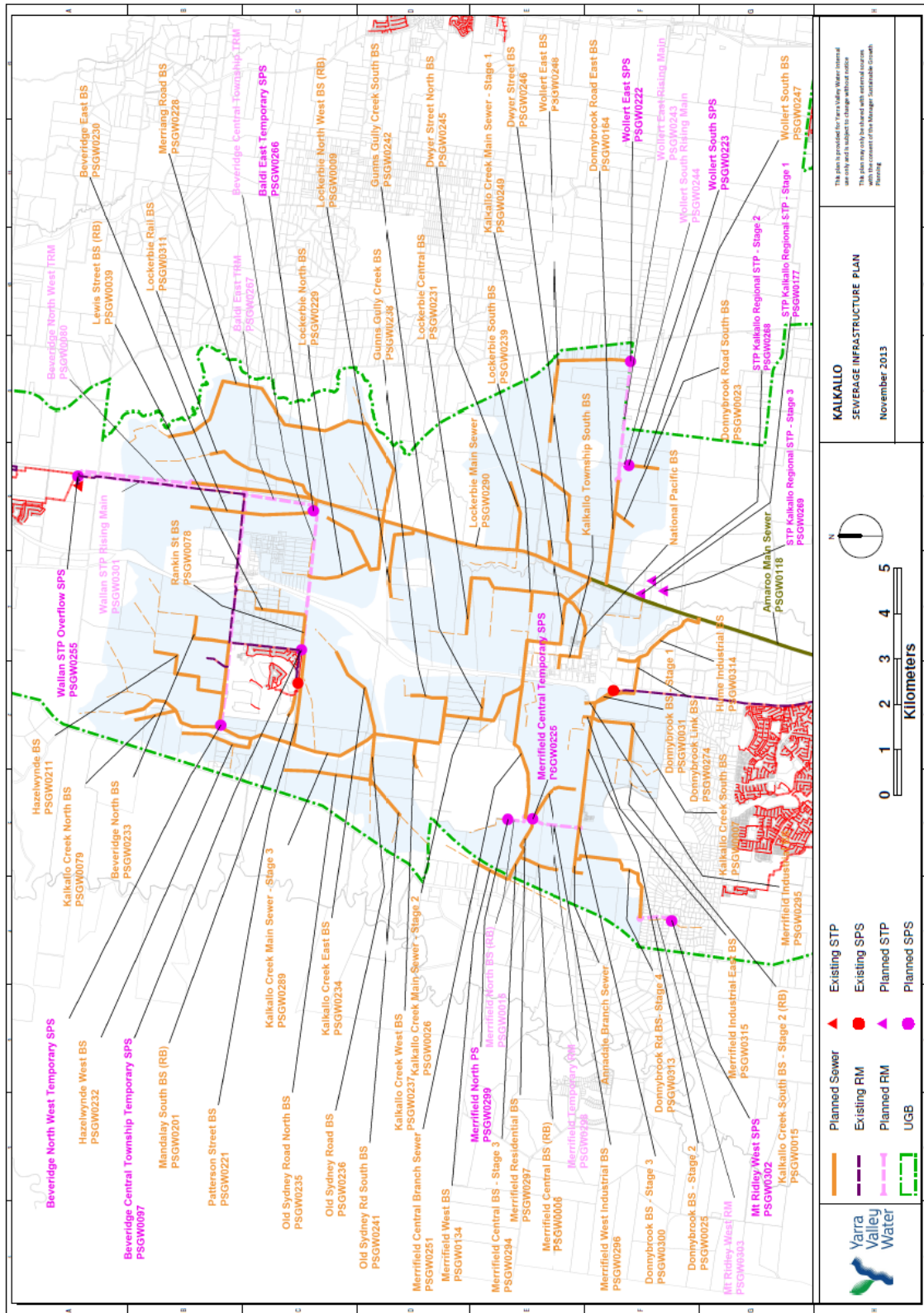




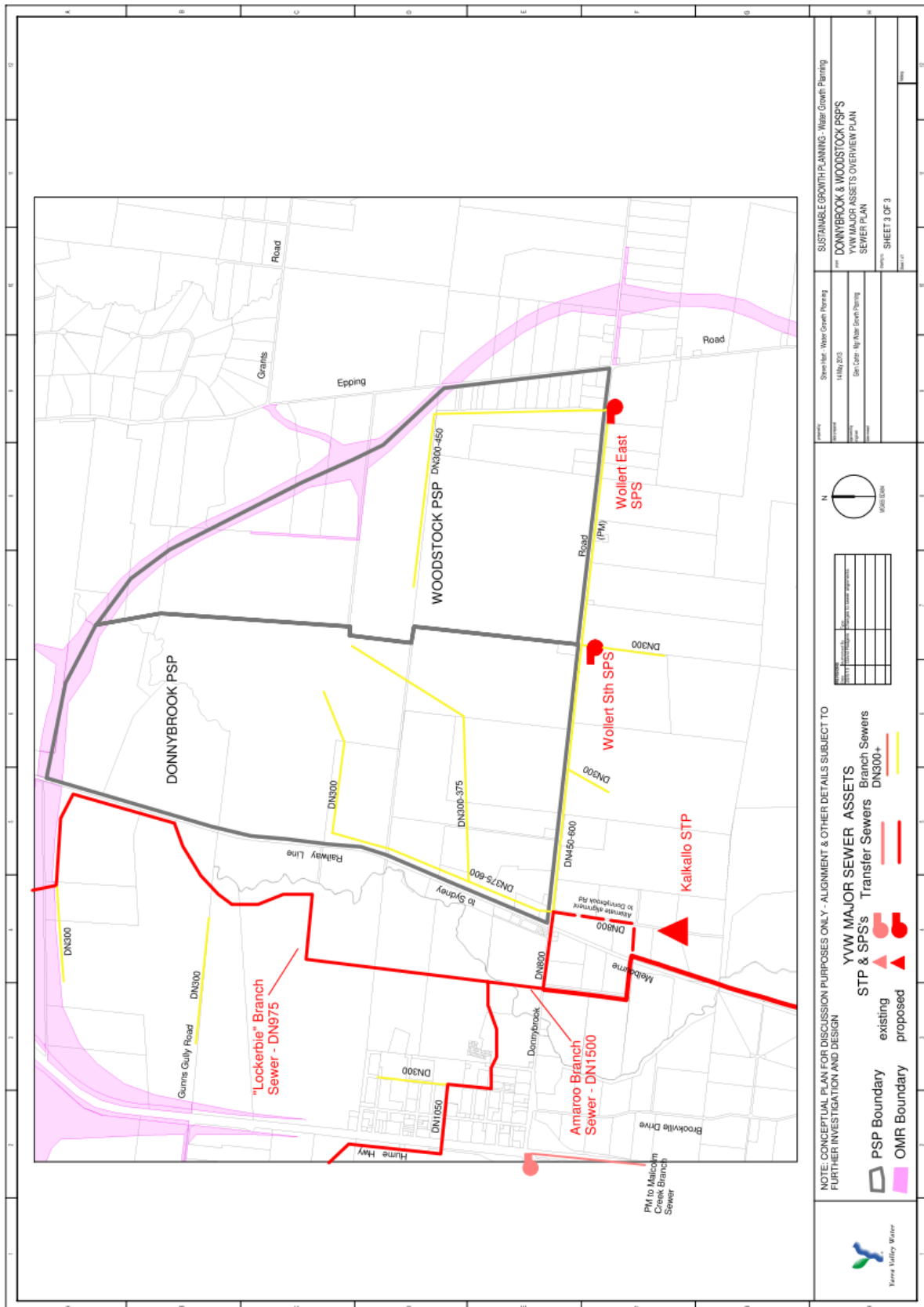
**Annex 4:**  
**Yarra Valley Water**  
**Recycled Water Supply Strategy Plan**  
**Donnybrook and Woodstock**



**Annex 5:**  
**Yarra Valley Water**  
**Sewerage Infrastructure Plans**  
**Kalkallo**  
**Donnybrook and Woodstock**



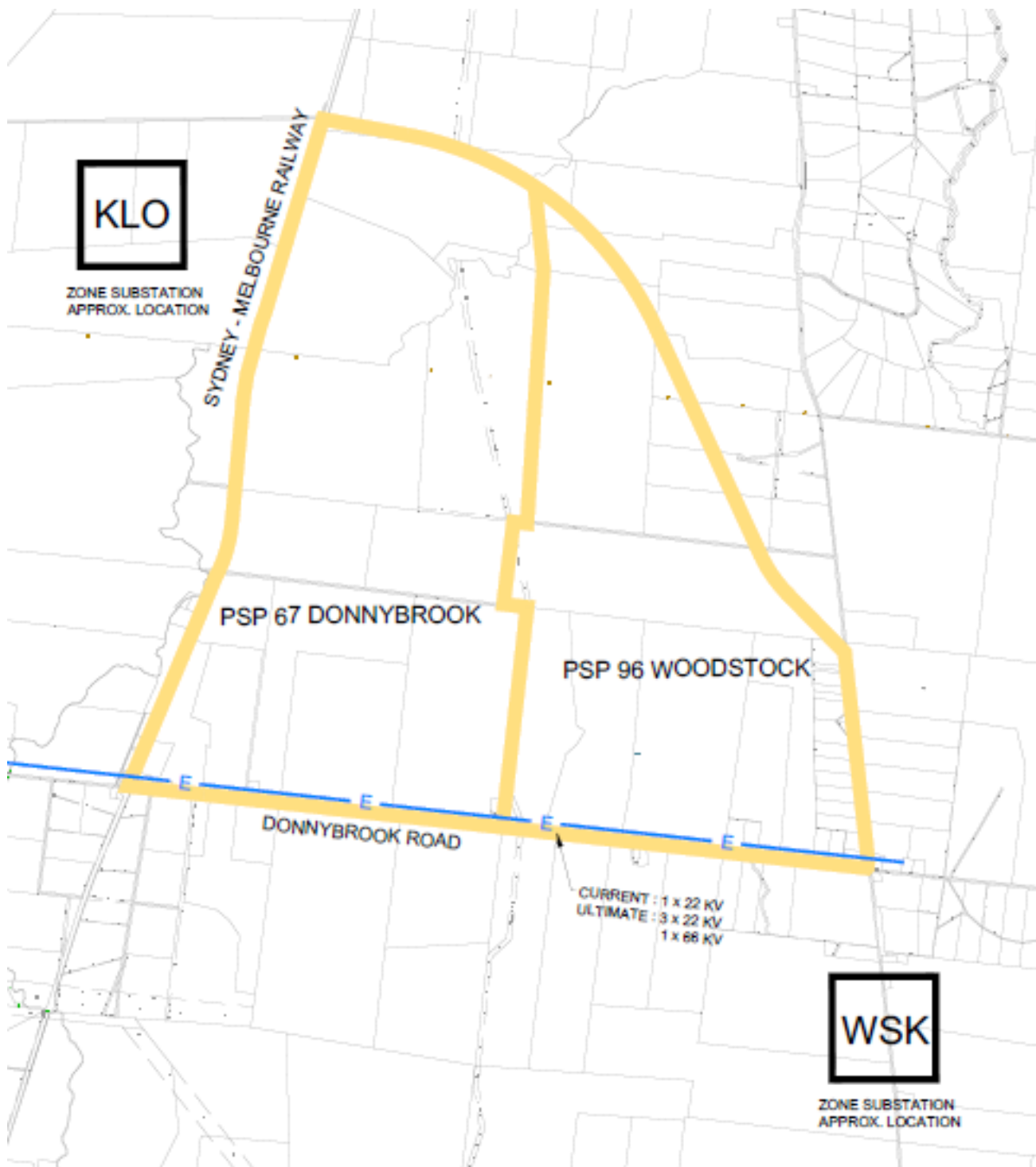
Extract - Yarra Valley Water Kalkallo sewer infrastructure strategy November 2013



Yarra Valley Water Donnybrook-Woodstock sewer infrastructure strategy May 2013

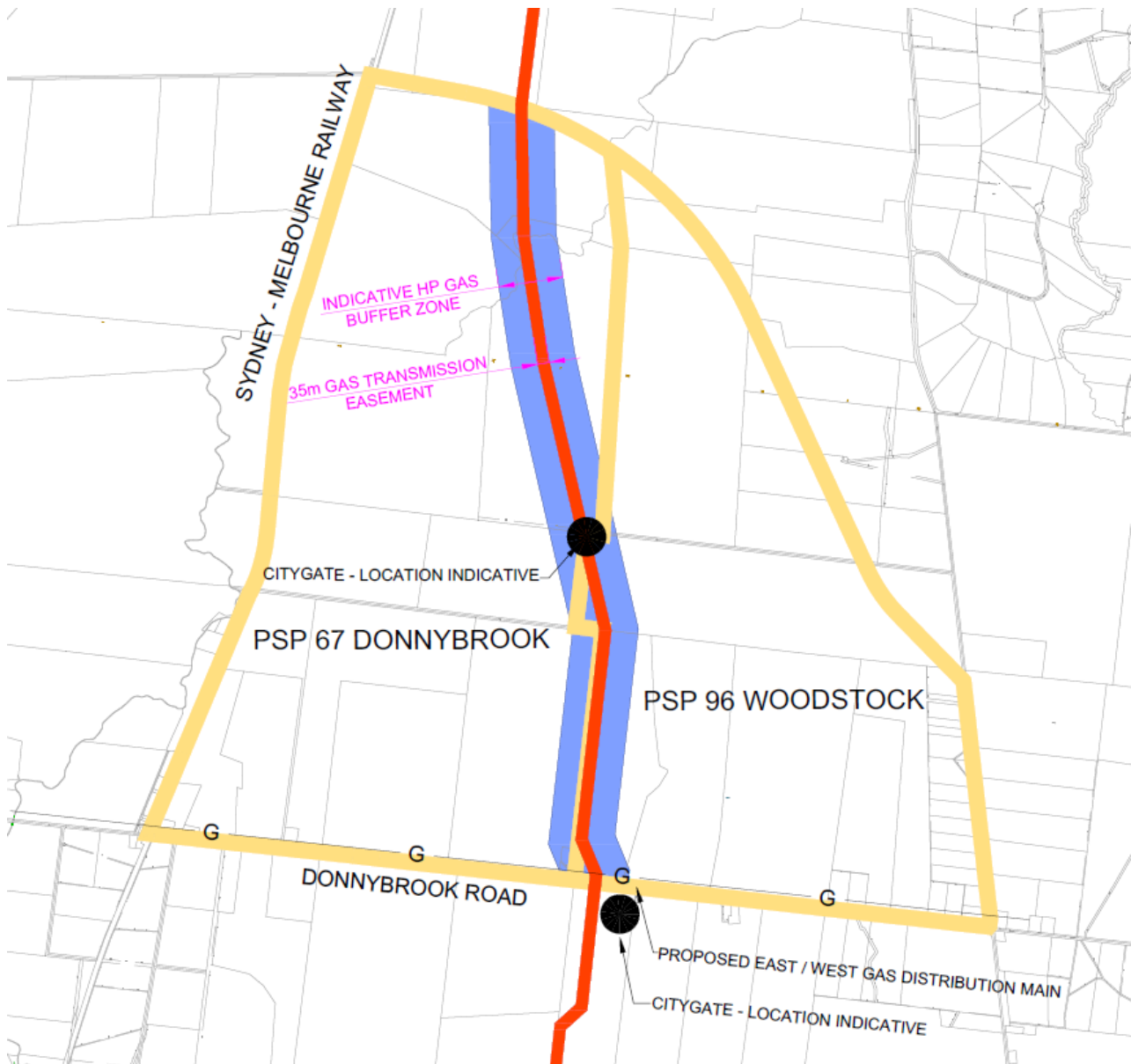


**Annex 6:  
SP Ausnet  
Electricity Supply Strategy Plan  
Kalkallo**



Extract – SP Ausnet Distribution network 30yr strategy development plan, Submission System 2011-2041

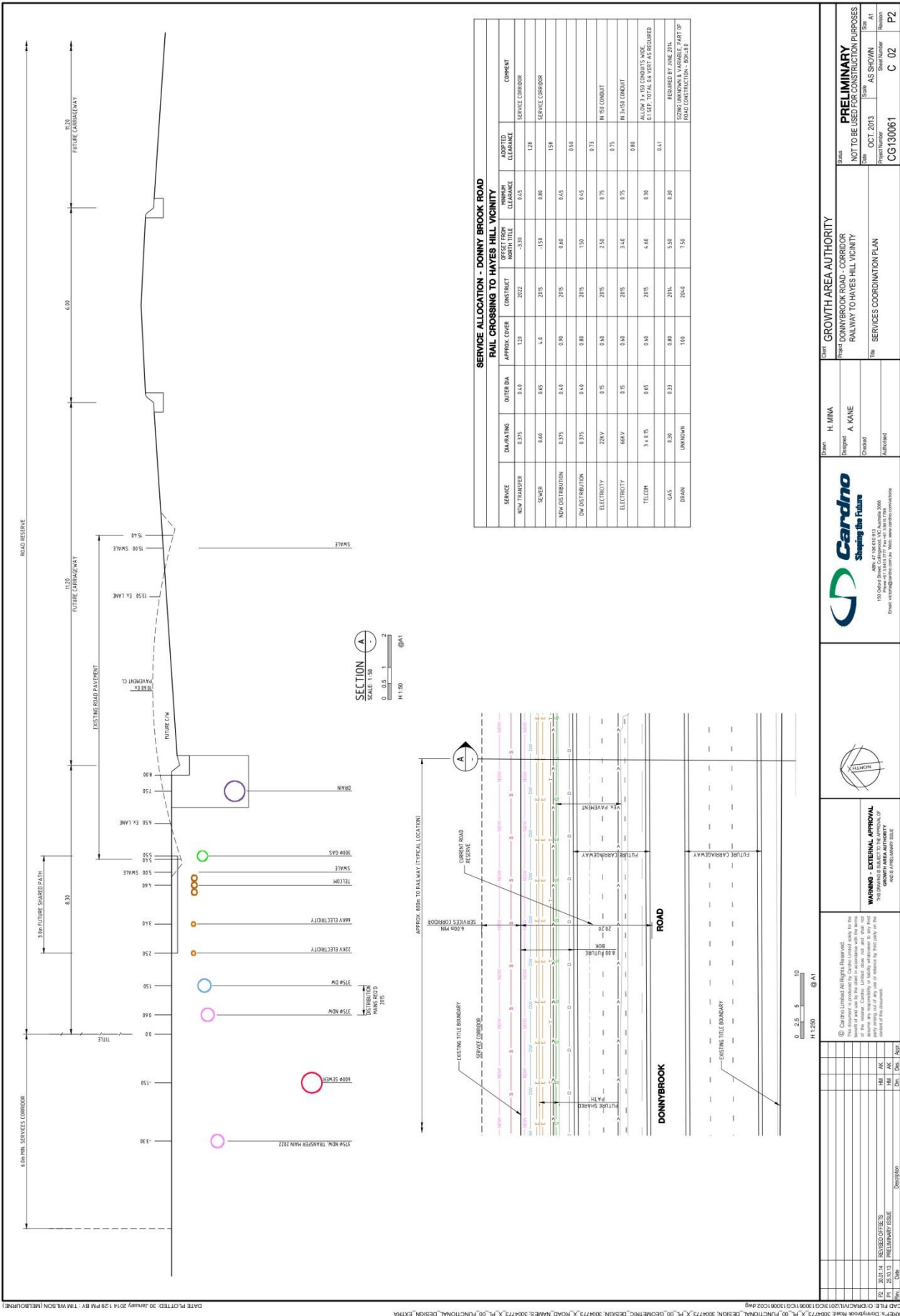
# **Annex 7: APA Gas Transmission & Distribution Gas Pipeline**



## **Annex 8**

# **Utility services location – Donnybrook Road**





## **Annex 9**

# **Utility services location – Donnybrook Rail Crossing**

