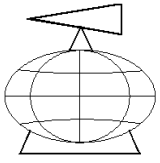


**CIVIL INFRASTRUCTURE MASTERPLAN  
REPORT  
FOR THE RELEASE OF THE  
DOONSIDE  
RESIDENTIAL LANDS**

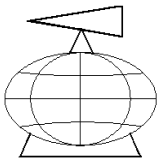
06 AUGUST, 2007

Prepared by

**YSCO GEOMATICS**  
Suite 4, 114 Hampden Road, Artarmon, 2064



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## **SITE DESCRIPTION**

The Doonside land parcel has an area of approximately 75 hectares of which nominally 55 hectares is proposed to be developed for roads and housing. The land is bounded by:

- Bungarribee Creek on the South and West,
- Eastern Road on the North, and
- Doonside Road on the East and North East.

The site slopes generally from East to West down from Doonside Road to Bungarribee Creek with some significant areas of natural and regenerating vegetation. The land parcel also contains substantial areas of European Heritage significance.

## **CIVIL INFRASTRUCTURE AVAILABILITY**

### Potable Water

The Doonside Residential Parcel will be served from the Minchinbury Reservoir Zone and existing water mains at the site frontages. The existing system does not have the supply capacity to service a residential development of the scale proposed for the land. Amplification of mains and significant head works are required to provide an adequate standard of supply.

### Recycled Water

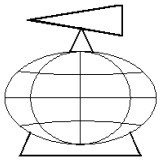
Recycled water is not currently available in the locality. Quakers Hill Sewerage Treatment Plant would be the source of supply, should the service be offered in the future. Sydney Water has identified a need for a recycled water supply and is investigating options.

### Sewer

The Doonside Residential Parcel drains to the Quakers Hill Sewerage Treatment Plant.

Existing sewer carrier mains are located to the South and West of the Doonside Residential Parcel and a number of smaller capacity lead-in mains traverse the land.

Initial investigations reveal that the existing sewer carrier system can support the proposed residential development, however, overloading of the sewer during large rainfall events does occur.



### Electricity supply

Integral Energy's electrical reticulation network cannot currently support the proposed development of the Doonside Residential Parcel. Substantial infrastructure works will be required to allow the development to proceed.

### Natural Gas

Natural gas mains are located within the existing residential subdivision to the East of the Doonside Residential Parcel. No mains are laid within Doonside Road and, consequently, lead-in works will be required to adequately service the development.

### Telecommunications Infrastructure

Telstra has an obligation to ensure that the standard telephone service, payphones, prescribed carriage services and digital data services are reasonably accessible to all Australians, on an equitable basis, wherever they reside or carry on business.

Copper cable supply is available to the Doonside Residential Parcel at no cost, other than for provision of trenching during roads, drainage and services construction. Future supply will be a mixture of optical fibre carriers and copper reticulation

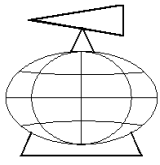
Advanced fibre optic and wireless reticulation technology might also be made available at a project cost.

### Public Road Infrastructure

The Doonside Residential Parcel is well positioned in respect of Sydney's regional roads network. The nearby M7 Motorway links to the M2, M4 and M5 Motorways giving future residents rapid access to large sections of the Sydney Metropolitan Area.

The site is also well serviced, at a local level, by the Great Western Highway, Doonside, Eastern and Knox Roads. All of these roads are constructed to a high standard and are capable of supporting the development's general access requirements, with relatively minor upgrade works.

Intersection performance in the vicinity of the Doonside Residential Parcel currently varies from "good" to "at capacity", indicating intersection up grades will be required.



## **CIVIL INFRASTRUCTURE MASTERPLAN**

The preferred development option provides adequate scope for efficient servicing of the Doonside Residential Parcel. Conflict between the natural environment and the proposed development has been minimised, while still retaining reasonable opportunities for the provision of services, to the satisfaction of the relevant servicing authorities and Council.

Servicing to and within the site will be provided under the following fundamental guidelines, without compromising the development design philosophy and the adjoining parklands:-

### Potable Water

Water supply will be directed to the development from existing mains in Doonside Road. These mains are adequately sized to supply the Doonside Residential Parcel. Internal reticulation mains will be connected to the existing mains with a series of "T" junctions at the development's public road entries.

The Doonside Parcel will receive potable water from the Minchinbury Reservoir system, which is currently near or at storage capacity. Provision of an adequate service is dependent on additional major works within the Sydney Water Minchinbury Reservoir system.

These works include;

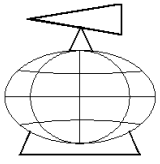
- Construction of a second Minchinbury Reservoir to increase storage. Sydney Water has substantially commenced work for the additional reservoir and completion is expected in August/September 2007,
- Construction of approximately 3.5 km of Water-main lead-in along the Great Western Highway, from Minchinbury to connect to the existing network mains at the corner of Doonside Road and the Great Western Highway.

In addition to major works, localised water-main lowering and or relocation is expected to be required to allow for intersection up-grades at Douglas Road and Bungarabee Road.

Reticulation, relocation and leadin works relative to the project area would be managed under the Developer Section 73 process. Developer Servicing Plan charges would apply.

### Recycled Water

Sydney Water has developed a programme for collection of tertiary treated effluent from the Quakers Hill, St. Mary's and Penrith STPs, to assist in the maintenance of environmental flows in the Nepean River and to provide recycled water to industrial and residential customers in the surrounding areas.



The recycled water customer supply system is to be implemented in two stages, with industrial areas being serviced in Stage One and the Doonside Parcel in Stage Two.

The Stage One customer supply agreements are expected to be finalised before the end of 2007. Timing of Stage 2 supply is not clear at this time, however, Sydney Water are intending to providing recycled water to the Doonside parcel.

Reticulation and leadin works relative to the project area would probably be managed under the Developer Section 73 process, providing Sydney Water has developed an appropriate Developer Servicing. If a DSP is not in place, internal recycled water reticulation would be installed for future connection

### Sewer

The Doonside Residential Parcel will drain to the Quakers Hill STP via the existing 900mm dia. Bungarabee Creek Carrier. It is apparent that the current base system is adequate for servicing the residential development of the land, subject to normal reticulation requirements, which will include;

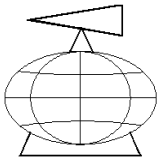
- Internal reticulation to service individual dwelling properties,
- Sewer relocation works and or decommissioning (sand filling) to remove infrastructure conflict, and,
- Management of stormwater overloads.

Reticulation, relocation and decommissioning within the project area would be managed under the Developer Section 73 process. Developer Servicing Plan charges for the Quakers Hill Sewer catchment would be applicable.

### Electrical

Sufficient capacity is not available in the Integral Energy Network to service the Doonside Residential Parcel. A new Zone Substation is required. The timing for development of the Substation is nominally 3 years, from the date the site is transferred to Integral Energy. A substation site has been selected at the Northern end of the parcel and the transfer of the necessary land, to Integral Energy, is currently progressing.

In addition to the new Zone Substation, the existing overhead 33kV feeder No. 455, located on the Great Western Hwy and along the Western boundary of Doonside Road is to be upgraded to 132kV, to link the new Substation to the Integral network. The upgraded 132 kV is likely to remain within the Public Road reservations, however, safety set backs of approximately 12.5 metres, from overhead cables, will be required within the Doonside Residential Parcel. The upgrade will be linked to the zone substation construction.



Integral Energy will fund and construct the major infrastructure in accordance with normal practice. The commitment to funding is likely to be on the basis of overhead transmission. If significant undergrounding of the 132kV feeder transmission lines is undertaken, Integral Energy is likely to require a substantial developer contribution to this aspect of the electrical works.

It is also expected that existing underground Integral services may need to be lowered or relocated at the proposed intersection up-grades at Douglas Road and Bungaribee Road.

### Natural Gas

The Natural gas mains currently located within the existing residential subdivisions, to the East of the Doonside Residential Parcel, will require extension to Doonside Road, prior to reticulation within the site. Agility has advised that extensions to the network can be completed within 3 months of formal applications being made.

Agility is a privately owned service provider and gas is not an essential service, consequently the provision of this service by Agility will be depend upon projected “take-up” by future residents and the estimated financial return to Agility.

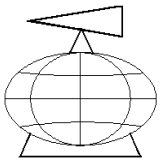
It is noted that funding of gas infrastructure may need to be provided by the “developer” and passed on to future residents, to ensure up front service provision. This funding would attract a significant subsidy from Agility, if the long term “take-up”: was assured.

### Telecommunications

The Doonside Residential Parcel will be served readily from the Arndell Park RSS (Blacktown Exchange), via existing infrastructure located in the surrounding public roads. Services will be provided by a mixture of copper and optical fibre network facilities.

Telecommunications plant will be reticulated throughout the residential development area as an underground facility, within the nominated street allocation. Where above ground Telecommunication equipment is required, it will be small scale and sited within the public domain, without significant visual impact. Internal copper reticulation will be fully funded by the selected service provider, as would lead in works.

High end fibre optic and wireless technology is also available within the Telstra network and could be installed, if sufficient demand was identified. The costs associated with the delivery of high end telecommunication product is significant and would ultimately need to be directed to end users within the Doonside Residential Parcel.



In addition to internal reticulation of telecommunications infrastructure, development of the Doonside Residential Parcel will require management of conflicts between the existing telecommunications facilities, proposed roads and housing. The management process is likely to require bridging of some elements and movement of others. Accurate costs relative to these works cannot be adequately determined until the full scope of activities is established.

#### Public Road Infrastructure

The development of the Doonside Residential Parcel is to incorporate some significant intersection up grades, to ensure “good” functioning of the existing perimeter road network.

These will include;

- Revision of the Doonside Road/Douglas Road intersection, incorporating an entry to the site, upgraded signalling and adjusted turning facilities,
- Re-configuration of the Doonside Road/Eastern Road roundabout to provide for a development entry.
- Re-configuration of the Doonside Road/Bungarrabee Road roundabout to provide for a development entry.

Works along Doonside Road, at the parcel boundary, are likely to be undertaken in conjunction with internal roads construction, as works in kind, and would be programmed to commence immediately Construction Certificates are available.

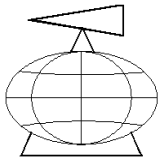
### **CIVIL INFRASTRUCTURE DELIVERY STRATEGY**

#### Potable Water

Connection to Sydney Water’s potable water mains can be obtained at the Doonside/Douglas Roads site entry and the Doonside/Bungarrabee Roads site entry. Preliminary proposals are for the first stage of the development to be focussed on the Bungarrabee intersection. Potable water will be initially introduced to the site at this location.

Extension of Water Mains into Eastern Road, to the Northern site entry will also be required when this Public road connection is made, to link with the internal reticulation.

Section 73 Applications should be made to Sydney Water upon completion of the Part 3A Approval process and issue of the first Development Consent for the Project. This will allow for leadin design commencement and a prompt contract commitment for construction, either as part of the first Roads an Drainage Contract or as a stan alone contract.



The Sydney Water Headworks (Minchinbury Second Reservoir Construction) is progressing well and will be complete in August/September 2007. Potable water connection will be available upon in line with any proposed development programme.

### Recycled Water

Reticulation of recycled water mains is normally carried out under the same contract as potable water mains and sewer mains, where Sydney Water provides a recycled water supply. The recycled water mains follow the same route as the potable water mains and are essentially a duplicated system.

Sydney Water have not yet completed works to allow recycled supply from the Quakers Hill Sewage Treatment Plant to the Doonside Residential Parcel and, accordingly, supply in parallel with potable water cannot be guaranteed.

Retrofitting of recycled water mains to the Doonside Parcel would be a difficult and expensive task. It is therefore proposed that the internal duplicate recycled water supply system be installed in conjunction with the potable water mains, in readiness for future connection.

This work would proceed in accordance with normal project staging, however a special agreement may need to be struck with Sydney Water, as part of the appropriate Section 73 Application, to ensure the installed mains will be accepted at future connection, if the relevant Developer Servicing Plan is not in place.

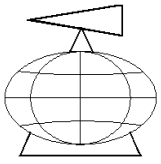
### Sewerage

The current serviced status of the Doonside Residential Parcel will allow sewer main reticulation to proceed as required, with little difficulty. Mains that require relocation will be exhumed where they may have a direct impact on future housing, services or roads. Other redundant mains are likely to be sand back filled. Initial relocation works will be carried out near the intersection of Bungarabee and Doonside Roads.

The majority of relocated mains are proposed to be incorporated within the residential development, as reticulation mains also servicing dwellings within the new project.

### Electrical Infrastructure

The release of the Doonside Residential Parcel, for residential purposes, is wholly dependent on the construction of a new Zone Substation on the Eastern Road edge of the parcel. As previously noted, timing for development of the Zone Substation is nominally 3 years. Once completed, the Substation will provide sufficient power to allow the development strategy and programme to be established in accordance with the preferred outcomes of the project, without reference to Integral Energy's facilities or supply capacity.



### Natural Gas

The availability of gas in Douglas and Bungarabee Roads, and the relatively simple process for extension and amplification, indicates that the parcel development Strategy can be devised without substantial reference to gas infrastructure requirements.

### Telecommunications Infrastructure

The substantial availability of telecommunications infrastructure in areas adjoining and within the Doonside Residential Parcel ensures that conventional connection requirements will not impede development unduly or have a substantial bearing on any proposed development strategy.

Existing optical fibre cables within and adjoining the Doonside Parcel will conflict with future construction, however, proper design processes should minimise impacts and costs.

### Public Road Infrastructure

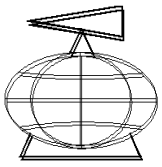
The necessary upgrades to Public Road Infrastructure are likely to be required progressively and generally will be undertaken in conjunction with adjoining works within the Doonside Residential Parcel. Works that are extraneous to the Doonside Residential Parcel are unlikely to be required up-front and should be programmed to be undertaken when appropriate funds become available.

### Project Staging

The Doonside Residential Parcel is proposed to be developed and marketed as sixteen (16) separate “Sales Precincts” ranging in yield from 29 to 57 lots, to provide regular and flexible product supply.

The individual “Sales Precincts” will be combined in six (6) separate infrastructure “Construction” elements, ranging in size from 81 to 154 lots, to allow for the establishment of cost effective construction programmes and efficient management of the interface between “Sales Precincts” .

Finally, three (3) independent “Contract” zones will be adopted to ensure the scale of works offered to tender is sufficiently large to provide good economies of scale and to attract larger construction organisations capable of conforming to the “Best Practice” requirements of the project. The “Contract” zones will each feature a major external works element to ensure access and services supply elements are completed without delay.



The Proposed Staging is as follows;

**CONTRACT ELEMENT A**

CONSTRUCTION STAGE 1, SALES PRECINCT 1A

Nominal Lot Size	Yield
550	3
500	38
350	10
Total	51

CONSTRUCTION STAGE 1, SALES PRECINCT 1A

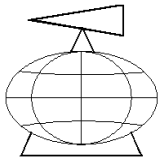
Nominal Lot Size	Yield
550	17
500	40
Total	57

CONSTRUCTION STAGE 2, SALES PRECINCT 2A

Nominal Lot Size	Yield
550	5
500	22
450	1
350	7
Total	35

CONSTRUCTION STAGE 2, SALES PRECINCT 2B

Nominal Lot Size	Yield
550	11
500	17
450	2
350	9
Total	39



CONSTRUCTION STAGE 2, SALES PRECINCT 2C

Nominal Lot Size	Yield
550	6
500	21
450	8
350	5
250	5
Total	45

CONSTRUCTION STAGE 3, SALES PRECINCT 3A

Nominal Lot Size	Yield
550	15
500	19
450	9
350	8
250	1
Total	52

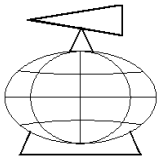
CONSTRUCTION STAGE 3, SALES PRECINCT 3B

Nominal Lot Size	Yield
550	10
500	2
450	7
350	10
Total	29

**CONTRACT ELEMENT B**

CONSTRUCTION STAGE 4, SALES PRECINCT 4A

Nominal Lot Size	Yield
550	1
500	18
450	12
350	15
250	4
Total	50



CONSTRUCTION STAGE 4, SALES PRECINCT 4B

Nominal Lot Size	Yield
550	1
500	12
450	10
350	12
250	4
Total	39

CONSTRUCTION STAGE 4, SALES PRECINCT 4C

Nominal Lot Size	Yield
550	9
500	13
450	11
350	8
Total	41

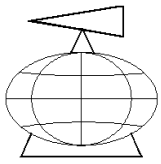
CONSTRUCTION STAGE 4, SALES PRECINCT 4D

Nominal Lot Size	Yield
500	11
450	14
350	21
250	8
Total	54

**CONTRACT ELEMENT C**

CONSTRUCTION STAGE 5, SALES PRECINCT 5A

Nominal Lot Size	Yield
550	21
500	11
350	14
Total	46



CONSTRUCTION STAGE 5, SALES PRECINCT 5B

Nominal Lot Size	Yield
550	11
500	16
450	13
350	10
Total	50

CONSTRUCTION STAGE 5, SALES PRECINCT 5C

Nominal Lot Size	Yield
550	20
500	6
450	11
Total	37

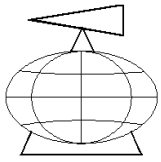
CONSTRUCTION STAGE 6, SALES PRECINCT 6A

Nominal Lot Size	Yield
550	36
500	2
450	4
350	4
Total	46

CONSTRUCTION STAGE 6, SALES PRECINCT 6B

Nominal Lot Size	Yield
550	22
500	1
450	14
350	8
Total	45

GRAND TOTAL 716



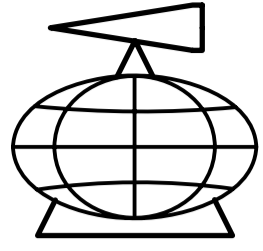
## **CONCLUSIONS**

It is clear, from investigations to date, that there are no insurmountable infrastructure impediments to the development of the Doonside Residential Parcel.

Timing and cost issues are the dominant concerns, particularly in so far as they relate to Electrical Supply. Provision of this service alone appears to be the critical element in the timely delivery of the residential land to the end user.

Notwithstanding that satisfactory Electrical Supply will not be available for a minimum of 3 years, information provided to date indicates that the dominant portion of necessary major infrastructure works may be completed adequately within a conventional development process.



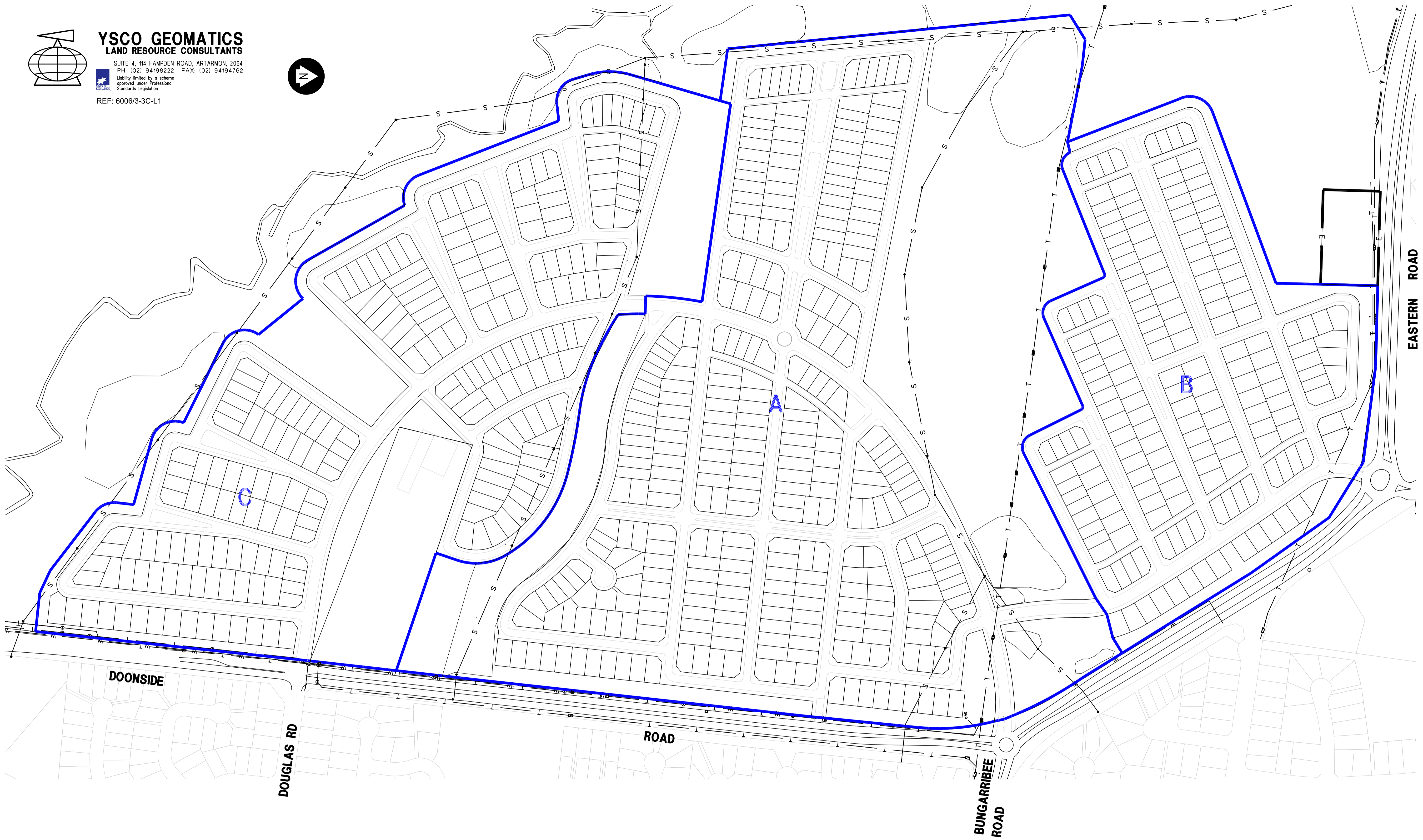
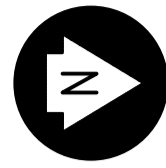


**YSCO GEOMATICS**  
LAND RESOURCE CONSULTANTS

SUITE 4, 114 HAMPDEN ROAD, ARTARMON, 2064  
PH: (02) 94198222 FAX: (02) 94194762

Liability limited by a scheme  
approved under Professional  
Standards Legislation

REF: 6006/3-3C-L1



SCALE  
1/2000  
@ A1

DATE & ISSUE  
JULY 07

PROJECT  
THE DOONSIDE PARCEL.

DESCRIPTION  
PROPOSED DEVELOPMENT STAGING  
CONTRACT BOUNDARIES

LEGEND

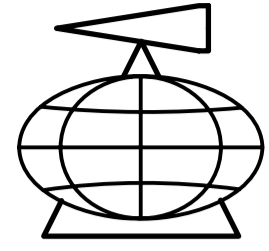
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- T — T — EXISTING TELSTRA CABLES
- S — S — EXISTING SEWER MAINS

**A**

POSSIBLE CONTRACT BOUNDARY

western sydney **parklands**



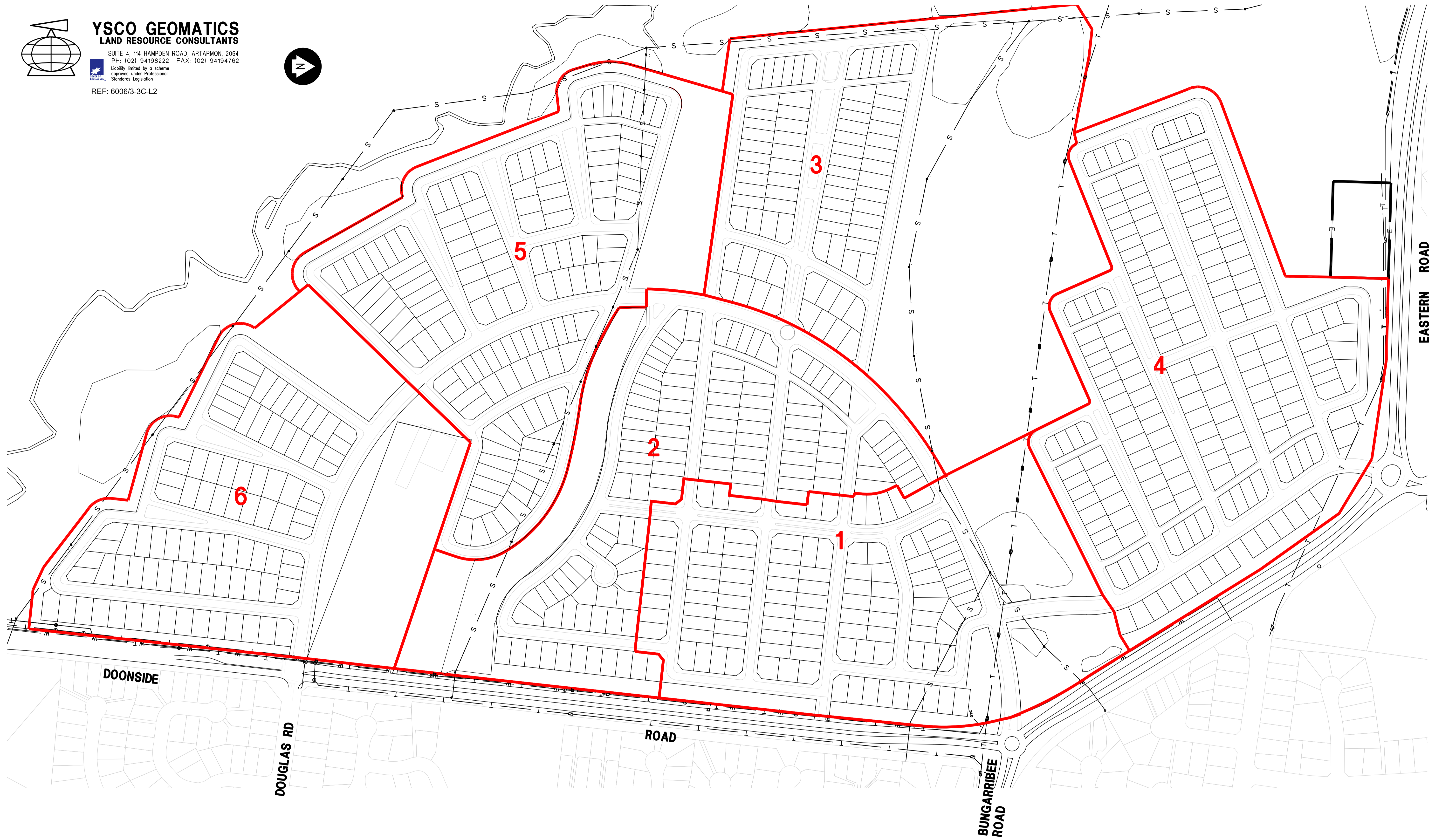
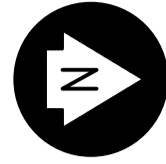


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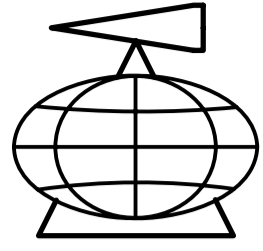
- W — W — EXISTING WATER MAINS
- T — T — EXISTING TELSTRA CABLES
- S — S — EXISTING SEWER MAINS

**6**

POSSIBLE CONSTRUCTION STAGE BOUNDARY

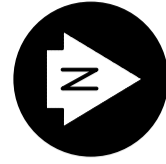
western sydney **parklands**





**YSCO GEOMATICS**  
LAND RESOURCE CONSULTANTS

SUITE 4, 114 HAMPDEN ROAD, ARTARMON, 2064  
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SCALE  
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@ A1

DATE & ISSUE  
JULY 07

PROJECT  
THE DOONSIDE PARCEL.

DESCRIPTION  
PROPOSED DEVELOPMENT STAGING  
SALES PRECINCT BOUNDARIES.

LEGEND

- W — W — EXISTING WATER MAINS
- T — T — EXISTING TELSTRA CABLES
- S — S — EXISTING SEWER MAINS

**6A**

POSSIBLE PRECINCT BOUNDARY & NUMBER

western sydney **parklands**

