



# Area 20

## Primary Utilities Report

Job Number 600230

Prepared for Department of Planning

November 2010



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## Document Control

Version	Date	Author		Reviewer	
A – Draft	16 October 2009	Dashpreet Singh	DPS	Russell Clark	RTC
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## Executive Summary

Cardno has been commissioned by the Department of Planning to investigate and assess the availability of primary utilities required for the urban development of Area 20. The report details trunk infrastructure supply requirements of the site and describes the internal service networks for the development with respect to wastewater, potable and recycled water and combined services (electricity, telecommunications and gas). The text of this report should be read in conjunction with the concept service design plans enclosed as Appendix A - D.

The Department of Planning recently issued a new indicative layout plan of Area 20 which seeks to incorporate a major piece of infrastructure through the development; the North West Rail Link and this report has been revised to incorporate the new Masterplan layout. However the issues, considerations and utilities infrastructure requirements associated with the proposed rail corridor are outside the scope of this report.

We understand that the report will be referenced by the Department of Planning who seeks to rezone the area from its current land-use, predominantly rural, to proposed land uses associated with urban residential development. On this basis the report highlights any potential areas of concern from an infrastructure servicing standpoint.

The chief findings of the investigation are that, with regards to logical staging of the Area 20 precinct, there are few constraints from an infrastructure servicing standpoint.

With the exception of the elevated reservoir required to provide potable water service to dwellings on the western ridgeline, the Area 20 precinct can progress with logical staging and is not reliant on construction of substantial infrastructure by utility authorities. This advice is contingent on current precinct programming for initial release no earlier than mid 2011.

Given proximity to potable and recycled water trunk infrastructure and the Mungarie Park Zone Substation it is expected that development would commence along the southern and eastern boundaries with Schofields and Windsor Road. Further extension of these initial stages would proceed downstream towards the creek line and beyond.

It is anticipated that as such times as development progresses on the western ridge line that the elevated reservoir would be constructed by SWC and does not pose a barrier to staging of the Area 20 precinct.

Cardno can confirm, based on investigations completed in the formulation of this report, that Area 20 is able to be serviced by all primary utility authorities. Cardno recommends ongoing dialogue is maintained between the Department of Planning, utility authorities and Area 20 landowners in order to ensure development proceeds in a logical and timely manner.



Russell Clark  
Senior Project Manager

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## 1 Introduction

Area 20 is one of the six First Release Precincts located within Sydney's Northwest Growth Centre and falls within the Blacktown Local Government Area (LGA). When completed Area 20 will provide approximately 2,500 residential dwellings with accompanying commercial, retail and open space land use. The Area 20 Precinct is located directly north-west of the Windsor Road and Schofields Road intersection and is bisected by Second Ponds Creek which runs centrally through the precinct.

It is understood the original Area 20 boundary was modified following a boundary review undertaken by the Growth Centres Commission (GCC), now incorporated into Department of Planning (DOP). The boundary review, in part informed by a waste water servicing review completed by Cardno in September 2008, saw a revised Area 20 boundary incorporate part of the Riverstone East Precinct. In practical terms the revised boundary generally included lands up to the ridgeline west of Second Ponds Creek thus maximising developable areas able to drain by gravity to the creek corridor.



Cardno has subsequently been commissioned to investigate and assess the availability of primary utilities required for the urban development of Area 20 and to prepare an indicative delivery plan for the construction and supply of trunk infrastructure services to meet the land release targets of the precinct.

The report details trunk infrastructure supply requirements of the site and describes the internal service networks for the development with respect to wastewater, potable and recycled water and combined services (electricity, telecommunications and gas). The text of this report should be read in conjunction with the concept service design plans enclosed as Appendix A - D.

We understand that the report will be referenced by DOP who seeks to rezone the area from its current land-use, predominantly rural, to proposed land uses associated with urban residential development. On this basis the report highlights if necessary any potential areas of concern from an infrastructure servicing standpoint.

## **2 Proposed Development**

The planning and management of the proposed Area 20 development is being undertaken in partnership by the Department of Planning and Blacktown City Council.

Area 20 is approximately 245 hectares of land and will consist of approximately 2,500 new residential dwellings and provide housing for around 7000 people. An indicative layout plan (ILP), prepared by LFA, highlights the likely residential mix. The most recent ILP received from the Department of Planning shows the North West Rail Link traversing in an east-west direction through the site adjacent to Schofields Road.

East of the creek densities are proportionately higher than those proposed to the west with a greater percentage of townhouses and low-rise apartments. West of the creek the overall density is reduced by a greater greater proportion of standard residential lots (approx. 450m<sup>2</sup>).

In general the low-rise apartments and higher densities are confined to areas of high amenity, Windsor Road and Schofields Road (in the east) and adjacent to open space areas. Precinct wide greater than 50% of the proposed residential mix is medium density. At the south-west corner of the Precinct there are light industrial areas, the local centre and mixed use lots situated next to the proposed railway station. The final development mix is subject to further urban planning.

Construction of first lots may commence as early as 2011 and will take up to 15 years in order to complete construction of Area 20 in its entirety.

## **3 Stakeholders and Utility Providers**

Below is a list of the utility providers engaged to supply the development with infrastructure and a brief description outlining their role and responsibilities:

- **Sydney Water** is the certifying authority for all potable, recycled and wastewater mains proposed within Area 20. The mains are developer funded and pending the approval of a Section 73 application, the assets are transferred to Sydney Water for ongoing ownership and maintenance.
- **Integral Energy** will provide a feeder from Mungarie Park Zone Substation via Commercial Road for electrical supply to Area 20. Furthermore, Integral Energy stands as the certifying authority for any electrical reticulation design prepared for the development.
- **Telstra** will reticulate Area 20 with telecommunications infrastructure and provide ongoing maintenance of the asset. Telstra are responsible for preparing a design plan and it is generally the civil contractors that install communications conduits (in accordance with the

design plan) as part of the civil works contract. Telstra visit the site once works have completed and pull cable through the empty conduits and install pits where required.

- **Jemena** will be providing natural gas infrastructure to the residential dwellings in Area 20. Their role will be to design, build and maintain the infrastructure reticulated throughout the development. Natural gas supply is available to Area 20 – refer correspondence from Jemena in Appendix H.

## 4 Methodology

The utility services strategy commenced with a desktop study of existing utility services. The current residential land use is predominately rural residential and the existing utility infrastructure is commensurate with this land use.

There are two pieces of major infrastructure currently present within the extents of Area 20. An Integral Energy switching station, located on the north-east corner of the intersection between Cudgegong Road and Schofields Road, and Sydney Water Corporations Second Ponds Creek Carrier (SPCC), a trunk wastewater line that generally follows the creek line central to the precinct.

The SPCC conveys wastewater flows for a considerable catchment extending south and ultimately transfers sewage effluent to the Rouse Hill Sewage Treatment Plant north east of Area 20. The SPCC was the result of a previous Cardno investigation informing the boundary review process and is referred to in greater detail in the proceeding sections.

Integral Energy's switching station is situated on line with twin 132kV trunk supply lines and is a critical part of the wider regional electrical supply network. The switching station is able to alter supply between 132kV lines and in so doing can facilitate continual supply in power outages or during maintenance periods. The 132kV lines to the south are conveyed underground through The Ponds and beyond. To the north the 132kV lines are conveyed overhead through Area 20 as they continue in a general northwest direction. The overhead lines have a considerable easement for maintenance and access to the benefit of Integral that impacts on the potential development potential of Area 20. It is understood that DOP are to investigate opportunities to underground these lines though these investigations are outside the scope of this report.

The Department of Planning recently issued a new indicative layout plan of Area 20 which seeks to incorporate a major piece of infrastructure through the development; the North West Rail Link and this report has been revised to incorporate the new Masterplan layout. However the issues, considerations and utilities infrastructure requirements associated with the proposed rail corridor are outside the scope of this report.

The requirements for utilities infrastructure for potable water, waste water, electricity, telecommunications and natural gas were considered. Utility agencies were consulted for initial input regarding the supply of service infrastructure. Following initial review coordination meetings were held with key authorities, specifically Sydney Water and Integral Energy, to better understand requirements and timings for key infrastructure elements.

Connection points for lead-in infrastructure were established based on likely staging, proximity to existing mains and, where prudent, in consideration of utility authority requirements. Final connection and staging details should be established during the detailed design and assessment phase.

An empirical analysis was undertaken to establish likely sizing and locations of mains. Logical cross-connections and redundancy of supply for emergency use were considered and incorporated into the conceptual plans.

The internal servicing strategy documented in this report will provide a framework on which to base future conceptual designs and inform any further discussions. A final utility servicing and trunk infrastructure scheme should be formulated in consultation with the relevant utility agencies during the LGA approvals phase.

## **5 Utility Servicing Infrastructure**

### **5.1 Wastewater Infrastructure**

Wastewater reticulation is shown on the attached Concept Wastewater Reticulation Plan, included as Appendix A.

The concept design is generally based on a gravity system of uPVC pipes, maintenance holes and junctions in the low corner of each residential lot. In consideration of the existing topography mid-block sewer lines are indicated where it is impractical to drain sewer to the street. The mains are located within private property in accordance with conventional Sydney Water practice.

Pipe size analysis in the attached concept layout was based on empirical graphs historically used by water agencies for waste water design. Detailed modelling of waste water discharges to assess pipe grades and sizing shall be undertaken in consultation with Sydney Water as part of any detailed design and assessment phase.

Generally the proposed Area 20 precinct drains to the SPCC by gravity though there two areas where this is impractical. Firstly a trapped low point in the south east corner of the precinct directly adjacent to the Schofields Road and Windsor Road intersection is unable to drain by gravity to the SPCC.

Secondly some existing rural lots were included within the proposed Area 20 precinct boundary where they straddle the ridgeline west of the creek. We understand these lots were included within the Area 20 precinct on the proviso that a substantial area could drain by gravity to the SPCC. Landowners can feasibly develop a substantial area of their existing rural lot. In some instances land beyond the ridge line may drain via gravity to the SPCC utilising deep sections of gravity wastewater installed at discreet locations. The practicality of this should be assessed together with concept road and lot grading, elements that fall outside the scope of this report.

Two options exist to drain the abovementioned areas beyond the ridge lines unable to drain to the SPCC. First option is to implement sewer pumping stations (SPS) to convey effluent to over the ridge lines and to the SPCC, though this option entails a high developer funded capital cost. The SPS will be dedicated to SWC for ongoing operation and maintenance. SWC has verified there is sufficient capacity in the SPCC to service the current boundary extents of Area 20 on a temporary basis.

The preference is for areas to drain to trunk sewer carriers by their natural catchments. In this regard the second option is more favourable. SWC have confirmed that the area west of the ridgeline can drain via gravity to the proposed wastewater First Ponds Creek Carrier (FPCC) scheduled for construction in 2016. Any lead-in works would likely be developer funded.

Similarly, the area east of the creek line at the south-east corner of the Area 20 precinct can drain to existing Rouse Hill sewer system. SWC have verified the Caddies Creek Carrier has sufficient capacity to accept the additional effluent from the medium-high residential dwellings of Area 20,



however the capacity of the existing sewer lines leading to the carrier need to be assessed on application with SWC through the Asset Creation Developer Process.

A copy of the verification email from Sydney Water is contained at Appendix E.

It is recommended that a cost benefit analysis be undertaken to prove the viability of these schemes as part of ongoing planning works.

## 5.2 Potable Water Infrastructure

Reticulated potable water infrastructure is shown on the attached Concept Potable Water Reticulation Plan, included as Appendix B.

The design is based on an interconnected network of uPVC mains to optimise hydraulic efficiency for domestic and fire-fighting use. The reticulation system will consist of taper, direction valves, stop valves and hydrant fittings to facilitate isolation of segments in the network for maintenance purposes with minimal disruption to residents.

Mains have generally been located on the high side of the roads to provide a failsafe discharge to the road and drainage system in the event of flushing or pipe failure. The few mains which have been located on the low side of the roads have been positioned to minimise the number of service crossings. This treatment typically occurs adjacent to open space or where a significantly greater number of connections are required on the low side of the road.

Potable water supply for Area 20 will predominantly come from the existing Parklea water supply system (Sydney Water - North West Growth Centre water related services for first release precincts, Environmental Assessment, February 2008). At this time, SWC are in the process of constructing a 450mm diameter uPVC trunk main along Schofields Road from the intersection of Windsor Road to Cudgegong Road. This water main will supply the dwellings in Area 20 up to RL 60m AHD with drinking water.

Though the SWC EA for first release precincts was based on the now superseded precinct boundary, SWC has verified the existing 450mm diameter trunk main will supply Area 20 with the exception of future development above RL 60m AHD *on the western side* of Second Ponds Creek (SPC).

In this regard it is noted that SWC requires a minimum 20m of pressure head at the point of supply. On the western side of the creek, at RL 60m AHD and above, this is not achievable with the primary reason being pressure losses in the pipe calculated at 3m per kilometre.

The supply of potable water to the north-western extents of Area 20 which exceed RL 60m can only be provided following construction by SWC of a 4ML elevated reservoir at the Cudgegong Road reservoir site in the precincts north. The programmed date of completion for this elevated reservoir is 2018 though the delivery may be influenced by the progression of development in neighbouring precincts. Consequently consideration needs to be given to development of Area 20 considerate to the available supply of potable water.

It is noted that SWC have previously confirmed that an area to the *eastern side* of SPC above RL 60m AHD *can* be supplied from Parklea. A copy of the verification email from Sydney Water is contained at Appendix E. The assumption in this regard is that reduced head losses given closer proximity, approximately 2km, to Parklea can therefore provide pressure head at the point of supply to satisfy SWC.

It is anticipated that significant regrading will take place on the eastern side of the creek in proximity of the existing quarry. Any proposed regrading in this area should consider possible adverse impacts on the existing 450mm trunk mains ability to supply this area.

It is proposed that the water mains are constructed and funded by the developer before transfer to Sydney Water for ongoing ownership and maintenance. Sydney Water should be consulted throughout the planning and detailed design phase to ensure the meets the required statutory and engineering guidelines.

### **5.3 Recycled Water Infrastructure**

Reticulated recycled water infrastructure is shown on the attached Concept Potable Water Reticulation Plan, included as Appendix C.

It is feasible to reticulate recycled water throughout the project and that generally the same principles apply as to the potable water infrastructure noted above. The Area 20 Precinct is part of the existing Parklea North supply system infrastructure and has sufficient capacity to service the new development.

The recycled water network would be an interconnected network of uPVC mains to optimise hydraulic efficiency for domestic and fire-fighting use. The reticulation system would consist of fittings in keeping with the potable water network and would generally be laid side by side in a shared trench to achieve economies during construction.

As with potable water an existing 375mm diameter uPVC trunk main is available for supply from The Ponds to the south, though it will require extension into Area 20. It is anticipated that the recycled main will be extended along with the potable main and will be within 50m of Schofields Road at such times as the first Area 20 stages reach construction. The recycled main coming from The Ponds will supply dwellings up to RL 60m with recycled water from Parklea North Recycled Water Zone, however dwellings above RL 60m recycled water will only be available after the construction of the elevated reservoir at the Cudgegong Reservoir site by 2019/2020.

A copy of the verification email from Sydney Water is contained at Appendix E.

### **5.4 Electricity Infrastructure**

The electrical reticulated infrastructure is shown on the attached Concept Shared Service Plan, included as Appendix D.

Following initial consultation with Integral Energy a meeting was held to discuss supply availability for Area 20. Archive Integral responses indicated that the proposed Mungarie Park Zone Substation (MPZS) had adequate capacity for Area 20 however once again this advice was contingent on the original, and now superseded layout.

At a meeting on 25<sup>th</sup> August '09, Integral Energy were able to confirm that the MPZS has sufficient capacity to supply the proposed 2,500 residential dwellings within the revised Area 20 precinct boundary and that this capacity would be made available. A copy of the meeting minutes and verification email from Integral Energy are contained as Appendix F.

Construction of the MPZS is currently underway with the zone substation slated for commission in mid 2010. Area 20 can therefore adequately be serviced by electrical infrastructure.

It is uncertain at this stage which party will fund the extension of trunk electrical feeds to the site. Though the cost of electrical reticulation would be developer funded.

The concept shared service plan incorporating electrical supply and reticulation, is included as Appendix D, the following should be noted:

- 2 x 22kV feeders from Mungarie Park Zone Substation extended along Commercial Road to service Area 20. Noting that depending on the preferred staging that Schofields Road is also available as a possible trunk supply route;
- Feeders could be nominated for either residential or industrial supply;
- Each 22kV feeder will provide a maximum 9.0MVA and supply approximately 1300 residential lots. Our demand figures conservatively assume 6-7 kVA per residential dwelling;
- Domestic 240V supply will be provided through a suite of 500kVA padmount substations, which is able to supply up to 76 dwellings;
- It is assumed that each medium density block would require a stand along padmount substation;
- Padmount substations will generally be established on easements with a restriction placed on the title of the burdened lot to benefit Integral Energy.

All high and low voltage conductors for the site will be located underground to improve urban amenity and provide extreme weather protection in accordance with Integral Energy guidelines. Further investigation and design will be undertaken by accredited designers in consultation with Integral Energy as part of ongoing design development.

## **5.5 Telecommunications Infrastructure**

Telecommunications infrastructure is shown on the attached Concept Shared Service Plan, which includes electricity, telecommunications and gas services in a common trench.

Noting that Telstra is currently supplying The Ponds Stage 3 development (directly south of Area 20) with a reticulated Telstra network, Cardno queried if there was available supply of Telstra infrastructure to Area 20. The outcome of discussions found that provided a developer gave sufficient notification of their intent to develop a site, supply will be made available where required.

Subsequent to this advice Telstra released a public statement regarding the supply of telecommunications to new development areas. Telstra have confirmed they will no longer be supplying copper telephone cable to green field development sites. From 1<sup>st</sup> June 2010 Telstra will offer high speed fibre optic cabling to all new dwellings through their 'Velocity Package.' The provision of high speed broadband by Telstra would be developer funded.

Other options exist for developers in the supply of high speed broadband to purchasers most notably through the National Broadband Network (NBN). The NBN is committed to the provision of fibre optic to 90% of existing Australian dwellings over the next 8 years. Installation of this network is free to existing residential areas however new release areas will be subject to developer funded costs, understood to be commensurate with the additional cost of trunk infrastructure supply.

Effectively the rollout of the NBN initiative together with Telstra's new stance the provision of telecommunications to new release areas would be subject to a competitive tender process. The cost associated with the works is difficult to predict. Broadly the cost is dependent on factors such as the total lots in the development, the lot rollout per year and more critically, the presence of existing fibre optic in the vicinity.

Telstra have confirmed fibre optic can be made available to Area 20 – refer to verification email in Appendix G.

## **5.6 Natural Gas Infrastructure**

Natural gas infrastructure is shown on the attached Concept Shared Service Plan, which includes electricity, telecommunications and gas services in a common trench, included as Appendix D.

Consultation with Jemena regarding the provision of reticulated natural gas to Area 20 found that a 300kPa 110mm P.E. main exists on Schofields Road terminating on Windsor Road which has sufficient capacity to service approximately 400 dwellings in Area 20. A copy of the verification email from Jemena is contained at Appendix H.

Natural gas will be designed, constructed and funded by Jemena as part of the normal land development process. Takeoff locations, sizing and programming will be undertaken by Jemena during the detail design and assessment phase.

## **6 Staging**

In consideration of discussions in the preceding sections it is noted that, with regards to logical staging of the Area 20 precinct, there are few constraints from an infrastructure servicing standpoint. Crucially with the exception of the elevated reservoir required to provide potable water service to dwellings on the western ridgeline, the Area 20 precinct can progress with logical staging and is not reliant on construction of substantial infrastructure by utility authorities. This advice is contingent on current precinct programming for initial release no earlier than mid 2011.

Given proximity to potable and recycled water trunk infrastructure and the Mungarie Park Zone substation it is expected that development would commence along the southern and eastern boundaries with Schofields and Windsor Road. Further extension of these initial stages would then be downstream towards the creek line and beyond.

It is anticipated that as such times as development progresses on the western ridge line that the elevated reservoir would be constructed by SWC and therefore does not pose a barrier to the logical progression of the Area 20 precinct.

The concept service design plans enclosed in Appendix A - D also include staging boundaries which should be read in conjunction with Table 1 below. The staging boundaries reference timing for supply of trunk infrastructure as the sole constraint. The actual staging of the Area 20 precinct will consider additional constraints such as stormwater management together with market forces in the release of land. It is anticipated that the staging boundaries nominated by this report will form the broad framework under which a more detailed development staging can be developed.



STAGE	INFRASTRUCTURE	TIMING & CONSTRAINTS
1	Wastewater	<b>No constraint</b> – sewer connecting to the existing Second Ponds Creek Carrier and Rouse Hill sewers can be constructed when development for Area 20 goes forward.
	Potable	<b>No constraint</b> – potable water can be extended to Area 20 and service the dwellings up to RL 60m AHD; denoted as Stage 1.
	Recycled	<b>No constraint</b> – recycled water can be extended to Area 20 and service the dwellings up to RL 60m AHD; denoted as Stage 1.
	Electrical	<b>No constraint</b> – electrical supply readily available from the Mungarie Park Zone Substation.
	Telstra	<b>No constraint</b> – Telstra’s copper wire and fibre optic technology is available to service Area 20.
	Gas	<b>No constraint</b> – current infrastructure along Schofields Road capable of serving 400 dwellings in Area 20 and will seek to meet future demand given adequate notice is provided prior to development.
2	Wastewater	Construction of the sewer in stage 2 is contingent on completion of the First Ponds Creek Carrier (FPCC) due to commence in <b>2016</b> .
	Potable	Potable water for stage 2 is available pending the construction of a 4ML potable elevated reservoir (including trunk supply main leading to the reservoir) at the Cudgegong Reservoir site due to commence in <b>2018</b> .
	Recycled	Recycled water for stage 2 is available pending the construction of a 4ML recycled elevated reservoir (including trunk supply main leading to the reservoir) at the Cudgegong Reservoir site due to commence in <b>2019/2020</b> .
	Electrical	<b>No constraint</b> – electrical supply readily available from the Mungarie Park Zone Substation.
	Telstra	<b>No constraint</b> – Telstra’s copper wire and fibre optic technology is available to service Area 20.
	Gas	<b>No constraint</b> – Jemena will seek to meet future demands of natural gas supply to Area 20.

**Table 1 – Construction Staging**

## **7 Limitations of these Investigations**

The internal servicing strategy for the Area 20 Precinct has been developed on the basis of available trunk infrastructure brought to the boundary of Area 20 with sufficient capacity to service the proposed residential development. While discussions with utility authorities generally indicates this to be the case Cardno does not offer any warranty over this third party advice. In the case of Integral Energy, and to a lesser degree Sydney Water, the only guarantee to supply is on lodgement and approval of a Development Application with the relevant Local Government Authority.

The utility servicing networks shown in the attached plans demonstrate desirable solutions for reticulation of services throughout Area 20. It should be noted that the service strategies are concept only and are subject to change at the detailed design stage. Pipe locations may be optimised during this phase to improve serviceability and reduce material costs. In particular gravity services are subject to the finalisation of ground survey and an earthworks strategy for the site. Finally, the issues and considerations associated with the North West Rail Link corridor need to be established as they have been excluded from the scope of this report.

## **8 Conclusion**

The internal servicing strategy shows a systematic pattern of reticulated utility infrastructure which can be logically staged to provide services for potable water, waste water, electricity, telecommunications and natural gas. The concept designs will be further developed in consultation with the utility service authority as part of the overall infrastructure strategy and with the detailed design phase of the project.

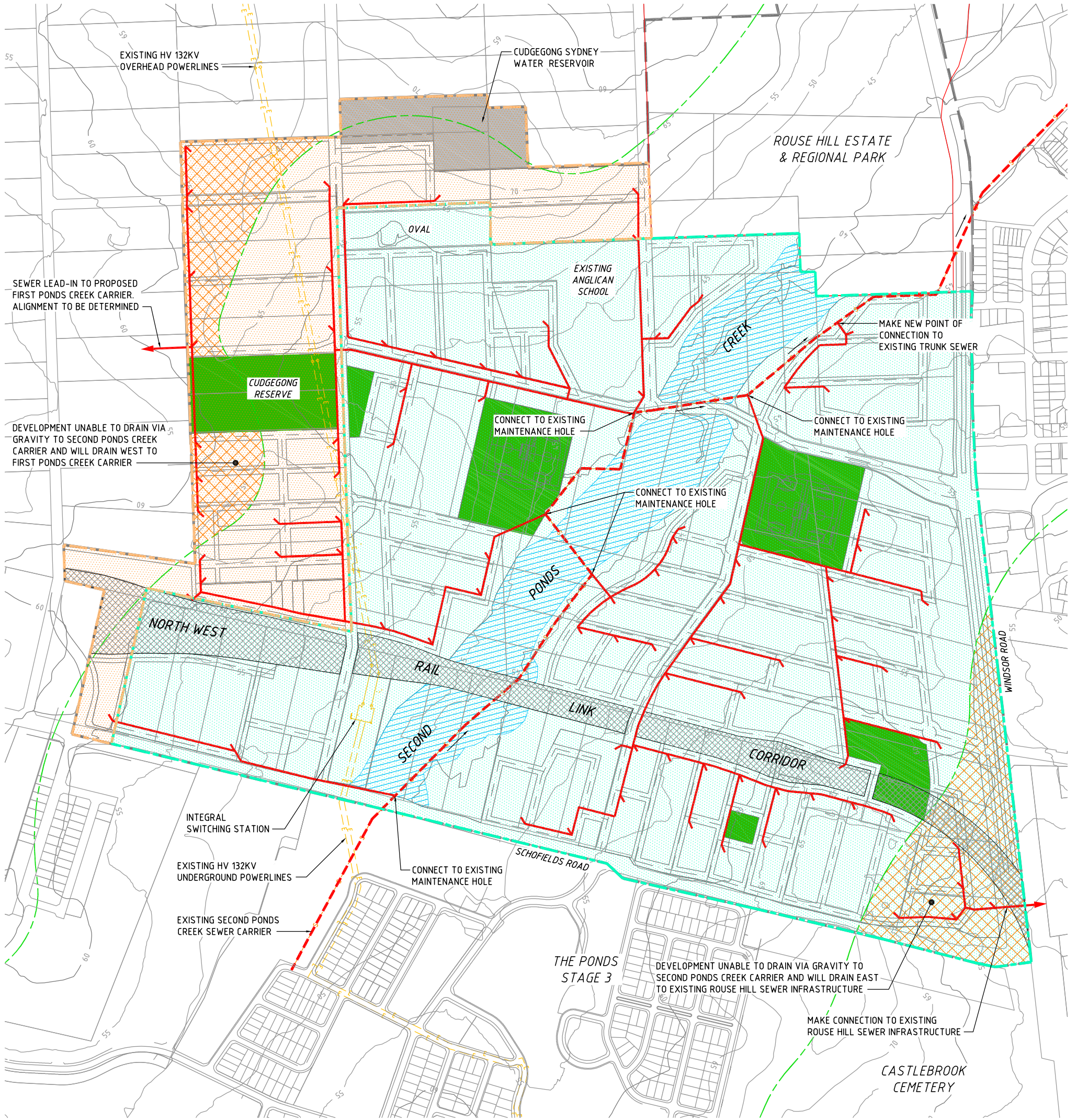
Cardno can confirm that, based on investigations completed in the formulation of this report, Area 20 is able to be serviced by all primary utility authorities. Cardno recommends ongoing dialogue is maintained between the Department of Planning, utility authorities and Area 20 landowners in order to ensure development proceeds in a logical and timely manner.

**Annex A**

**Concept Wastewater**

**Reticulation Plan**





**NOTE**

1. UTILITY STRATEGY IS CONCEPT ONLY TO BE READ IN CONJUNCTION WITH DRAFT PRIMARY UTILITIES REPORT, CARDNO NOVEMBER 2010.

**LEGEND**

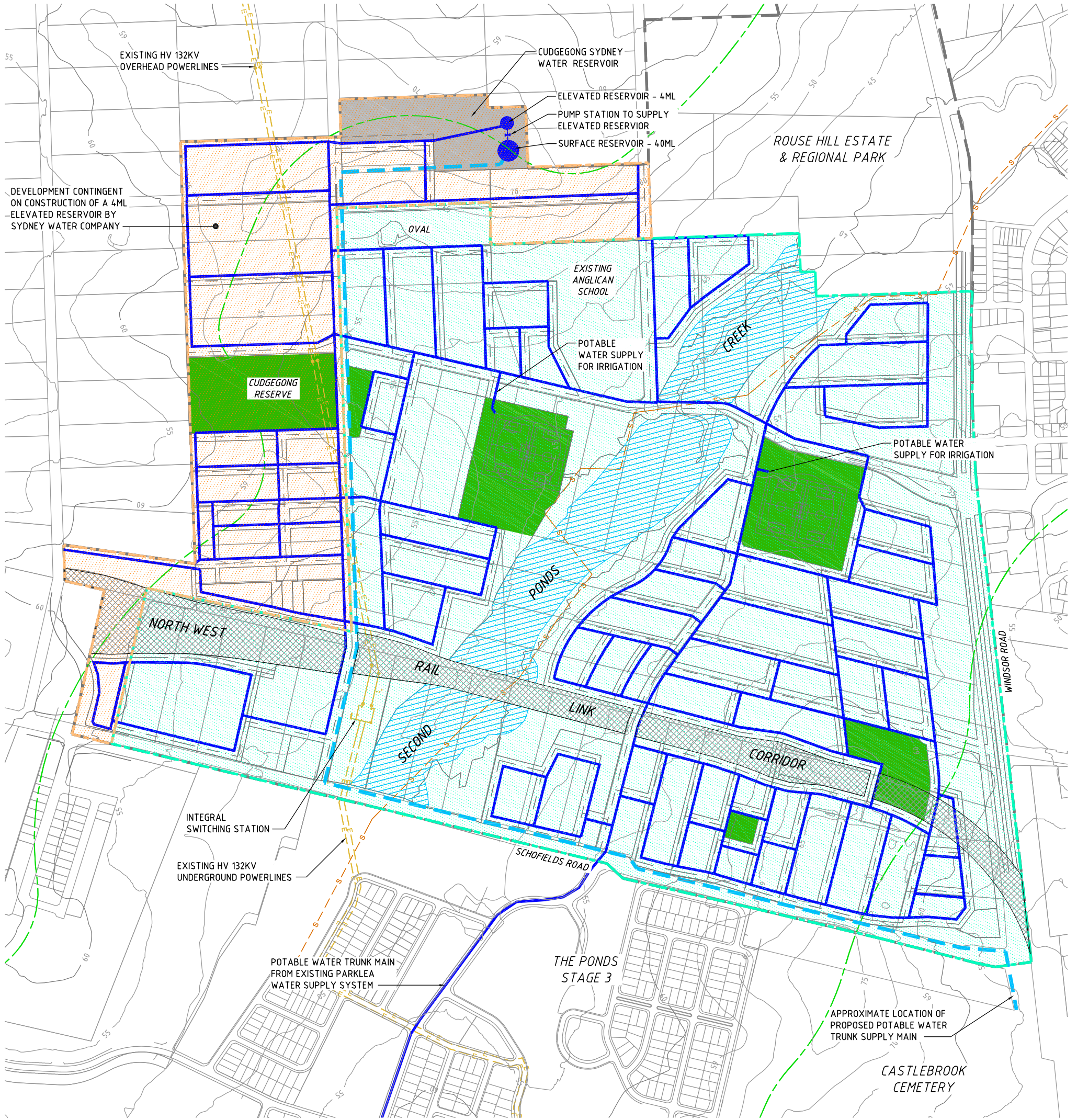
- SITE BOUNDARY
- RIDGE LINE
- SEWER LINE
- SECOND PONDS CREEK SEWER CARRIER
- PARK / OPEN AREA
- NORTH WEST RAIL LINK CORRIDOR
- SECOND PONDS CREEK CORRIDOR
- STAGE 1 WORKS
- STAGE 2 WORKS



**Annex B**

**Concept Potable Water  
Reticulation Plan**





**NOTES**

1. UTILITY STRATEGY IS CONCEPT ONLY TO BE READ IN CONJUNCTION WITH DRAFT PRIMARY UTILITIES REPORT, CARDNO NOVEMBER 2010.
2. THE POTABLE WATER SERVICE TRENCH IS LOCATED WITHIN THE ROAD RESERVE AND ADJACENT TO THE PROPERTY BOUNDARIES

**LEGEND**

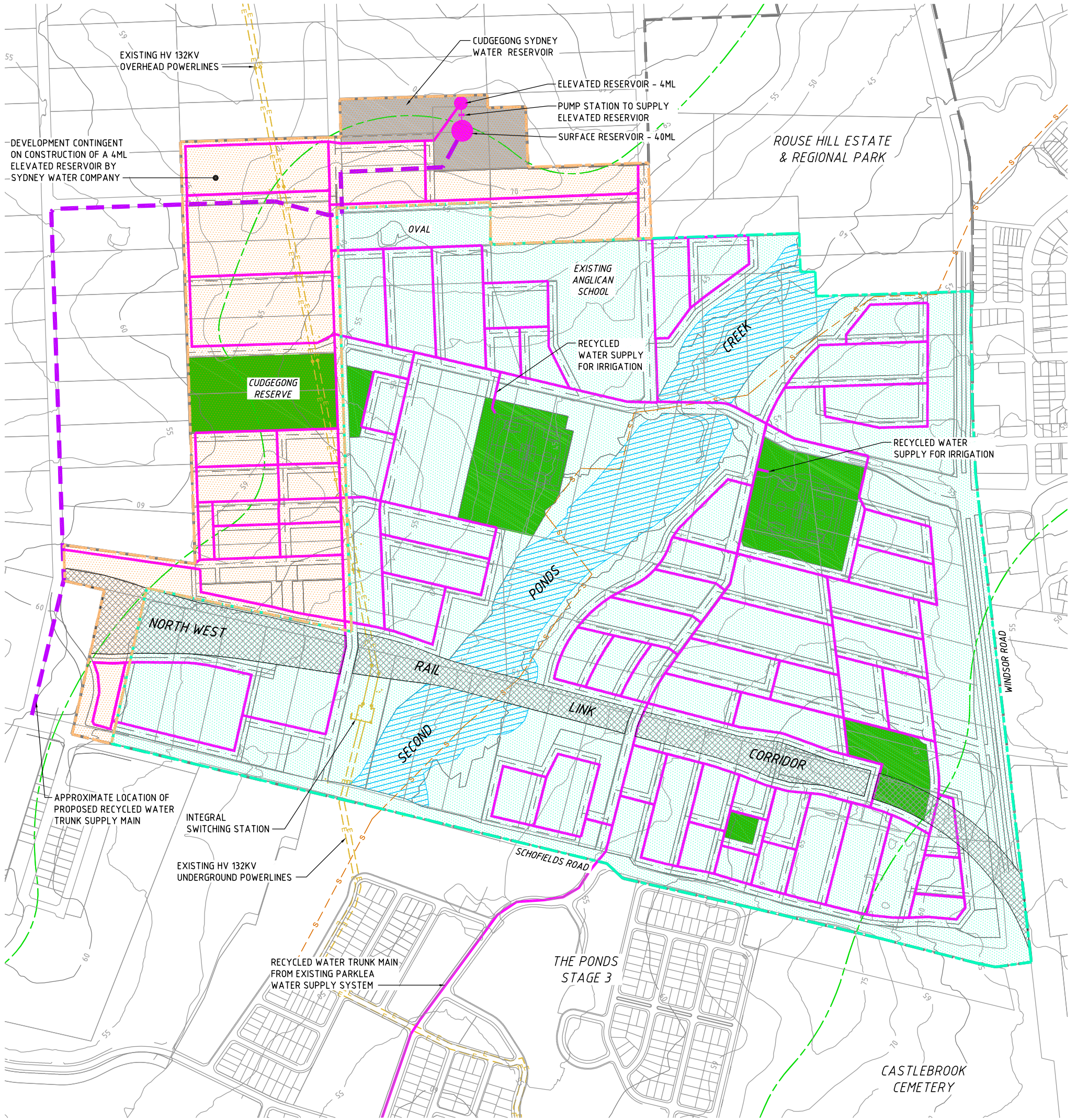
- SITE BOUNDARY
- RIDGE LINE
- POTABLE WATER LINE
- PROPOSED POTABLE WATER TRUNK MAIN
- PARK / OPEN AREA
- NORTH WEST RAIL LINK CORRIDOR
- SECOND PONDS CREEK CORRIDOR
- STAGE 1 WORKS
- STAGE 2 WORKS



**Annex C**

**Concept Recycled Water  
Reticulation Plan**





**NOTES**

1. UTILITY STRATEGY IS CONCEPT ONLY TO BE READ IN CONJUNCTION WITH DRAFT PRIMARY UTILITIES REPORT, CARDNO NOVEMBER 2010.
2. THE RECYCLED WATER SERVICE TRENCH IS LOCATED WITHIN THE ROAD RESERVE AND ADJACENT TO THE PROPERTY BOUNDARIES

**LEGEND**

- SITE BOUNDARY
- RIDGE LINE
- RECYCLED WATER LINE
- PROPOSED RECYCLED WATER TRUNK MAIN
- PARK / OPEN AREA
- NORTH WEST RAIL LINK CORRIDOR
- SECOND PONDS CREEK CORRIDOR
- STAGE 1 WORKS
- STAGE 2 WORKS



**Annex D**

# **Concept Shared Service Plan**














**NOTES**

1. UTILITY STRATEGY IS CONCEPT ONLY TO BE READ IN CONJUNCTION WITH DRAFT PRIMARY UTILITIES REPORT, CARDNO NOVEMBER 2010.

**LEGEND**

-  SITE BOUNDARY
-  RIDGE LINE
-  COMMON SERVICES (INCLUDES ELECTRICAL RETICULATION)
-  500KVA PADMOUNT SUBSTATION
-  PARK / OPEN AREA
-  NORTH WEST RAIL LINK CORRIDOR
-  SECOND PONDS CREEK CORRIDOR
-  STAGE 1 WORKS
-  STAGE 2 WORKS





**Annex E**

**Correspondence**

**Sydney Water**

## Dashpreet Singh (Sydney)

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**From:** KATE WILD [KATE.WILD@sydneywater.com.au]  
**Sent:** Thursday, 25 March 2010 11:40 AM  
**To:** Lee Mulvey  
**Cc:** Dashpreet Singh (Sydney); Russell Clark (Sydney); ADRIAN MILLER  
**Subject:** Re: 20100322 - Area 20 - Sydney Water - Utilities - clarification of sewer servicing areas

Hi Lee

Answers to your questions on our 16 December 2009 letter are below in red. I hope this information provides further clarity for you.

Also, speaking to Dashpreet from Cardno yesterday he raised a query regarding the availability of recycled water to land below RL 60m. Our letter of 16 December 2009 indicated that recycled water to land below RL 60m would not be available until 2020. I apologise, this was an error. Once the extension of the recycled watermain in The Ponds Boulevard occurs and recycled watermains are extended into Area 20, land up to RL 60m will receive recycled water from the existing Parklea North Recycled Water zone. The new elevated Recycled Water reservoir supplying land above RL 60m would not be available until 2019/20.

Please feel free to contact me on 8849 5842 should you require any further detail.

Kind Regards  
Kate

---

### Kate Wild

Strategic Projects Coordinator | Urban Growth Strategy | Asset Management Division | Sydney Water Corporation  
Level 6, 1 Smith Street, Parramatta NSW 2150 | T (02) 8849 5842 | E [kate.wild@sydneywater.com.au](mailto:kate.wild@sydneywater.com.au)

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>>> "Lee Mulvey" <[Lee.Mulvey@planning.nsw.gov.au](mailto:Lee.Mulvey@planning.nsw.gov.au)> 22/03/10 4:15 pm >>>

Hi Adrian,

Further to your letter dated 16 December 2009, I seek clarification on the capacity of sewers on the eastern side of Windsor Road to cope with the additional flows from the SE corner of the site and their location. The anticipated dwelling yield for this area is approximately 300 dwellings in medium to high density forms. **The current DN 1200 mm Caddies Creek Carrier has capacity to cope with the additional flows. Capacity of the existing reticulation sewer/s will be confirmed when applications are lodged with Sydney Water through the normal Asset Creation Developer Process.**

In relation to land on the western side of the ridge line, I agree that the preferred outcome would be gravity feed to the new First Ponds Creek carrier. I estimate that this carrier would be more than 1km from the subject area and would require a lead-in main. Would this be constructed by landowners/developers or Sydney Water? **Under our current Growth Servicing Plan Sydney Water does not intend to construct any lead-in works for the site. Developers may need to deliver lead-in works once the precinct has been rezoned.**

Also, in the event that a developer did elect to construct a pumping station to service this area ahead of time, can we assume that the Second Ponds Creek carrier would have capacity for this area on a temporary basis? **Yes the carrier would have capacity on a temporary basis.**

Let me know if I can provide any more detail to assist.

Regards

Lee Mulvey  
Precinct Project Manager

**Annex F**

**Correspondence**

**Integral Energy**



## Dashpreet Singh (Sydney)

---

**From:** Peter Pau [Peter.pau@integral.com.au]  
**Sent:** Friday, 4 September 2009 12:35 PM  
**To:** Russell Clark (Sydney); David Ho; Lee Mulvey  
**Cc:** Eugene Lorenzo  
**Subject:** RE: Area 20 - Minutes / Outcomes from Integral Meeting

**Follow Up Flag:** Follow up  
**Flag Status:** Flagged

Hi Russell,

The feeder plan is only preliminary at this stage. When Mungerie Park ZS is built and the associated distribution feeders are installed, the new network arrangement would be available on our GIS system which you will be able to access.

At this point, the entire Area 20 precinct is expected to be serviced from our new 132/22kV Mungerie Park ZS. A minimum of two 22kV feeders would be required to service this precinct. There are currently overhead HV mains along Rouse Rd and Terry Rd as indicated at the meeting. The plan is to establish a new feeder from Mungerie Park which will tie in with the existing mains in the area. Please email us the proposed staging plan and precinct maps (road layout etc) when they become available.

Regards,

Peter Pau  
Engineer - Network Planner  
System Development

### **INTEGRAL ENERGY**

51 Huntingwood Drv Huntingwood NSW 2148  
T. (02) 9853 6583 F. (02) 9853 6099  
E. peter.pau@integral.com.au

---

**From:** Russell Clark (Sydney) [mailto:Russell.Clark@cardno.com.au]  
**Sent:** Thursday, 3 September 2009 1:56 PM  
**To:** David Ho; Peter Pau; Lee Mulvey  
**Subject:** Area 20 - Minutes / Outcomes from Integral Meeting



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910 Pacific Highway Gordon NSW 2072  
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All

The following is a summary of discussions and outcomes from the following project meeting:

Project: Area 20  
Meeting @ Integral Energy  
Date: 25<sup>th</sup> August '09

Attendees:

David Ho – DH (Integral)  
Peter Pau – PP (Integral)  
Eugene – EU (Integral) *(Can someone please forward as I don't have Eugene's details)*  
Lee Mulvey – LM (DOP)  
Russell Clark – RTC (Cardno)

Discussion Notes <post meeting note by author>:

- LM and RTC gave a brief rundown of current Area 20 status, detailed the boundary review process and in particular noted that the amended precinct boundary gives rise to a total of 2500 residential lots. There was acknowledgement the original precinct (some 1500 lots) was to be serviced by Integral infrastructure, notably the Mungarie Park zoned substation (MPZS), and that the additional yield was in part the reason for the meeting;
- PP verified Integral planning was for MPZS to service Area 20 and further clarified that MPZS would be able to service the revised precinct boundary;
- PP clarified the timing for commission of the MPZS was mid 2010;
- Discussions by RTC on likely timing for Stage 1 of the Schofields Road upgrade. Integral noted that the Stage 1 construction works would include installation of conduits for future 22kv feeders from MPZS and that RTA design will cater for this. <Peter – You mentioned in the meeting that Integral had a feeder plan from MPZS. Are we able to get a copy?>
- Further discussions regarding other precincts for release in North West Growth Centre. There was acknowledgement that MPZS could not supply both Area 20 and Box Hill. <Further discussion in this regard will be instigated by Box Hill development team. At this time, given Box Hill Residential is proposed for some 11,000 lots and would presumably require a designated zoned substation, it is assumed that Area 20 can be supplied in its entirety by MPZS. Integral to confirm understanding>
- Integral would prefer to service Area 20 from Commercial Road rather than Schofields Road though this would be dependant on ultimate development staging;
- It was noted, at this time, that no single owner within Area 20 has holdings that would necessitate greater than 50% capacity of electrical feeder. It is therefore currently assumed that these works would be to Integrals cost;
- PP also noted that conduits are being installed north along Windsor Road to the intersection with Rouse Road and across to the Area 20 boundary. From this point the cable would be overhead. It was noted that spare capacity exists in the current system to service approximately 150 lots from this point;
- RTC resolved to submit a preliminary electrical supply plan to Integral at such times as the development staging and infrastructure masterplanning stages are being completed.

Let me know if you feel discussions outside of that noted above warrant minuting.

regards

**Russell Clark**

Senior Project Manager  
Urban and Transport

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**Annex G**

**Correspondence**

**Telstra**

## Dashpreet Singh (Sydney)

---

**From:** Keogh, Jeffrey L [Jeffrey.Keogh@team.telstra.com]  
**Sent:** Wednesday, 7 April 2010 11:37 AM  
**To:** Dashpreet Singh (Sydney)  
**Subject:** FW: Area 20 Precinct - Telstra Fibre Optic  
**Attachments:** CP17-03-Draft ILP- 6.pdf

**Follow Up Flag:** Follow up  
**Flag Status:** Flagged

Dear Dashpreet,

The land falls on the boundary between Kellyville and Riverstone exchange areas. We already have a Can Fibre Centre established at Riverstone exchange so we are very well situated to rollout FTTP to the area.

I don't see any major obstacles to rolling out fibre to the site. It is Telstra's preferred method now.

Once we are more closer to construction phase, we are happy to work closely with developers in the provisioning of Telstra's infrastructure.

Let me know if you require more details at this stage.

Regards

**Jeffrey Keogh**  
**Urban Development Manager**

Telstra Smart Community<sup>R</sup>

<http://www.telstra.com.au/smartcommunity>

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**From:** Dashpreet Singh (Sydney) [mailto:Dashpreet.Singh@cardno.com.au]  
**Sent:** Tuesday, 30 March 2010 4:39 PM  
**To:** Keogh, Jeffrey L  
**Subject:** Area 20 Precinct - Telstra Fibre Optic



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Hi Jeffrey,

As discussed, we wish to investigate the supply of fibre optic cable to the Area 20 Precinct. Please find attached a draft Indicative Layout Plan for the proposed development.

Area 20 is located in Sydney's Northwest Growth Centre directly north-west of the Windsor and Schofields Road intersection. The proposed development consists of approximately 2,500 new residential dwellings with a roll out of say 150-200 lots per annum.

Any and all information you can provide to supplement our infrastructure study for the provision of fibre optic cable to the precinct will be appreciated. Can you get this information to us by COB this week?



Should you need any additional information, please don't hesitate to call and discuss.

Kind Regards,

**Dashpreet Singh**

Civil Engineer

Urban & Transport

Phone:02 9496 7700

Fax:02 9499 3902

Email:dashpreet.singh@cardno.com.au

Web:www.cardno.com.au

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**Annex H**

**Correspondence**

**Jemena**

## Dashpreet Singh (Sydney)

---

**From:** Hilton, Neale [Neale.Hilton@jemena.com.au]  
**Sent:** Thursday, 25 March 2010 10:18 AM  
**To:** Dashpreet Singh (Sydney)  
**Cc:** lee.mulvey@planning.nsw.gov.au  
**Subject:** FW: Area 20 Precinct - Natural Gas infrastructure

Following further investigation of Natural Gas supply for Area 20, I have been advised that the current 110mm P.E. gas main located in Schofields Rd would have current capacity for approximately 400 dwellings in Area 20. Jemena is planning to inter-connect existing infrastructure which currently terminates on Windsor Rd, cnr Nelson Rd, with High Pressure facilities in Mulgrave. This should occur in 2011.

Please note that Jemena does not reserve capacity for any individual project and will monitor each area prior to construction taking place.

Does Planning NSW encourage or stipulate the connection of Natural Gas to each dwelling? Any firm energy applications relating to these areas would be of interest to Jemena to assist with load profiling and infrastructure delivery. Regards.

Neale Hilton  
Network Dev. Manager  
Jemena  
Level 14, 1 O'Connell Street, SYDNEY NSW 2000 Locked Box 2/159 Ridgecrop Drv, CASTLE HILL NSW 2154  
M: 0402 060 151 | F: (02) 9899 3571  
E: neale.hilton@jemena.com.au  
W: www.thenaturalchoice.com.au

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

**From:** Lee Mulvey [mailto:Lee.Mulvey@planning.nsw.gov.au]  
**Sent:** Wednesday, 9 December 2009 4:08 PM  
**To:** Hilton, Neale  
**Cc:** Russell Clark  
**Subject:** Re: Area 20 Precinct - Natural Gas infrastructure

Hi Neale,

Thanks very much for the quick response.

As you point out, detailed information is not usually required for a rezoning proposal. However, as part of our precinct planning process, we try to coordinate with infrastructure providers and identify potential bottle necks to development i.e. matching the timing and delivery of infrastructure with new housing development.

Have you any idea of the timing of the district feeder main, or will it simply be provided when the demand exists?

Regards

Lee Mulvey  
Precinct Project Manager

Strategies and Land Release  
Department of Planning  
Level 5, 10 Valentine Ave, Parramatta NSW 2150 PO Box 1457, Parramatta NSW 2124

T: 02 9860 1531  
F: 02 9895 7670  
M: 0428 416 374  
Email: Lee.Mulvey@planning.nsw.gov.au

To find out more about Sydney's Growth Centres, please visit [www.growthcentres.nsw.gov.au](http://www.growthcentres.nsw.gov.au)

>>> "Hilton, Neale" <Neale.Hilton@jemena.com.au> 08/12/2009 10:14 >>>

Lee,

Thank you for providing the detailed concept plan for this proposal. It is with interest that Jemena have preliminary information which it can utilise in it's forward planning of this region. I would like to take this opportunity to formally reply to your findings by Cardno.

Upon reading the attached document I was unaware that detailed data was required for a preliminary planning instrument. As per my email 1 October 2009, Area 20 was not the main focus of my correspondence. Additionally, note 4.6 wording is not my own and requires further detail.

Jemena in consultation with a Joint Venture (JV) developer for the "Kalina" residential housing estate, extended a natural gas feeder main along Schofields Rd from Windsor Rd to Tallawong Rd, to service approx 400 homes. Numerous points were taken into account when supplying this infrastructure which was agreed to for example, location of first stage, number of dwellings, time taken to yield total dwellings, natural gas connection to dwellings, natural gas appliance types and shared trenching of utilities. This type of information can then be assessed when offering to supply infrastructure.

Jemena suggests at this early stage that should natural gas be considered to service Area 20 that construction start as close to Schofields Rd as possible. Minimal natural gas infrastructure is available in the Riverstone LGA and cannot currently support the anticipated growth predicted. It is envisaged that an eventual district feeder main will be required from the Jemena Trunk Station located in Industry Rd Mulgrave. Please utilise the above information to help formulate your delivery plan. I look forward to further involvement with the development. Regards.

Neale Hilton  
Network Dev. Manager  
Jemena

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## Dashpreet Singh (Sydney)

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**From:** Hilton, Neale [Neale.Hilton@jemena.com.au]  
**Sent:** Thursday, 1 October 2009 12:34 PM  
**To:** Dashpreet Singh (Sydney)  
**Subject:** RE: Precinct 5 - Rqst for Gas Utility Design & AREA 20 Development

Thanks fro the plans on Precinct 5 I will be aback to with a design ASAP. With regards to Area 20, natural gas supply is only available from Schofields Rd. A 300kPa 150mm P.E. mains has been laid as is planned as one of substantial feed mains required to service this area. It currently terminates adjacent to the ALLAM/LANDCOM JV on Schofields rd near the intersection of Cudgegong Rd. It will be utilised to supply AREA 20.

### Neale Hilton

Network Dev. Manager

## Jemena

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**From:** Dashpreet Singh (Sydney) [mailto:Dashpreet.Singh@cardno.com.au]  
**Sent:** Thursday, 1 October 2009 11:11 AM  
**To:** Hilton, Neale  
**Cc:** Russell Clark (Sydney)  
**Subject:** Precinct 5 - Rqst for Gas Utility Design & AREA 20 Development



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Hi Neale,

Further to our phone conversation earlier, as requested please find enclosed a PDF depicting the electrical utility reticulation design and a DXF showing the lot layout for The Ponds Stage 3 Precinct 5 with a view to formalise design documentation for gas utility service.

We have received DA consent for the works and are currently preparing documentation for cc. Note that a shared trench arrangement similar to what took place in Precinct 1 will be adopted.

On a separate note, we are conducting a high level study for infrastructure to the North West Growth Centre, Area 20 Precinct (plan attached). The site is located adjacent to The Ponds Stage 3, north of Schofields Road. Can Jemena please confirm if gas supply to this region is readily available to service the planned residential development. Please let me know if you need further information to make this assessment.

Kind Regards,

### **Dashpreet Singh**

Civil Engineer  
Urban & Transport

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