



Infrastructure Precinct Planning Report

Riverstone East

March 2015

Department of Planning & Environment

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10 Valentine Ave,
Parramatta NSW 2150

Issue and revision record

Revision	Date	Originator	Checker	Approver	Description	Standard
A	27.06.2014	John Taylor	Greg Lee	Chris Avis	DRAFT For Client Review	
B	29.08.2014	John Taylor	Greg Lee	Chris Avis	DRAFT For Client Review	
C	16.01.2015	John Taylor	Greg Lee	Chris Avis	For Exhibition	
D	30.01.2015	John Taylor	Greg Lee	Chris Avis	For Exhibition	
E	19.03.2015	John Taylor	Greg Lee	Chris Avis	For Exhibition	

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1 Introduction

In 2005 the NSW Government identified a need to sustainably plan Sydney's urban growth at its outer perimeters to accommodate part of an expected additional 1.7 million people in Sydney by 2036. From this, two growth centres were established. The North West Growth Centre (NWGC) located within The Hills, Blacktown and Hawkesbury local government areas and The South West Growth Centre (SWGC) located within Liverpool, Camden and Campbelltown local government areas.

The two Growth Centres are planned to provide up to 181,000 new homes for 500,000 people over the next 25-30 years. The NWGC, which this report is focused around, aims to provide 70,000 of these homes for 200,000 residents.

In order to streamline the rezoning processes to facilitate development of the Growth Centres, a Precinct Planning process has been used. This ultimately coordinates the planning and delivery of water, wastewater, recycled water, power, telecommunications, roads and other key services in order to facilitate new communities.

Mott MacDonald has been engaged by the Department of Planning and Environment (DP&E) to undertake an Infrastructure study to inform the preparation of an Indicative Layout Plan (ILP) and Master Plan for the Riverstone East Precinct (The Site) located within the North West Growth Centre (NWGC).

The purpose of this report is to identify key existing servicing infrastructure and outline requirements for new trunk infrastructure to service the precinct. This information will then be used, not only to inform the ILP, but also to identify an 'Early Activation' Sub-Precinct which is most suitable for initial development within the precinct.

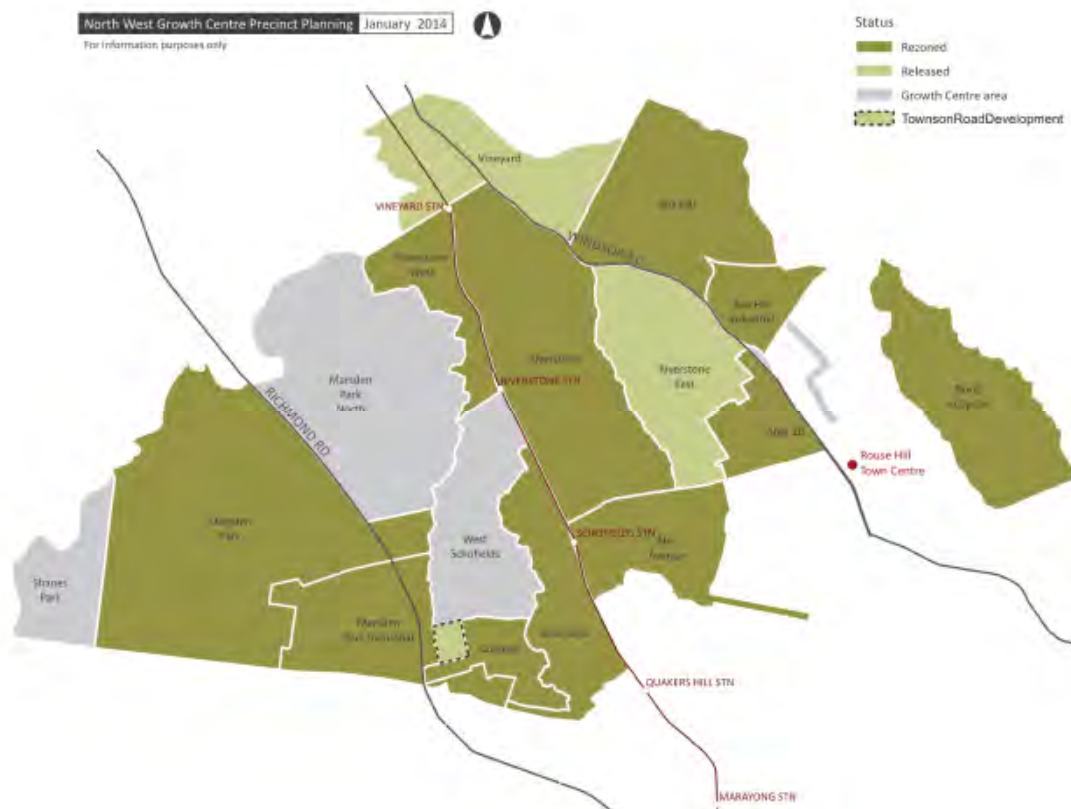
1.1 Regional Context

The North West Growth Centre is located approximately 50km north-west of Sydney's CBD, and borders Rouse Hill Town Centre at its eastern corner. Figure 1.1 below shows the overall NWGC structure layout and current rezoning status.

It is crossed by Richmond Road and Windsor Road generally between South Creek (also Wianamatta Creek) and Commercial Road to the north respectively and generally between the Westlink M7 and Schofields Road to the south respectively. At the southern border on Richmond Road, entry and exit to and from the Westlink M7 can be gained in both a south and east direction.

The Western Rail Line bisects the NWGC with existing stations at Schofields, Riverstone and Vineyard. The North West Rail Link (NWRL) is proposed to have stations at Rouse Hill Town Centre and on Cudgegong Road in Area 20, at the south-east corner of the NWGC.

Figure 1.1: North West Growth Centre Structure Plan



Source: NSW Department of Planning and Environment

1.2 The Site

The Riverstone East Precinct is located in the eastern, central portion of the NWGC and is bounded by Windsor Road to the north, various roads to the east, Schofields Road to the south and First Ponds Creek to the west. The site is bordered by several other Precincts including Alex Avenue to the south, Area 20 to the east, Box Hill and Box Hill Industrial to the north and north-east respectively and Riverstone to the west.

The overall site comprises 656 hectares of General Rural zoned land under Blacktown Local Environmental Plan 1988, with Blacktown City Council (BCC) being the Local Government Area (LGA) in which the entire site is located. It is approximately 4.5km long in a generally north-south direction and approximately 2.3km at its widest section in a generally east-west direction.

Figure 1.2: Existing Site



Source: Nearthmap

1.3 Base Information

The base information used as part of this assessment and presented on the plans included as Appendix A is shown in Table 1.1 below.

Table 1.1: Base Information

Item	Category	Description	Source
1	Survey and Cadastral	1m Contour Data	DP&E
2	Survey and Cadastral	Cadastral Data	DP&E
3	Existing Services	TransGrid transmission lines	DP&E
4	Existing Services	TransGrid transmission lines, easement and pole locations	Dial Before You Dig (DBYD)
5	Existing Services	Endeavour Energy transmission lines, distribution lines and easements.	DBYD
6	Existing Services	Sydney Water existing sewer and water infrastructure locations	DBYD
7	Existing Services	Jemena distribution mains	DBYD
8	Existing Services	Caltex High Pressure Multi Products Newcastle Pipeline Easement	DBYD
9	Existing Services	Telecommunications infrastructure type and location	DBYD
10	Northwest Rail link	Rapid Transit Rail Facility location	DP&E

1.4 Survey

To ensure accurate design, detailed ground survey is required to correctly document existing topography including surface features and structures to suitably prepare strategies for:

- Road layouts;
- Zoning;
- Drainage, primarily to locate appropriate sites for detention and water quality structures; and
- Infrastructure servicing, including sewer

Aerial LiDAR survey (3D) is acceptable to suitably prepare strategies for the above components of the Precinct Plan. Contour data of the Site at 1m intervals has been utilised in this assessment. Subsequent design stages will require more detailed survey data to ensure a robust solution is achieved.

1.5 Existing Services

Existing service location information has largely been obtained through a Dial Before You Dig (DBYD) services search. The data obtained has then been overlaid on cadastre plans in AutoCAD and plotted manually. Some additional information was provided by the Department of Planning and Environment in AutoCAD format and was cross referenced against the DBYD information.

The service information has been consolidated and displayed on a number of plans which can be found in Appendix A. The details shown on the plans should be considered as indicative only as the original DBYD information is not based on detailed survey data. This means they may vary from the locations shown on plan.

2 Existing Servicing Infrastructure

The following details existing services infrastructure located within and in close proximity to the Site. Existing layout plans developed from Dial Before you Dig information, as well as service provider consultation have been created and are included in Appendix A for reference.

2.1 Water Supply

A number of large trunk mains depart the existing Rouse Hill Reservoir (WS0476) located on the border of the Site, within the Area 20 Precinct. The reservoir is positioned approximately central, between Cudgegong, Worcester, Schofields and Guntawong Roads. The mains directly leaving the reservoir include a 1050mm diameter SCL and 600mm diameter DICL, which travel south-west along Macquarie Road into the site and turn south-east on Tallawong Road where they continue to Schofields Road. A number of terminating stubs and downsizing results in a single 600mm dia. DICL trunk main traveling west along Schofields Road and away from the site.

There are no significant reticulation lines through the Site with the exception of a small area in the southern corner along Gordon Road and Oak Street. In light of this it has been assumed that existing lots gain their water supply from on-site sources.

Figure 2.1: Existing Water Services



Source: Dial Before You Dig

2.2 Sewer

There is currently no mains sewer infrastructure within the Site area. It is understood that the existing lots are serviced by on-site systems with waste water treated and disposed of on-site or waste water regularly collected and removed by tanker.

The Riverstone Sewerage Treatment Plant (STP), lies outside the northern border of the site at Bandon Road, west of Windsor Road and within the Riverstone West Precinct.

Figure 2.2: Existing Sewer Services



Source: Dial Before You Dig

2.3 Electricity

2.3.1 Endeavour Energy

The site is currently serviced primarily from the existing Riverstone Zone Substation. Supply is brought via an overhead network from the substation to the site along Garfield Road East. Property connections are obtained from the overhead network.

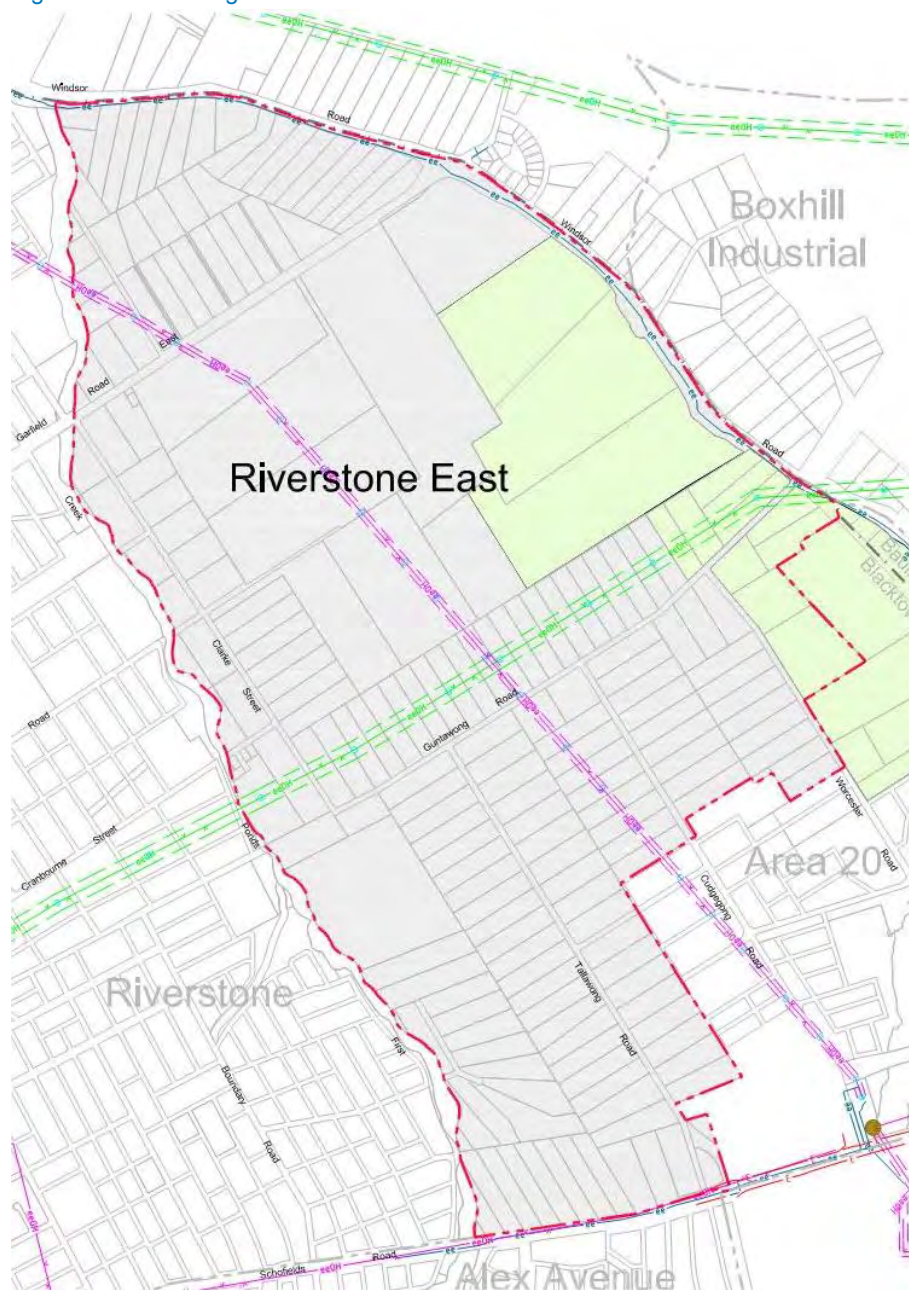
The site is also bisected by existing overhead 132kV transmission lines travelling generally in a south-east direction through the centre of the site. From the Vineyard Bulk Supply Point (BSP) located off Bandon Road, approximately 850m west of St James Road in the Riverstone West Precinct, the lines travel east. Once they enter the Riverstone Precinct they turn south-east and generally hold this line, continuing into the Riverstone East Precinct approximately half way between Garfield Road East and Windsor Road, and then into Area 20, adjacent Cudgegong Road. Once in Area 20 the lines pass through the existing Rouse Hill Switching Station located on Cudgegong Road, approximately 150m north of Schofields Road. These transmission lines are contained within a 30m wide easement which passes primarily through private land. Average spacing of the transmission pylons is approximately 200m.

Another set of 132kV overhead transmission lines pass along the southern boundary of the site within the Schofields Road reserve. They travel from the Rouse Hill Switching Station west along Schofields Road to the Existing Schofields Zone Substation.

2.3.2 TransGrid

Existing 330kV transmission lines cross the site between its east and west boundaries, slightly north of Guntawong Road. The lines are contained within a 60.96m easement primarily through private land. The transmission line crosses the 132kV Endeavour Energy line approximately half way between the east and west boundary. Transmission pylons vary in spacing from 200m up to 430m.

Figure 2.3: Existing Electrical Services



Source: Dial Before You Dig

2.4 Gas

An existing 200mm (300kPa) steel main traverses the site from its boundary at Garfield Road East to the opposite boundary at Guntawong Road. It enters the site along Garfield Road East and immediately travels south-east along Clarke Street. It then turns north-east on Guntawong road where it continues to Windsor Road. Once on Windsor Road the main splits north to Burns Road and south to Schofields Road.

From discussions with Jemena, the above main has only recently been installed and is part of their proposed network upgrades. As such, there are currently no secondary mains within the site providing property connections.

Figure 2.4: Existing Gas Services



Source: Dial Before You Dig

2.5 Telecommunications

Generally the entire site falls within the Riverstone Exchange Area, with the exchange located on Riverstone Road, centrally between boundaries of the Riverstone Precinct. There is a small area at the south of the site, fronting Schofields Road which falls within the Kellyville Exchange Area, with this exchange located at the intersection of Windsor Road and Old Windsor Road.

The majority of roads through the site house overhead telecommunication lines. These are contained on the same network as the electrical lines. All property connections are via direct connection from the overhead network.

There are some areas where below ground telecommunications lines traverse the site, with the main conduits travelling north-east from the Riverstone Exchange along Riverstone Road then south-east on Clarke Street. Once they reach Guntawong Road they travel north-east again to Windsor Road, with a branch at Cudgegong Road going south-east into Area 20. The branch at Windsor Road splits, heading both north-west to Burns Road and south-east joining with the Kellyville Exchange network. The main conduit run has a combination of copper and optic fibre lines.

Windsor Road

Boxhill Industrial

Riverstone East

Area 20

Riverstone

Alex Avenue

Gunawardene Road

Talbot Road

East Road

Windsor Road

Barbours Road

Creek

Sewer

Grange Road

Street

Boundary Road

Schofields Road

Wentworth Road

Cunningham Road

Black Road

15

2.6 Roads

The existing road network is generally laid out in a grid, with roads running in a north-west/ south-east and north-east/ south-west alignment. The principal arterial road to the site is Windsor Road travelling along its north-east border and continuing north-west past the site. From Windsor Road, a number of roads branch into the site. Schofields Road which traverses its south-east border and onto Railway Terrace and Garfield Road East which crosses its northern portion are both arterial roads to the site. The latter provides a direct connection through Railway Terrace to Richmond Road, which has access to the Westlink M7. Guntawong Road which crosses approximately the centre of the site from Windsor Road is a collector road which turns into Clarke Street, close to the border of First Ponds Creek.

There are no arterial roads which traverse the site perpendicular to the roads described above. There are however, a number of notable collector roads. Two of these are Tallawong Road and Cudgegong Road, which enter the site from Schofields Road and provide a link to Guntawong Road. Once Guntawong turns into Clarke Street it turns north-west and crosses over Riverstone Road then terminates at Garfield Road East. Clarke Street is the only link within the site between Garfield Road East and Guntawong Road, a distance of approximately 1,300m. Slightly south-west and on the opposite side of Garfield Road East to Clarke Street is the boundary of the site and Edmund Street which continues north-west. Figure 2.6 shows the existing road network.

The current land zoning of General Rural reflects the current condition of the road network. All roads within the site have a chip seal wearing course, with the exception of Garfield Road East which has an asphaltic concrete wearing course. The condition of the roads is generally poor, with various cracking, pot-holes, depressions, edge breaking, stripping, ravelling and numerous patches clearly visible. Generally all roads have a gravel shoulder which run into v-drains, with primarily no formal kerb and gutter drainage network.

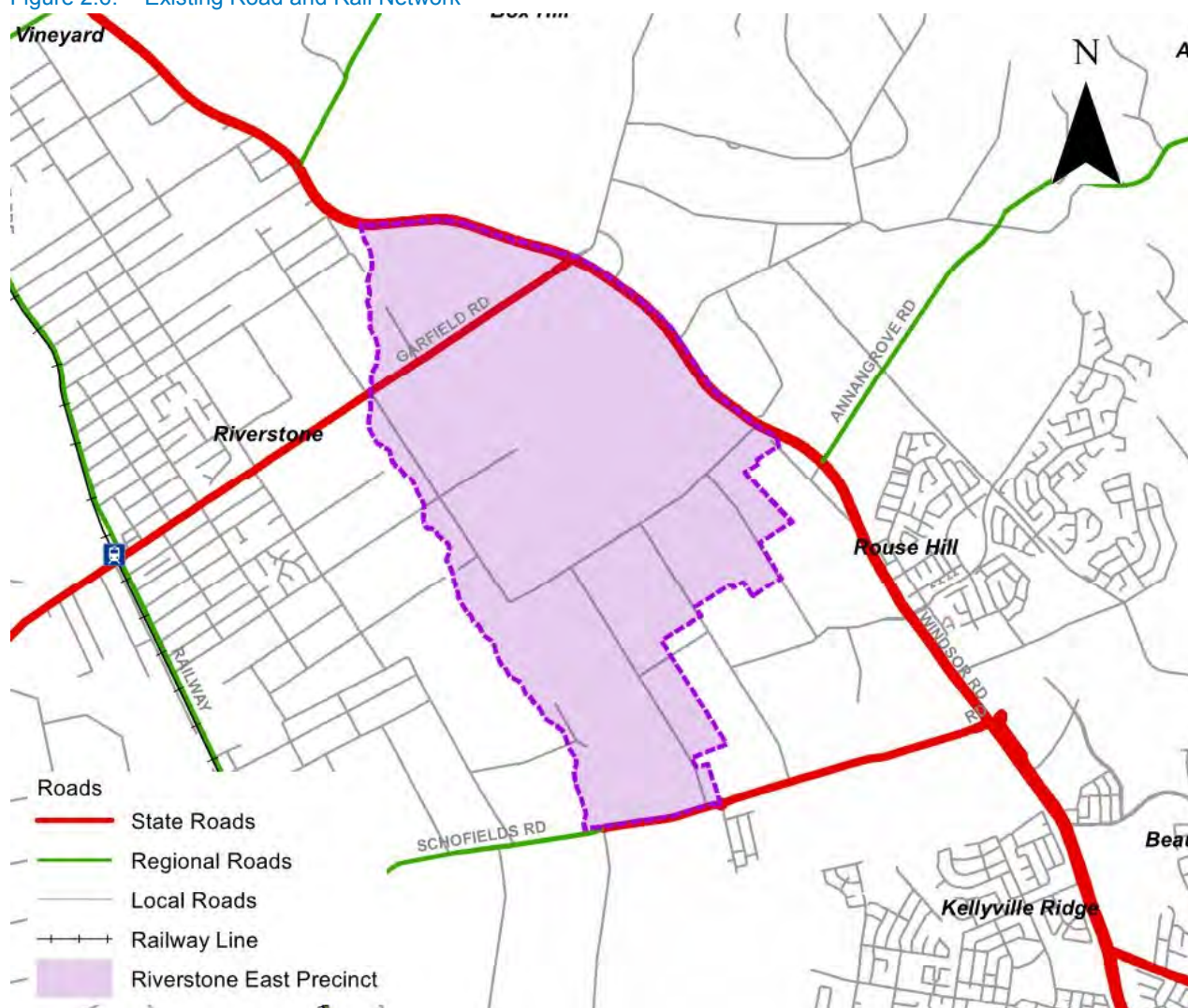
Further details of the existing road hierarchy can be found in the Riverstone East Precinct Transport Study by ARUP.

2.7 Train Network

The North Shore, Northern & Western Line (T1) passes parallel to the site on its western side, approximately 2km from the Precinct boundary. Two stations are located within close proximity to the site. The closer of the two, Riverstone station is located at the intersection of Garfield Road East and Railway Terrace. It has a formal primary parking lot attached to the station, with a second formal parking lot on the opposite side of Riverstone Parade. The second also has areas of vacant lots which appear to be used as an overflow parking lot. There appears to be capacity for approximately a few hundred vehicles. Vineyard station is located approximately 3km north-west of the northern border of the Site, at the intersection of Bandon Road and Riverstone Parade. It has a small informal gravel car park on the corner of Bandon Road and Riverstone Parade catering for approximately 10 vehicles. A number of vehicles also park on the gravel shoulders of the intersecting roads.

Further details of the existing road hierarchy can be found in the Vineyard Precinct Transport Study by ARUP.

Figure 2.6: Existing Road and Rail Network



Source: Riverstone Precinct Transport Study – DRAFT report, ARUP 2014

3 Ultimate Development

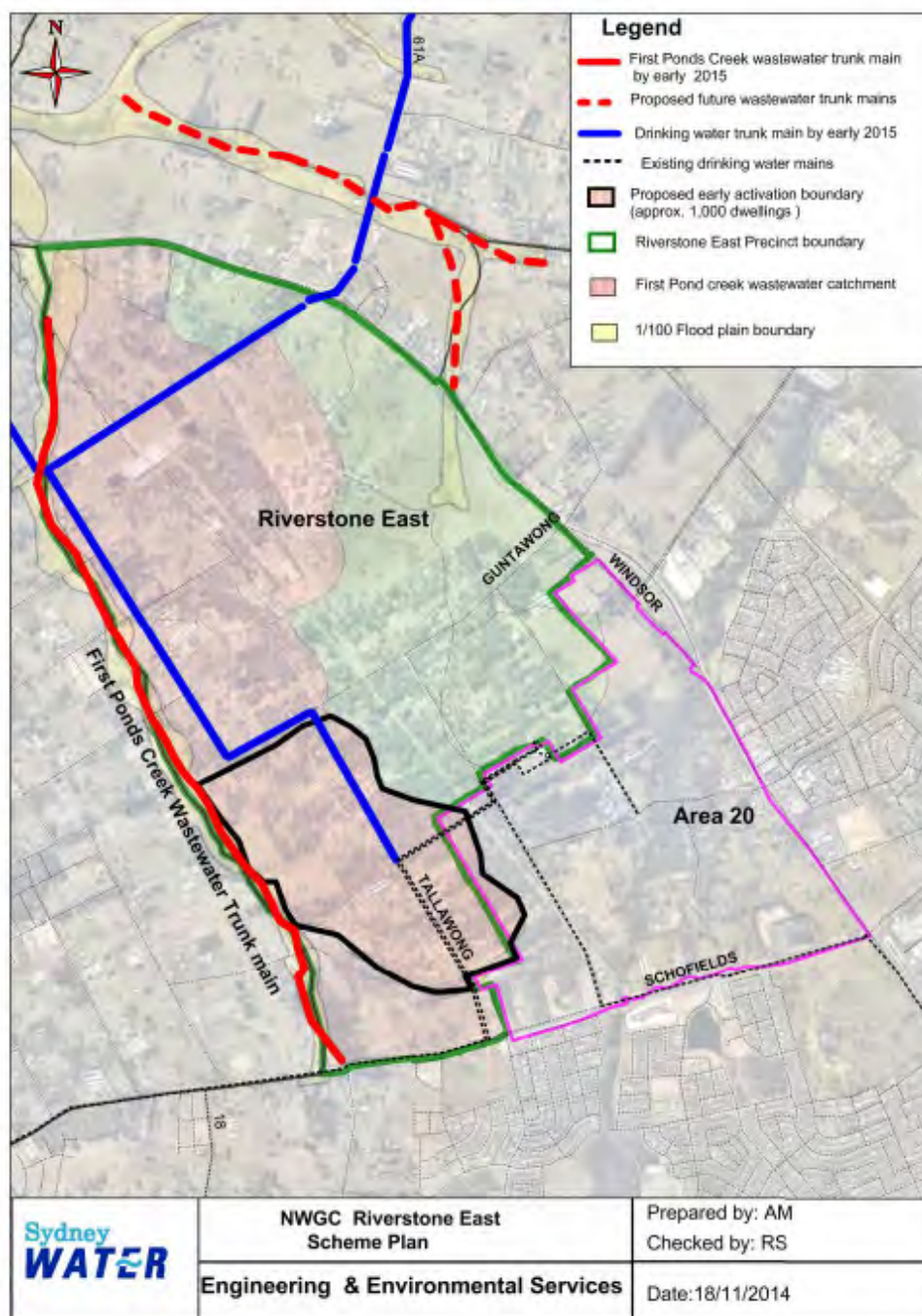
The following details the currently proposed servicing strategy for the ultimate developed Site. Ultimate layout plans developed from Dial Before you Dig information, as well as service provider consultation have been created and are included in Appendix A for reference.

3.1 Water Supply

Sydney Water has already commenced construction on trunk mains to service the greater NWGC. Concerning Riverstone East, the same 750mm dia. trunk main used to service the EAP is to be utilised to service the overall site, extending north-west from the existing trunk mains at the corner of Macquarie Road and Tallawong Road to Guntawong Road. This will then travel south-west to Clarke Road and north-west again to Garfield Road East. At this point a 450mm dia. trunk main is proposed to branch north-east to Windsor Road where it will cross into Box Hill and downsize to a 375mm dia. trunk main. The main line at the corner of Garfield Road East and Clarke Road will exit the site, continuing north-west along Edmund Road.

The above detailed works are projected to be complete by early 2015, and are shown in Figure 3.1 on the following page.

Figure 3.1: Sydney Water Ultimate Servicing Strategy – Potable Water



Source: Sydney Water – 20.11.2014

3.2 Sewer

The Site topography leads to the waste water network being split into two catchments as shown in Figure 3.1 above. In line with the previously discussed NWGC water supply scheme, Sydney Water has proposed new carrier waste water mains for the site, also shown in Figure 3.1 above. The majority of the site drains north-west to the First Ponds Creek carrier main (shown in red). Sydney Water estimates that this system has capacity for approximately 3,700 new dwellings and is projected for completion in early 2015. The remainder of the site (shown in green), drains to the north-east to the Chain of Ponds Creek Carrier main and has potential to cater for approximately 2,500 dwellings.

The Chain of Ponds Creek carrier crosses Windsor Road from the Site into Box Hill Industrial then through Box Hill and Vineyard where it joins the First Ponds Creek carrier main and continues onto the Riverstone sewerage processing plant (ST0042). The construction of this main is staged in four packages, with the fourth proposed to service the eastern portion of the site. From discussions with Sydney Water they have outlined that market demand will drive the need of this fourth package and as such do not have a projected completion date. However, at this stage they do not envision its need until beyond 2020.

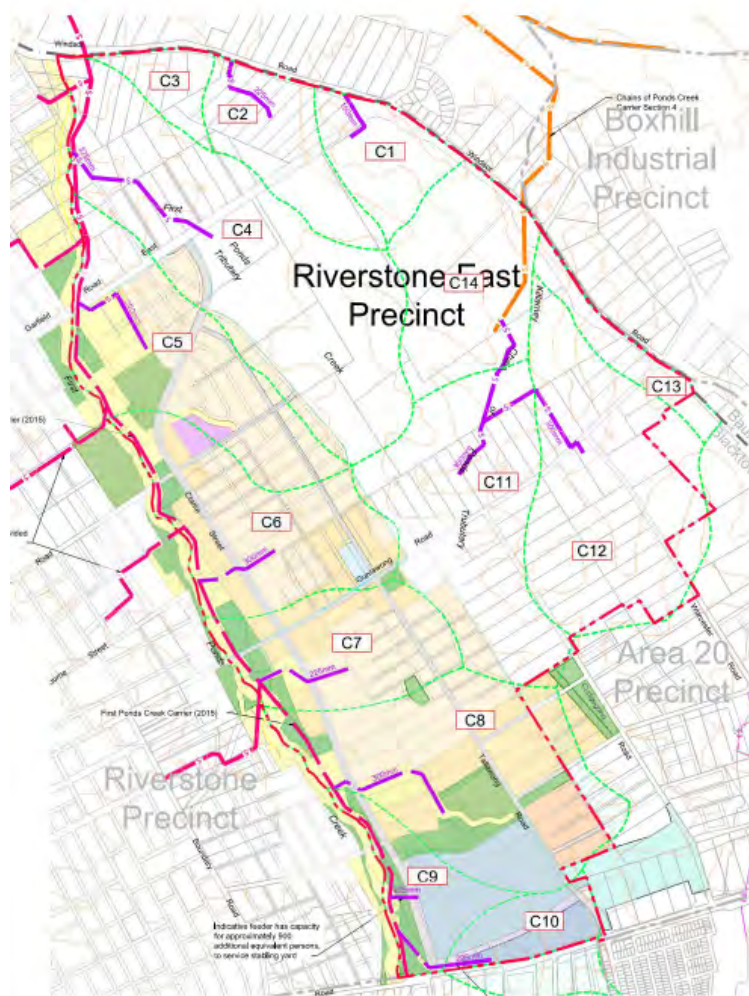
Feeder mains will be required to connect any new developments to the new trunk carriers. Mott MacDonald has undertaken a preliminary exercise in sizing potential feeder mains based on existing topography and site constraints. These are listed in the below table and shown on Figure 3.2. It should be noted that the feeder mains described are indicative only in both size and location. They will need to be assessed in detail at a later stage of the development.

Table 3.1: Approximate Sewer Feeder Mains

Catchment	Approximate Developable Land (ha)	Anticipated Land Use	Approximate Lot Yield*	Equivalent Persons (EP)	Approximate Feeder Size (mm)
1	15.66	Low Density Residential; Regional Open Space	225	788	225
2	26.91	Low Density Residential	385	1348	225
3	10.28	Low Density Residential	147	515	150
4	78.64	Low Density Residential	1124	3934	375
5	48.99	Low Density Residential	700	2450	300
6	44.48	Low Density Residential	636	2226	300
7	34.49	Low Density Residential	300	1051	225
8	55.22	Low Density Residential; High Density Residential	450 Low 250 High	1825	300
9	4.56	Industrial**	-	684	225
10	8.22	Industrial**	-	1233	225
11	53.59	Low Density Residential; Regional Open Space	766	2681	300
12	36.46	Low Density Residential; Regional Open Space	521	1824	300
13	0.00	Regional Open Space	0	0	-

*assumed 14.3 low density residential lots per hectare of gross developable area. This allows for roads, parks, etc.
 **area around stabling yard has been assumed to be zoned as industrial with 150 equivalent persons per gross hectare
 #high density residential has been assessed as 70 equivalent persons per gross hectare.

Figure 3.2: Sewer Catchment Plan and Feeder Mains

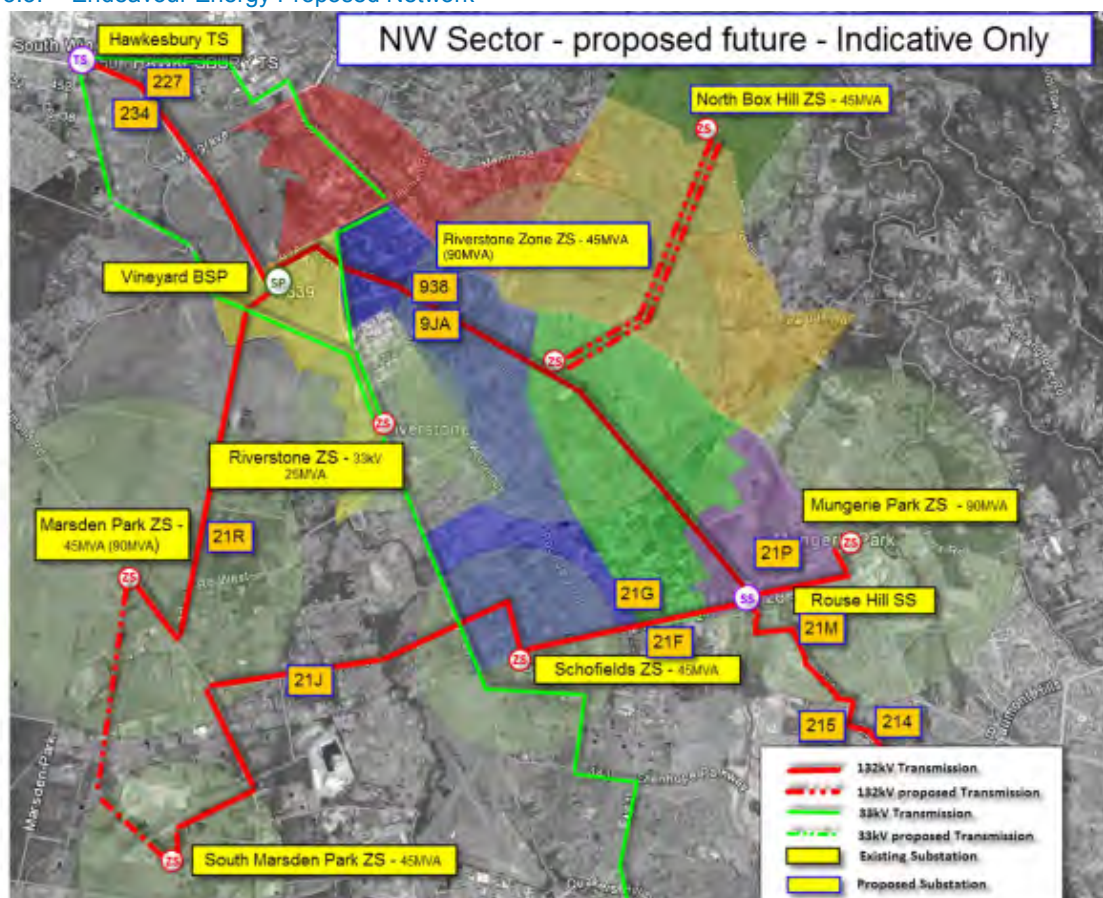


3.3 Electricity

The ultimate development strategy will see a new zone substation in Riverstone East/ Box Hill provide power to the central and northern areas of the Site, and the existing Schofields zone substation provide power to the southern portions of the Site. Figure 3.3 below, shows the general servicing strategy for the overall region. It identifies that a new North Box Hill zone substation will provide power to North Box Hill and the northern areas of Box Hill and a second new zone substation in Riverstone East/ Box Hill will

provide power to the southern areas of Box Hill and Vineyard as well as the central and northern areas of Riverstone East. It should be highlighted that while the figure shows a proposed substation in Riverstone East, a site has not been acquired and the substation is planned to be located within either Riverstone East or Box Hill.

Figure 3.3: Endeavour Energy Proposed Network



Source: Endeavour Energy – 31.03.2014

3.3.1 Servicing Scenarios

The existing Riverstone zone substation currently provides power as far east as North Box Hill. As the Riverstone East/Box Hill and North Box Hill substations are commissioned, power dedicated to these eastern areas will become available to divert elsewhere. Because of this, there are two possible scenarios for servicing the Riverstone East Precinct. These are described below:

Scenario 1 – North Box Hill zone substation commissioned first

This would make additional capacity available in the existing Riverstone zone substation that could be directed to the central and northern portions of the Riverstone East Precinct until such a time that the Riverstone East/ Box Hill zone substation is commissioned.

Scenario 2 – Riverstone East/ Box Hill zone substation commissioned first

In the event that this zone substation is commissioned first, the majority of the central and northern parts of the precinct would have almost immediate access to adequate power supply.

As it is not Endeavour Energy policy to reserve capacity for a particular area, new developments that require power are given any that is available. This means that if a zone substation is commissioned in Riverstone East/ Box Hill first, but developments in North Box Hill are occurring that require power, capacity from the new zone substation will likely be diverted to these areas. This would reduce the amount of power available for the Site until the North Box Hill zone substation is commissioned to release the capacity from the Riverstone East/ Box Hill zone substation.

Endeavour Energy has advised that a new overhead high voltage main may be required between the BSP and new Riverstone East/Box Hill and/or Box Hill North zone substations. This would generally be contained within the road reserve and require a 10m wide easement along the adjacent properties. Future road upgrades and land zoning should take consideration of the any potential route and potential easement requirements.

3.3.2 Timing

Endeavour Energy has advised that the timing in which the Precinct will be serviced for electrical servicing is ultimately market driven. To unlock the entire Precinct, the proposed Riverstone East/ Box Hill zone substation as well as the proposed zone substation in North Box Hill will need to be constructed.

Currently, a site has not been acquired for either of these two substations, though negotiations are currently underway with land owners to obtain an appropriate location. Endeavour Energy have outlined that the planning, acquisition, approval, design and construction phases involved in commissioning a new zone substation would take between 3 and 4 years. This would mean that a new substation may not be commissioned until 2018-2019.

3.4 Gas

Two new mains have been proposed to service the site and surrounding precincts. The first is a 200mm steel main, proposed to extend from the existing main on Guntawong Road south along Tallawong Road to Schofield Road. It will then travel west along Schofield Road entering into the Alex Avenue Precinct approximately 350m from Tallawong Road. It is currently programmed for a 2025 completion. The second is a 150mm steel main, proposed to extend from the existing main along Garfield Road East to Windsor Road, then crossing it into Box Hill. There is currently no programmed date for construction of this main, as the timing will depend on market demand.

3.5 Telecommunications

Discussions with Telstra and NBN Co have outlined that demand will drive the installation of telecommunication lines to the development areas. Once the Site has been rezoned and developments commence, developers must lodge an application with a provider, depending on the size of the development (Telstra < 100 lots; NBN Co > 100 lots).

They have advised that when undertaking construction of any new public roads or upgrades to existing roads that they be notified. This is so that they can arrange for new lead-in ducts to be installed across the Precinct to facilitate future development as needed.

3.6 Roads

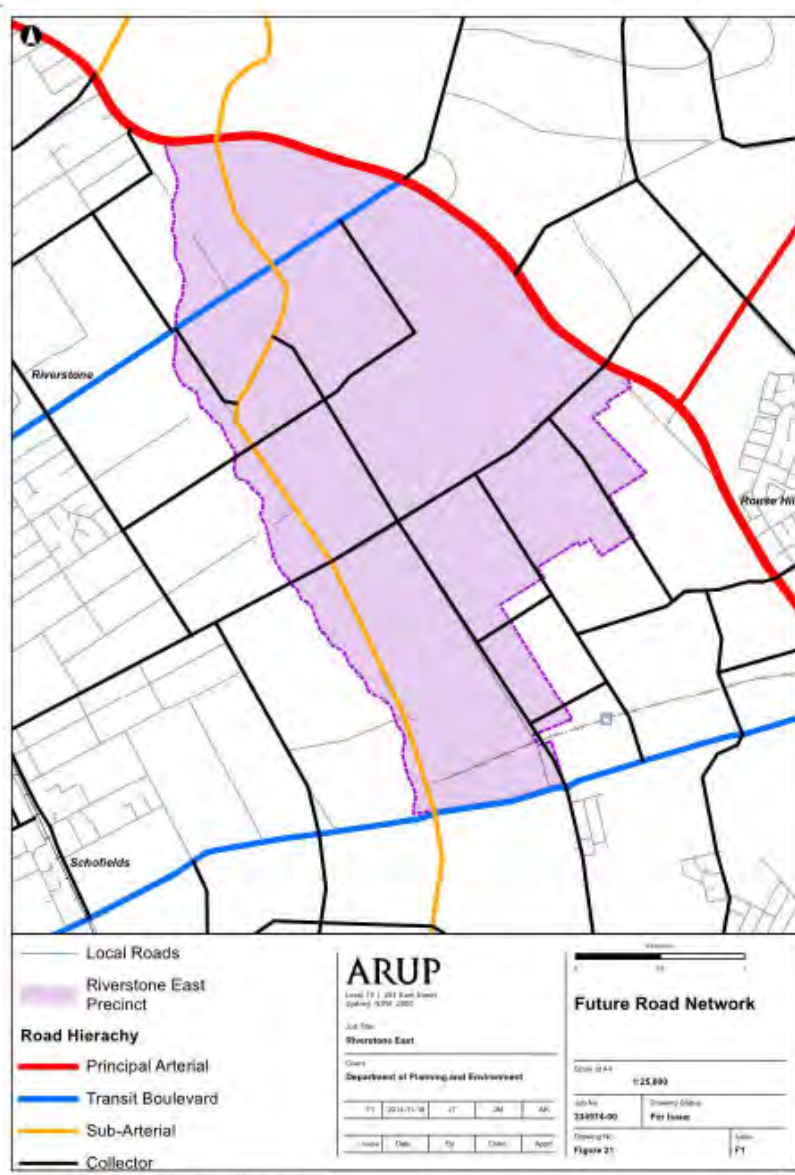
The Riverstone East Precinct Transport Study by ARUP outlines that the existing roads within the Site will form the structure of the future road network. Windsor Road being the only arterial road to the site will support the majority of regional traffic movements. Schofields Road and Garfield Road East have been flagged as transit boulevards to support regional traffic and bus movements, with Clarke Street, Tallawong, Cudgong and Guntawong Roads identified for improvement and for the framework for the higher-order (sub-arterial / collector) road network.

Figure 3.4 shows the ultimate road hierarchy for the Site. As can be seen, a number of new roads are proposed which include:

- two new sub-arterial roads:
 - one connecting Riverstone East to Box Hill from Garfield Road East over Windsor Road to Hambledon Road; and
 - the second connecting Riverstone East to Alex Avenue from Garfield Road East over Schofields Road.
- two new collector roads:
 - one extending from Tallawong Road to Garfield Road East; and
 - The second extending from Guntawong Road into the Riverstone Precinct.

Further details of the overall proposed site transport structure, including bus routes, pedestrian and cycling facilities and typical road cross sections can be found in ARUP's report.

Figure 3.4: Proposed Road Hierarchy



Source: ARUP

3.6.1 Timing

The construction and upgrade of major local roads will depend on development progress over the precinct, as they will be delivered via developer Section 94 contributions with Blacktown City Council.

4 Supplementary Infrastructure

4.1 Rapid Transit Rail Facility

As part of the North West Rail Link, the final station in the line will be located adjacent to Cudgegong Road in Area 20. Beyond this and within the site will be the Rapid Transit Rail Facility. The 27.7 Ha site is bounded by Tallawong Road to the east, Schofields Road to the south, First Ponds Creek to the west and Oak Street to the north. The facility will provide stabling for 45 trains and maintenance services for a fleet of 76 trains as part of Sydney's new rapid transit rail network. The transport corridor is contained within the facilities site along its southern boundary and will continue westward to Marsden Park

As part of the stabling yard, Transport for NSW has proposed an area fronting Schofields Road to be dedicated for development.

Further details of the facility can be found in ARUP's Riverstone East Transport Study.

Figure 4.1: Stabling yard site layout



Source: Transport for NSW – North West Rail Link

5 Staged Rezoning

Taking into consideration to the timing for delivery of services to the Precinct, it has been determined by DPE that a staged rezoning plan is more appropriate than rezoning of the entire Precinct as one. This is to boost development in a targeted area encouraging natural growth, as rezoning all of the Precinct at once may result in development in sporadic areas which could slow the overall progress of the Precinct. The zoning has been therefore split into three main stages as described below.

5.1 Stage 1

Stage 1, also called the Early Activation Precinct (EAP) consists of a large portion of the First Ponds Creek sewer catchment, with the notable exception of land north of Guntawong Road and land between the central ridgeline and the existing Endeavour Energy high voltage power lines. The Stage 1 area is illustrated in Figure 5.1.

This area was defined as it will be generally unlocked from a servicing perspective by early 2015. This is primarily due to the completion of Sydney Water trunk mains. Other services such as electricity and gas have existing capacity for a number of dwellings with no immediate upgrades required to their infrastructure. It should be noted however that lead-in works will need to be constructed to utilise those existing services as well as the new water and sewer.

Stage 1 is projected to cater for approximately 1,800 new dwellings, and should satisfy market demand in the area for 5-10 years.

5.2 Stage 2

The rezoning of the Stage 2 Precinct area shares similar border constraints to the stage 1 area, though falls between Guntawong Road and Garfield Road East and is also shown in Figure 5.1 below. It's rezoning will ultimately be dependent on market demand and servicing provision; though will follow the EAP with potential for an overlap in release before Stage 1 becomes fully developed.

Stage 2 is projected to cater for approximately 1,400 new dwellings, and should satisfy market demand in the area for approximately an additional 5-6 years.

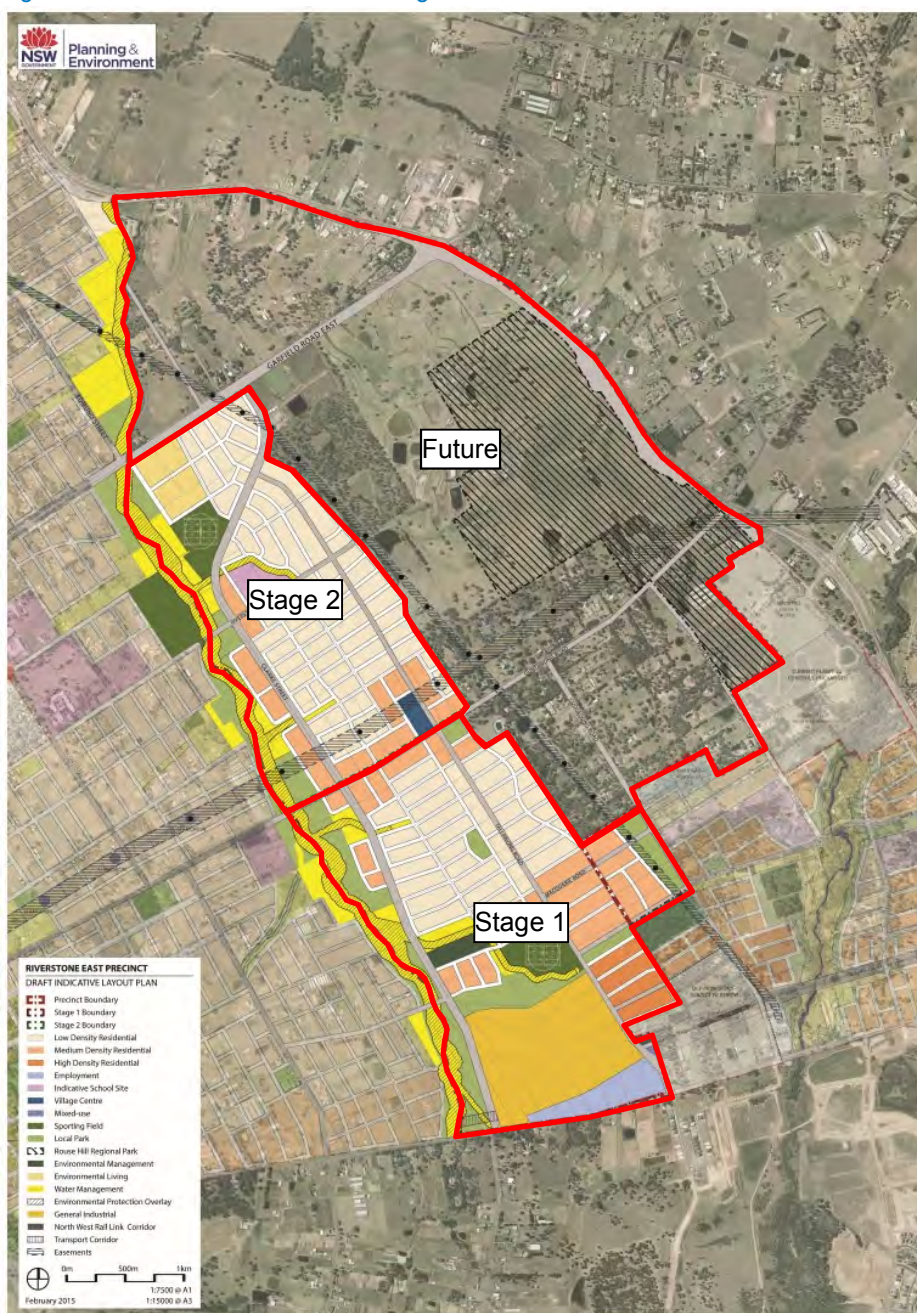
5.3 Future

The re-zoning strategy for the remaining precinct area has at this stage yet to be determined. This is partially due to an evident infrastructure gap beyond the first 2 release stages.

The main driving factor for rezoning of this area is the construction of the Chain of Ponds Creek sewer carrier main and construction of new zone substations in the surrounding areas. While potable water is projected to be complete in early 2015 to supply the entire Precinct, Sydney Water has advised that until the market shows a clear need for development in the eastern Precinct area, they have no immediate program to construct this carrier man. Sydney Water currently do not project its need until beyond 2020. By this time it is anticipated that additional electrical infrastructure will have been constructed to supply a

portion of the total development though there are no current timeframes of when the required infrastructure will be delivered. Sydney Water has advised the carrier main would require approximately a three year turn around to design and construct. Endeavour Energy has advised a similar turnaround time for any new zone substation.

Figure 5.1: Draft ILP – Initial Rezoning Phases



Source: COX Richardson

6 Early Activation Sub-Precinct (Stage 1)

As part of the Precinct Planning process, an 'Early Activation' Sub-Precinct (EAP) is to be identified which can support between approximately 800-1000 lots utilising predominantly existing infrastructure with as little upgrades as possible. This is to provide an area that is unlocked and available to develop as soon as the Precinct is rezoned. From here it is then expected that developers will be able to expand on the EAP infrastructure, enabling development in other areas of the Precinct to radiate from this centre.

Through consultation with service providers, an area in the south-west corner of the site has been identified as the most likely location for the EAP (Also identified on plan as Stage 1). These are based on what is currently available in terms of capacity and physical infrastructure and what is proposed in the near future.

The following details the currently proposed servicing strategy for EAP. EAP layout plans developed from Dial Before you Dig information, as well as service provider consultation have been created and are included in Appendix A for reference.

6.1 Water Supply

Sydney Water have indicated an area in the southern portion of the site, west of Cudgegong Road and between Guntawong and Schofields Roads as an EAP. As part of the overall water supply scheme for the NWGC, a proposed 750mm dia. trunk main will traverse the area, extending from the existing mains and travelling north along Tallawong Road. This is proposed to be completed by early 2015. Figure 6.1 shows the proposed potable water alignment and sizing of trunk mains.

6.2 Sewer

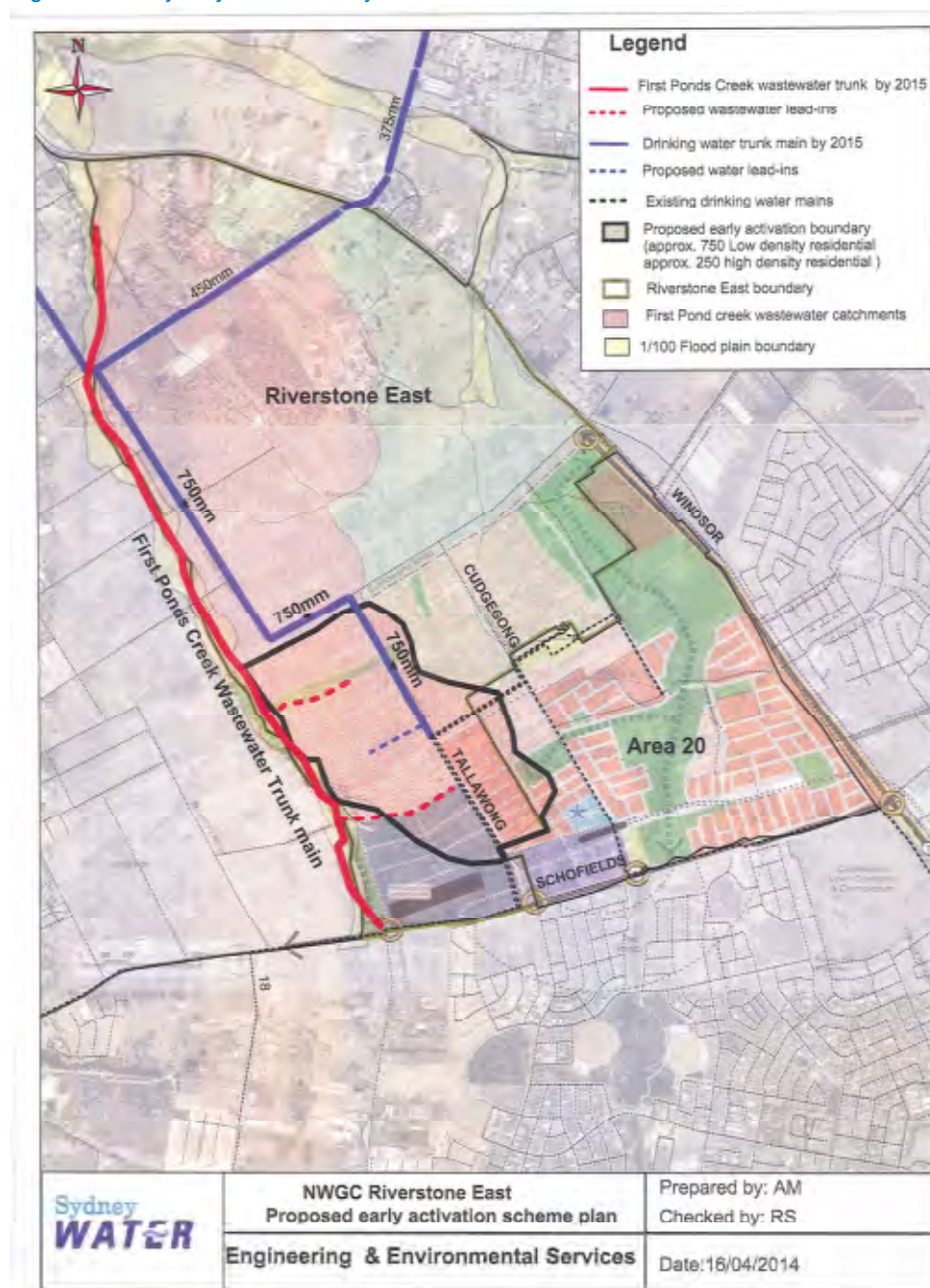
In combination with the above water supply scheme for the overall NWGC, Sydney Water has proposed wastewater services including a trunk main the entire length of First Ponds Creek to Schofields Road. This is to be completed in a similar time frame as the water supply trunk main (early 2015).

Combining the two proposed schemes, an estimate of 750 low density residential and 250 high density residential lots is expected to be adequately serviced within this area. It should be noted that the general precinct boundary provided has been based on existing topography to suit existing waste water catchments. The boundary does not consider surrounding precincts or land uses as can be seen in Figure 6.1 below.

6.2.1 Feeder Mains

Feeder mains to service the EAP are included in the assessment in Section 3.2 for the ultimate development. With regards to the EAP site, it is generally made up of two catchments both of which drain directly to the new First Ponds Creek trunk main, projected for a 2015 completion.

Figure 6.1: Sydney Water - Early Activation Sub-Precinct

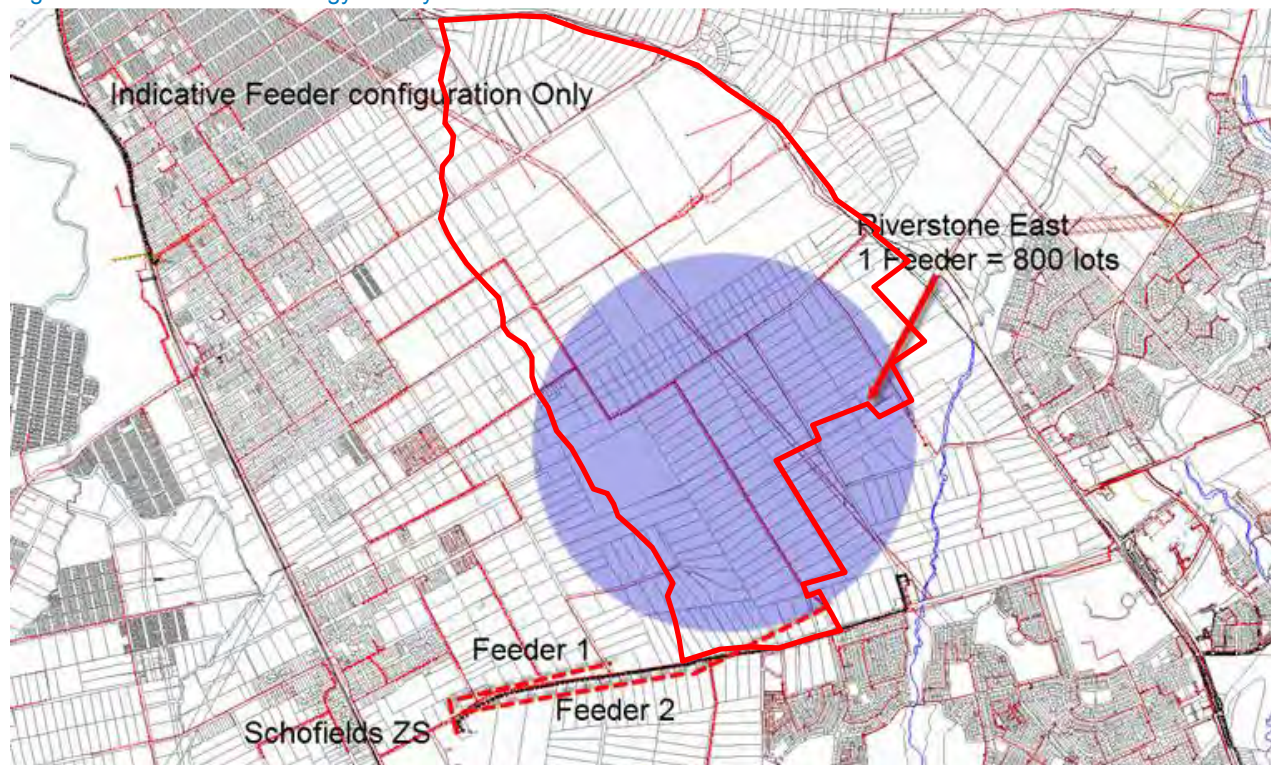


Source: Sydney Water – 16.04.2014

6.3 Electricity

Endeavour Energy has provided a preliminary servicing strategy for the EAP. The existing Schofields zone substation located on Schofields Road, west of the site has capacity to provide this area with an additional 700-1400 lots. To achieve the maximum 1400 lots, two new feeders would be required to be brought from the substation, along Schofields Road and into the site. The proposed feeders can be distributed via the existing overhead network and enter the site along Gordon Road, via Boundary Road or along Tallawong Road.

Figure 6.2: Endeavour Energy – Early Activation Sub-Precinct



Source: Endeavour Energy – 07.05.2014

6.4 Gas

Jemena have outlined that the existing 300kPa system within the site has sufficient capacity to supply the 800-1000 proposed lots. However, new secondary mains extended from the feeder mains would be required to service any new developments. These can be designed in detail at subsequent stages of planning.

6.5 Telecommunications

As per section 3.5, both Telstra and NBN Co have advised that the existing main conduit infrastructure is sufficient to provide reticulation to an EAP within the Site area. They have outlined that they only assess infrastructure improvements at a development stage. Depending on the number of lots, protocol is generally to lodge an application with Telstra if the development is less than 100 lots and NBN Co if it is greater than 100 lots. The application will be assessed and servicing provided as needed, including lead-ins. They have however indicated that should any major roads be upgraded outside of a development, they should be notified such that they can provide major conduits as needed.

6.6 Summary of Available Capacity

The below table summarises the lot potential from each service provider. The table highlights that the maximum number of lots which can be created is limited to the service which has the least available capacity. As can be seen, all services have the capacity to provide the minimum number of lots required.

Table 6.1: Available Capacity

Service Provider	Lot Potential
Water/ Sewer	3,700
Electrical	800-1,400
Gas	800-1,000
Telecommunications	800-1,000
Minimum	800-1,000

Source: Developed through service provider consultation

Appendices

Appendix A. Plans	35
Appendix B. Authority Correspondence	36

Appendix A. Plans

Appendix B. Authority Correspondence

Sent: 31 March 2014 15:26

Subject: RE: Riverstone East and Vineyard Precincts
Attachments: Riverstone East Proposed ZS & easement.jpg; PD1 narrow.pdf; PD1 wide.pdf; NW Sector proposed transmission - Indicative Only .jpg

Please find attached

1. A Indicative ultimate 132kV transmission layout
2. Proposed location of a Riverstone East ZS adjacent the 30m wide 132kV transmission easement along Garfield Rd. The site is required to be 1ha in size and on a corner block.
3. Standard Zone Substation layout

If you require any further information please let me know

Regards

www.endeavourenergy.com.au



Sent: Monday, 31 March 2014 2:33 PM

Subject: FW: Riverstone East and Vineyard Precincts

As discussed.

Sent: Monday, 24 March 2014 5:34 PM

Subject: Riverstone East and Vineyard Precincts

Thank you for your time this afternoon, it was good meet and introduce ourselves and discuss Endeavour Energy's current servicing strategy for the North West Growth Centre with the Riverstone East and Vineyard Precincts in particular.

As discussed, could you please provide the following at your earliest convenience:

- A plan showing the existing network including zone substation, transmission lines, main feeders, easement dimensions etc.;
- A plan showing proposed/ preferred network modifications to service the Riverstone East and Vineyard Precincts;
- A timeframe for servicing of the two precincts (i.e. Existing Riverstone zone substation expected to reach capacity by 2018, new box hill / riverstone east zone substation required by xxxx);
- Typical substation arrangements including minimum width/ depth, location characteristics (i.e. corner lots etc.); and
- Easement requirements, acceptable developments within easements (carparks, passive open space etc.).

Should you have any questions or wish to discuss please do not hesitate to contact myself or on

Kind regards,



Global management, engineering and development consultants



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.....

Sent:

07 May 2014 09:01

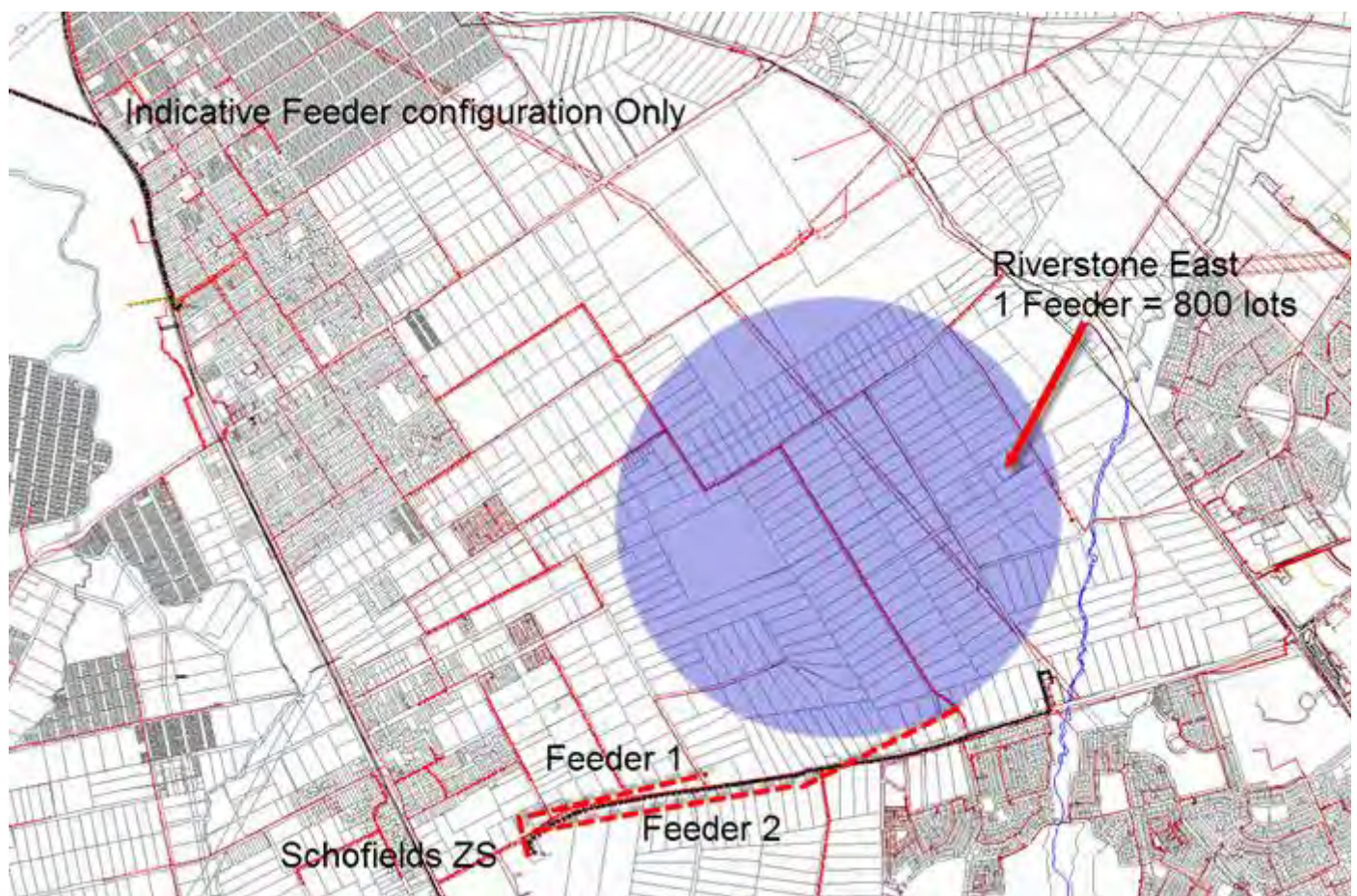
Subject:

RE: NWGC - Riverstone East and Vineyard Precincts - Early Activation Precincts

Riverstone East Precinct

Feeders can be developed from Schofields ZS to supply the southern part of Riverstone East. At least two feeders can cut into the existing HV networks along Boundary Rd and Tallawong Rd (as shown below). These two feeders could supply between 700 to 1400 lots.

Subsequent feeders can be developed from Schofields ZS to supply further lots in the southern part of Riverstone East Precinct. The limit of feeders from Schofields will be dependent upon road patterns and layout



Vineyard Precinct

Suitable distribution feeder works and augments are required to divert spare capacity to the vineyard precinct. This will allow up to 400-500 lots initially. Further developments can advance once a new ZS is commissioned in Riverstone East

The feeders and distribution works outlined are indicative only and are subject to change once a developer submits a load application.

Regards

www.endeavourenergy.com.au



Sent: Monday, 5 May 2014 11:25 AM

Subject: NWGC - Riverstone East and Vineyard Precincts - Early Activation Precincts

Thanks for taking my call. As discussed, could you provide plans and a brief summary indicating Endeavour Energy proposed servicing strategies for the Early Activation Precincts at Riverstone East and Vineyard Precincts?

Should you have any questions, please do not hesitate to contact myself on

Kind regards,



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.....

Sent: 15 April 2014 15:54

Subject: Riverstone East and Vineyard Precincts - Infrastructure Planning - Jemena

Attachments: Rouse Hill Overall Map.pdf

Our current Riverstone 300kPa system has sufficient capacity to accommodate the early activation sub-precinct developments consisting of 800-1000 lots in each precinct. New gas mains will still be required to be brought into these precincts from our existing feeder mains in order to supply the proposed developments.

To supply the growth beyond the early activation sub-precinct in these areas, a staged project known as the Rouse Hill Capacity Development Project has already been planned to bring new gas infrastructures to the new estate areas in order to provide the capacity required to cater the growth demands. Stage 3 of the project is currently planned in FY17 to enhance capacity to the Vineyard, Riverstone, East Riverstone and Schofields areas by laying secondary mains and installing a number of Regulator Stations. However, the timing of the project is subjected to change depending on the actual growth in the area.

Please find attached for the sketch illustrating the existing infrastructures and future plans in the area, unfortunately we cannot provide cad files of our existing infrastructure but maps can be obtained as required through the dial b4 you dig option.

When final approved layouts are available send them to me and in conjunction with the certified electrical designs I can arrange for a full supply assessment to be undertaken with a view to providing formal reticulation offers for each stage as it is developed.

I hope this information is suitable at this early stage and I look forward to working with you to bring the benefits of natural gas to these proposed growth areas.

Regards

Jemena Gas Networks (NSW) Limited

thenaturalchoice.com.au



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Sent: Thursday, 10 April 2014 11:53 AM

Subject: FW: Riverstone East and Vineyard Precincts - Infrastructure Planning - Jemena

Thank you for taking my call. As discussed, Mott MacDonald has been engaged by the Department of Planning and Infrastructure to undertake the infrastructure planning assessment for the Riverstone East and Vineyard Precincts of the North West Growth Centre.

As part of the assessment we are required to identify existing servicing arrangements by various service providers in the area, and proposed servicing strategies for the two development precincts. From this information we would inform the Indicative Layout Plan (ILP) and identify an 'early activation' sub-precinct consisting of 800-1000 lots in each Precinct. These early activation sub-precincts would need to be able to go online as soon as possible, with minimal cost relating to infrastructure upgrades.

It would be very much appreciated if you could please provide the following, if available, to assist in our assessment:

- CAD files of your infrastructure at each of the two precincts;
- Plans/sketches of any currently proposed servicing strategies and sequencing (including anticipated staged completion dates); and
- Current network capacity available to accommodate the early activation sub-precincts.

As discussed, while we would like to meet in person with yourself or an appropriate representative of Jemena to discuss the above, we understand this may not be necessary at this stage. However, we will await your advice.

If you have any questions or wish to discuss, please do not hesitate to contact myself on

Thanking you in advance for your attention in relation to this matter.

Kind regards,



Global management, engineering and development consultants



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Sent: 10 April 2014 11:52 AM

Subject: Riverstone East and Vineyard Precincts - Infrastructure Planning - Jemena

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- Plans/sketches of any currently proposed servicing strategies and sequencing (including anticipated staged completion dates); and
- Current network capacity available to accommodate the early activation sub-precincts.

As discussed, while we would like to meet in person with yourself or an appropriate representative of Jemena to discuss the above, we understand this may not be necessary at this stage. However, we will await your advice.

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Sent: 03 April 2014 16:46

Subject: Riverstone East and Vineyard Precincts - NBN Servicing Strategy

Attachments: Riverstone East and Vineyard Precincts_Planning Concept.pdf; MMD-334311-C-DR-00-VY-0001.pdf; MMD-334311-C-DR-00-RE-0001.pdf

Thank you for your time this week, it was good to meet and introduce ourselves and discuss NBNC's current servicing arrangements and potential strategies for the Riverstone East and Vineyard Precincts.

As discussed in the meeting, please find attached digital copy of the precincts for overlay of your existing assets/ mains in the area.

Should you have any questions or wish to discuss, please do not hesitate to contact myself on

Kind regards,



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Riverstone East and Vineyard Precincts_Planning Concept.pdf

MMD-334311-C-DR-00-VY-0001.pdf

MMD-334311-C-DR-00-RE-0001.pdf

Sent:

08 April 2014 13:55

Subject:

RE: Riverstone East & Vineyard

Attachments:

Vineyard wastewater servicing map.pdf; Vineyard water servicing map.pdf;
Riverstone East water 2.pdf; Riverstone East-wastewater servicing.pdf; ATT00001..txt

Sorry for the delay, please find attached maps for Riverstone East and Vineyard. I am still waiting for the CAD files and will send through asap. These maps are indicative only and servicing will be influenced by more detailed flood and catchment mapping.

Thanks



[Urban Growth Strategy](#) | [Sydney Water](#)

Sent: Sunday, 23 March 2014 9:23 PM

Subject: Riverstone East & Vineyard

Thank you for the opportunity to meet with you to introduce ourselves, discuss the precincts and to gain an understanding of your current plans and sequencing of works.

As discussed in the meeting, could you please send through at your earliest convenience:

- CAD files of your infrastructure at each of the two precincts;
- Plans/sketches of the current wastewater and water servicing strategies and sequencing (including anticipated staged completion dates) for Riverstone, Riverstone East and Vineyard;
- Details of proposed (or as constructed) levels of the planned upgrades.

Also, we confirm that we will be providing SWC with data on the 100 year ARI flood extents as soon as they are at a sufficient level of detail (including riparian setback information) for Riverstone East and Vineyard precincts.

Please give me a call if you would like to discuss further.

Regards,



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Sent: 08 April 2014 15:00

Subject: FW: Emailing: Overall_Work_Lot_dwg - NWGC wastewater alignments package 2/3A

Attachments: Overall_Work_Lot_dwg.DAT; Overall_Work_Lot_dwg.ID; Overall_Work_Lot_dwg.MAP; Overall_Work_Lot_dwg.TAB

-----Original Message-----

Sent: 08 April 2014 2:51 PM

Cc:

Subject: FW: Emailing: Overall_Work_Lot_dwg - NWGC wastewater alignments package 2/3A

Please find attached DWG files for wastewater.

Thanks

Urban Growth Strategy | Sydney Water

~~ Following Files were attached ~~

Overall_Work_Lot_dwg.DAT

Overall_Work_Lot_dwg.ID

Overall_Work_Lot_dwg.MAP

Overall_Work_Lot_dwg.TAB

Sent: 28 March 2014 12:07

Subject: RE: North West Growth Centre - Riverstone East and Vineyard Precincts
Attachments: MMD-334311-C-DR-00-VY-0001 Telstra.dwf; MMD-334311-C-DR-00-RE-0001 Telstra.dwf

As requested attached are your plans in dwg with Telstra exchange boundary, Telstra Exchange location and Telstra Main Conduits.

Thanks



Sydney Metro | Area Planning & USO | Fixed & Data Access Engineering | Networks | Telstra Operations
www.telstra.com

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Sent: Wednesday, 26 March 2014 5:52 PM

Subject: RE: North West Growth Centre - Riverstone East and Vineyard Precincts

Thank you for your time this afternoon to discuss the Precincts and to gain an understanding of your current plans and sequencing of works.

As discussed, could you please provide a plan (in DWG form if possible) showing the following at your earliest convenience:

- Existing exchange locations at Windsor and Riverstone;
- Exchange boundaries; and
- Main feeder lines through the two precincts.

Attached for your information are sketches showing the two precinct boundaries.

Should you have any questions or wish to discuss please do not hesitate to contact myself on

Kind regards,



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Subject: RE: North West Growth Centre - Riverstone East and Vineyard Precincts

No worries.

We are available after 4pm today if you want to ring me!

Regards



Sydney Metro | Area Planning & USO | Fixed & Data Access Engineering | NAT

Sent: Wednesday, 26 March 2014 2:20 PM

Subject: RE: North West Growth Centre - Riverstone East and Vineyard Precincts

I am deeply sorry, I confused a message I received this morning from another service provider for a rescheduled meeting to be from you.

I will try you at 4.

Kind regards,



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Sent: 25 March 2014 5:08 PM

Subject: RE: North West Growth Centre - Riverstone East and Vineyard Precincts

Not a problem, 12 noon is fine. I'll contact you then.

Kind regards,



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Sent: 25 March 2014 5:06 PM

Subject: RE: North West Growth Centre - Riverstone East and Vineyard Precincts

I tied up in meetings in the morning. How about 12 noon or 4pm tomorrow.

I will have _____ with me as he is the Area Planner for these areas.

Regards



Sydney Metro | Area Planning & USO | Fixed & Data Access Engineering | NAT

Sent: Tuesday, 25 March 2014 5:01 PM

Subject: RE: North West Growth Centre - Riverstone East and Vineyard Precincts

Thanks for the prompt response; a phone call should suffice for now.

At the moment we are just trying to get an understanding of what's currently in the area and what Telstra is proposing in the future. Once we are a bit more advanced it may be a good idea to meet in person.

I will try you on the phone tomorrow morning at 9:30am if that suits you ok?

Disregard the attachments, I believe they are associated with the images/ links in my signature.

Kind regards,



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Sent: 25 March 2014 4:52 PM

Subject: RE: North West Growth Centre - Riverstone East and Vineyard Precincts

Happy to talk to you.

Do you want to setup a time, we can either talk over the phone or you meet in person.

I didn't get the attachments underneath?

Regards



Sydney Metro | Area Planning & USO | Fixed & Data Access Engineering | NAT

Sent: Tuesday, 25 March 2014 4:34 PM

Subject: North West Growth Centre - Riverstone East and Vineyard Precincts

Mott MacDonald has been engaged by the Department of Planning and Infrastructure to undertake the infrastructure planning assessment for the final two precincts of the North West Growth Centre, being the Riverstone East and Vineyard Precincts.

As part of the assessment we are required to identify existing servicing arrangements by various service providers in the area, and proposed servicing strategies for the two development precincts.

It would be very much appreciated if you could call to discuss Telstra's existing and proposed servicing arrangements for the two precincts under assessment.

Thanking you in advance for your attention in relation to this matter.

Kind regards,

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MMD-334311-C-DR-00-VY-0001.pdf
MMD-334311-C-DR-00-RE-0001.pdf

Sent: 25 March 2014 09:31

Subject: RE: Riverstone East and Vineyard Precincts - TransGrid plans

Attachments: Vineyard Precinct - DPI Master Infra Plan.pdf; Riverstone East Precincts & TG TL Enquiry.pdf

Re: DPI - Riverstone East and Vineyard Precincts - TransGrid Infrastructure

Further to your enquiry please find attached plans from the *TransGrid Asset Management Information System* (TAMIS) identifying the two precincts, plus TransGrid's easements and other land interests therein. The following is a summary of the TransGrid infrastructure located within the precincts:

Precinct	TransGrid Land Interest	TransGrid Infrastructure
Vineyard	Lot 210 in DP830505, Bandon Rd, Vineyard	Vineyard 330kV Substation
	Earing to Kemps Creek 500kV 70 metre wide Easement.	Feeders 5A1 / 5A2 Structures 214 – 228
	Vales Point to Sydney West 330kV 60.96 metre wide Easement.	Feeders 25 / 26 Structures 213 - 255
	Sydney West to Sydney North No.2 330kV Easement width approx. 85 metres.	Feeder 14 Structures 38 – 48
Riverstone East	Sydney West to Sydney North No.1 330kV Easement width approximately 60.96 metres.	Feeder 20 Structures 55 – 64
	Sydney West to Sydney North No.2 330kV Easement width approx. 85 metres. <i>[This easement sits outside of the Precinct.]</i>	Feeder 14 Structures 30 – 40

The light brown hatched area shown in the Vineyard Precinct plan is an area identified by TransGrid for possible expansion of the network. Further enquiries with TransGrid's *Network Planning and Performance* (NP&P) group will be necessary to ascertain what, if any, future plans they have for this area. Before making this enquiry, it would be helpful to receive detailed plans showing what the Department of Planning and Infrastructure propose for the area, so I may brief NP&P accordingly.

Should you have any queries, please feel free to contact me per the details below.

Kind regards



Sent: Monday, 24 March 2014 12:01 PM

Subject: Riverstone East and Vineyard Precincts - TransGrid plans

As discussed, could you please provide TransGrid plans associated with the above two precincts? As requested, I have attached precinct location plans.

Should you have any questions or wish to discuss, please do not hesitate to contact myself on

Kind regards,



Global management, engineering and development consultants



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~~ Following Files were attached ~~

image001.jpg

image002.jpg

image003.jpg

image004.jpg

MMD-334311-C-DR-00-VY-0001.pdf

MMD-334311-C-DR-00-RE-0001.pdf

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