Marsden Park Services Infrastructure Implementation Plan

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1 Introduction

1.1 Background

The Proponents of the Marsden Park Precinct engaged Cardno on behalf of the Department of Planning and Infrastructure to prepare this Services Infrastructure Implementation Plan (Implementation Plan). The Proponent for Stage 1 is Stockland Developments Pty Ltd and the Proponent for the remaining Stages is Woorong Park Pty Ltd. This plan has been prepared to fulfil the requirements of Clause 19.4 of the executed Marsden Park Planning Agreement. Its purpose is to detail and confirm agreed actions and deliverables with each primary utility provider as proposed in the Services Infrastructure Strategy prepared by SKM (refer Appendix E). The primary utility providers consulted in preparation of this plan include:

> Potable Water: Sydney Water Corporation
> Wastewater: Sydney Water Corporation
> Electricity: Endeavour Energy
> Communications: National Broadband Network Corporation (NBN)
> Natural Gas: Jemena

This implementation plan has been prepared on the basis of information available at this point in time.

1.2 The Site

The proposed Marsden Park Precinct (the Precinct) land release area is located within the North West Growth Centre in the Blacktown Local Government Area. The Precinct is bounded by South Creek to the North, Richmond Road to the East, the proposed Marsden Park Industrial Precinct (MPIP) and St Mary's subdivision to the South and Stony Creek Road to the West. The current main land use of the Precinct is for agriculture with a variety of mixed businesses located along Richmond Road. The total area of the Precinct is approximately 1,800 hectares and is expected to accommodate up to 10,000 dwellings. The Precinct also includes approximately 600 hectares of the Air Services Australia Site in the south, which is intended to be set aside for conservation and open space.

1.3 Precinct Acceleration Protocol

The Department of Planning and Infrastructure has commenced planning of the Marsden Park Precinct under the Growth Centres Precinct Acceleration Protocol (PAP) which provides a process where a proponent can agree to upfront funding for the planning of the future urban development of the Precinct in exchange for the Minister accelerating the release of the Precinct for planning.

1.4 Land Use Schedule

The proposed land use classifications and areas were determined and calculated by AECOM on behalf of the Department of Planning and Infrastructure as part of the precinct planning process and have been reproduced here for information. The values below are based upon the Indicative Layout Plan (ILP) Revision 7 Version 1 (refer Appendix A).

Table 1- Land Use Schedule

Land Use	Area (ha)
Low Density Residential	481.8
Medium Density Residential	109.0
Mixed-Use Residential	5.3
Environmental Management	221.5
Community	4.1
K-12 School	8.0
Primary School	9.0
Town Centre	12.8
Village Centre	2.8
Sporting Field	69.0
Neighbourhood Park	45.2
Water Management	84.0
Private Open Space	10.5
Conservation	602.0
Richmond Road Reserve	27.7
Sub Station	1.0
Environmental Conservation	95.4
Section 94 Roads	8.3
Total	**1797.4**

1.5 Development Staging and Programme

An indicative programme and staging plan has been developed and distributed to the authorities to inform the findings of this Implementation Plan. Refer to Figure 1 for the concept staging plan. This staging plan represents a staging scenario; however it is possible that development outside this staging sequence may occur. The programme was developed with consideration to the Retail and Employment Assessment developed by MacroPlan and was prepared to ensure that the Proponent can deliver the Precinct in the most efficient and effective manner with consideration given to development constraints. Should appropriate approvals be secured, land outside the proposed staging scenario may be developed concurrently with other stages.

Monitoring of development front and rates will be reviewed each year concurrently with the Implementation Plan. The Servicing Strategy and Implementation Plan will be updated on an annual basis to reflect more detailed information as it is prepared or made available.

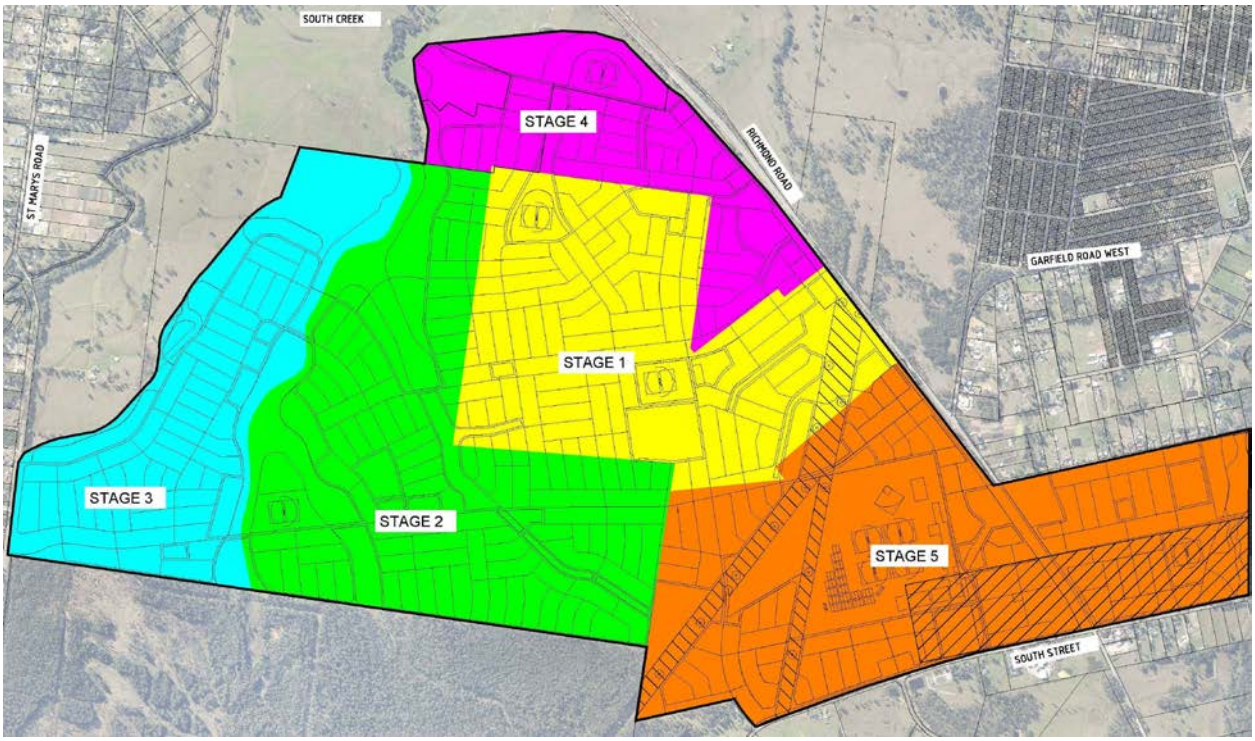


Figure 1 – Concept Staging Plan

Registration of 400 lots each year is forecast for Stage 1 based upon the Proponent's experience with developments of a similar nature. The 400 lots per year has been used as a basis for the determination of infrastructure requirements, however monitoring of development rates will be reviewed each year concurrently with the Implementation Plan. The Servicing Strategy and Implementation Plan will be updated on an annual basis to reflect more detailed information as it is prepared or made available. . Registration of the first residential lots as part of Stage 1 is scheduled for April 2014. It is expected that Stage 1 will comprise of approximately 2400 lots. Refer to Table 2 for the concept development delivery programme.

Table 2 – Concept Development Delivery Programme

Stage	Year	Lots Scheduled to be Registered	Cumulative Lots
Stage 1	2020	2400	2400
Stage 2	2026	2400	4800
Stage 3	2029	1200	6000
Stage 4	2032	1200	7200
Stage 5	2036	3320	10520

The development of the schools, retail and community facilities within Stage 1 will be undertaken in accordance with the agreed Voluntary Planning Agreement. It is noted that the concept development programme will likely vary dependent upon market conditions.

Stages 2 and 3 are estimated to yield 400 lots per year, Stage 4 is estimated to yield 550 lots per year and Stage 5 is estimated to yield 600 lots per year, however as there is more than one land owner the actual yield generation is likely to vary.

1.6 Richmond Road Upgrade

The Roads and Maritime Service (RMS) has advised that Richmond Road will be upgraded from the existing two-lane carriageway to a four-lane carriageway to meet the increased traffic demands. It is intended that Richmond Road undergo a staged upgrade commensurate with population growth within the Marsden Park Precinct and will be funded under the Special Infrastructure Contributions (SIC) scheme. The proposed road corridor is planned to be wide enough to permit a further upgrade to six lanes sometime in the future.

Details of the design, staging and costing of the Richmond Road upgrade do not form part of this implementation plan, however the alignment and staging will be considered in the selection of routes for the utilities intended to service the Marsden Park Precinct.

1.7 Limitations

This Implementation Plan builds on the findings of the Services Infrastructure Strategy submitted previously for endorsement to the Department of Infrastructure and Planning. This plan is based upon information and advice from the primary utility providers. While discussions with the primary utility providers indicate that there is sufficient capacity in the existing networks to service the precinct through proposed augmentation and extensions, Cardno does not offer any warranty over this third party advice. In the case of Endeavour 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 servicing strategies 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.

2 Potable Water

The primary potable water supplier to the Precinct is Sydney Water. Cardno consulted with Sydney Water and SKM during the preparation of this report to confirm the extent of the existing potable water network and to agree on a strategy for supplying the demands of the Precinct. SKM prepared the Marsden Park Water Servicing Report for the Precinct.

2.1 Services Infrastructure Implementation Plan

SKM prepared a Water Servicing Report for the Marsden Park Precinct. (Refer to Appendix F) The report outlined the results of an investigation into the feasible options for the provision of potable water to Stage 1 of the development and identified a preferred servicing option.

There are a variety of options to service the remaining stages of development at Marsden Park including the staged implementation of the current version of the Sydney Water Ultimate Servicing Strategy. The preferred option for servicing future stages of development will be selected at a future date as the suitability of the preferred option may depend upon Sydney Water's planned revision of the Ultimate Servicing Strategy for the North West Growth Centre. In a meeting held with Sydney Water and DP&I on the 4th May 2012, Sydney Water confirmed that it will endorse Potable Water supply for the development of Stage 1 only and will select a preferred ultimate option during 2013. The Implementation Plan will provide options for Sydney Water to assess beyond the development of Stage 1.

Should appropriate approvals be secured, land outside the proposed staging scenario may be developed concurrently with the proposed staging sequence; therefore infrastructure provided as part of the Stage 1 delivery may be used to provide potable water to these developments. The Implementation Plan will be reviewed annually to confirm whether development is occurring outside of the proposed staging sequence.

Marsden Park Industrial Precinct Servicing Strategy

The proponent of the Marsden Park Industrial Precinct (MPIP) previously sought endorsement from Sydney Water to install 2.1km of DN250 potable water main within the Richmond Road corridor to the intersection of Richmond Road and Townson Road to service Stage 1 of its development. This strategy involved connecting to an existing DN375 potable water main in Colebee Crescent, Hassall Grove.

The existing DN375 potable water main and the reservoir servicing it has capacity to service Stage 1 of the MPIP and Stage 1 of the Marsden Park Precinct. The Proponent has reached agreement with the proponent of the MPIP to upsize the proposed DN250 to a DN450 to service Stage 1 of each of the precincts. Refer to SKM's Water Modelling Report in Appendix F for details.

Proposed Potable Water Network

The preferred option as indicated in SKM's Water Modelling Report is referred to as the Minchinbury East servicing option and involves the upsizing of the MPIP potable water main to a DN450. This option is detailed in this Implementation Plan as servicing Stage 1 of the Marsden Park Precinct.

2.2 Staged Service Demand Estimates

SKM completed modelling of the preferred potable water supply option using Sydney Water's "Infoworks" design package. The modelling assumes that rainwater tanks would be adopted at Marsden Park Stage 1 to meet BASIX requirements. Static model runs at 19:00 were undertaken assuming the Minchinbury reservoir at a two-thirds depleted level (water depth of 5 m). Modelling also considered the increase in demand from the MPIP by 50% and 100%.

A peak hour flow analysis was undertaken to understand the maximum flow (and hence the number of lots) that could be delivered to Marsden Park from the Minchinbury system. Refer to SKM's Water Modelling Report in Appendix F for details.

2.3 Staged Service Infrastructure Implementation Program

Stage 1 Implementation

The Proponent is working collaboratively with the proponent of the MPIP to upsize the DN250 pipework that is proposed to service Stage 1 of the MPIP to a DN450. The following will be undertaken:

> Locate the existing DN375 potable water main in Colebee Crescent, Hassall Grove and install a DN450 tee junction. (To be undertaken by MPIP)
> Install 2.1km of DN450 potable water pipework from Colebee Crescent to the intersection of Richmond Road and Townson Road. The pipe will be located within the proposed Richmond Road corridor for the majority of its length. (To be undertaken by MPIP)
> Install 5.0km of DN450 potable water pipework from the intersection of Richmond Road and Townson Road to the Marsden Park Precinct. The pipe will be located within the existing Richmond Road corridor and may need to be concrete encased in sections to provide protection for future Richmond Road construction activities.

Stage 1 of the potable water delivery will service 2,680 lots considering a 100% increase in the MPIP demands and the additional impacts of potentially elevated lots. Refer to Appendix C for a sketch indicating the proposed infrastructure.

Stage 2 Implementation

Stage 2 of potable water delivery requires the installation of 0.4km of DN450 potable water main from the DN450 water main in Colebee Crescent installed as part of Stage 1, to an existing DN450 potable water main in Rooty Hill Road.

Stage 2 of the potable water delivery will service an additional 160 lots (2,840 total precinct lots) considering a 100% increase in the MPIP demands and the additional impacts of potentially elevated lots. Refer to Appendix C for a sketch indicating the proposed infrastructure.

Remainder of Precinct

Potable water will be delivered in a staged sequence. Developers will be required to make an application to Sydney Water to connect to the infrastructure installed by the Proponent for stage 1 works and will be responsible for the infrastructure to connect to the existing infrastructure – similar to current practices.

There are a number of options to service the remainder (or part) of the Marsden Park Precinct. These include the following:

> Minchinbury West;
> Rouse Hill;
> Sydney Water's current Ultimate Strategy.

Refer to SKM's Water Modelling Report in Appendix F for details of each option and indicative costs.

The preferred option for servicing future stages of the precinct would be selected at a future date as the preferred option would depend on a number of factors, not least the planned revision of the Sydney Water Ultimate Servicing Strategy.

2.4 Funding of Infrastructure

The Proponent is responsible for the installation and funding of potable water servicing infrastructure for the site. The Proponent will come to a commercial agreement with the proponent of the MPIP to fund the 2.1km of DN450 potable water main.

Table 3 – Indicative Potable Water Costs

Stage	Programme	Indicative Cost
Stage 1	Before 1 lot	$12,800,000
Stage 2	Before 2,680 lot	$900,000

Refer to SKM's Water Modelling Report in Appendix F for indicative costs of possible servicing options for future stages of the Marsden Park Precinct.

2.5 Onsite Infrastructure Requirements

The potable water reticulation network will be situated below ground within the verge of the public road reserve. It is the developer's responsibility to consult with Sydney Water during the development application and construction certificates phases of each development release through an accredited Water Services Coordinator in accordance with Sydney Water's Section 73 process.

Table 4 – Potable Water Cover Requirements

Utility	Minimum Cover (under road)	Minimum Cover (not under road)
Potable Water	750mm	600mm

The network may be installed in accordance with the Shared Trenching Agreement or the NSW Streets Opening Conference guideline. Below is the minimum cover requirement for potable water supply.

2.6 Endorsement of Infrastructure

Sydney Water has reviewed the proposed implementation plan and has provided endorsement satisfying the requirements of Clause 19.4 of the executed Marsden Park Planning Agreement.

Refer to Appendix D for the Sydney Water endorsement.

3 Wastewater

The primary wastewater supplier to the Precinct is Sydney Water. Cardno consulted with Sydney Water and SKM during the preparation of this report to confirm the extent of the existing wastewater network and to agree on a strategy for supplying the demands of the Precinct. SKM prepared the Services Infrastructure Strategy for the Precinct.

3.1 Services Infrastructure Implementation Plan

SKM prepared a Wastewater Servicing Report for the Marsden Park Precinct. (Refer to Appendix G) The report outlined the results of an investigation into the feasible options for the provision of wastewater to Stage 1 and Stage 2 of the development and identified a preferred servicing option.

There are a variety of options to service the remaining stages of development at Marsden Park including the staged implementation of the current version of the Sydney Water Ultimate Servicing Strategy. The preferred option for servicing future stages of development will be selected at a future date as the suitability of the preferred option may depend upon Sydney Water's planned revision of the Ultimate Servicing Strategy for the North West Growth Centre.

Sydney Water has stated that they plan to amplify Riverstone WWTP before 2020. The size and timing of the amplification is being driven by development within the NWGC, including the development of the Marsden Park Precinct.

Sydney Water's Ultimate Servicing Strategy

Sydney Water has previously investigated what infrastructure is required to service the ultimate development of the NWGC, including Marsden Park. This was documented in "Sydney Water's Ultimate Water Servicing Strategy" in July 2008 (the Ultimate Strategy) and included a plan for the ultimate potable water, recycled water and wastewater infrastructure.

The Ultimate Strategy outlines what infrastructure is required to provide wastewater services to the ultimate development of both the Marsden Park Precinct and MPIP. The strategy for wastewater services is to service both precincts via a common sewerage system with transfer of wastewater to Riverstone WWTP.

Under the Ultimate Strategy, large gravity carrier mains will be constructed throughout the Marsden Park Precinct and neighbouring precincts, along with a number of pump stations and rising mains. These assets will transfer wastewater to Riverstone WWTP that will be augmented to provide treatment of the additional wastewater flows. As shown in Figure 2 the proposed wastewater carrier mains will include:

> Bells Creek Carrier;
> Marsden Park North Carrier;
> Marsden Park Carrier;
> Richmond Road Carrier.

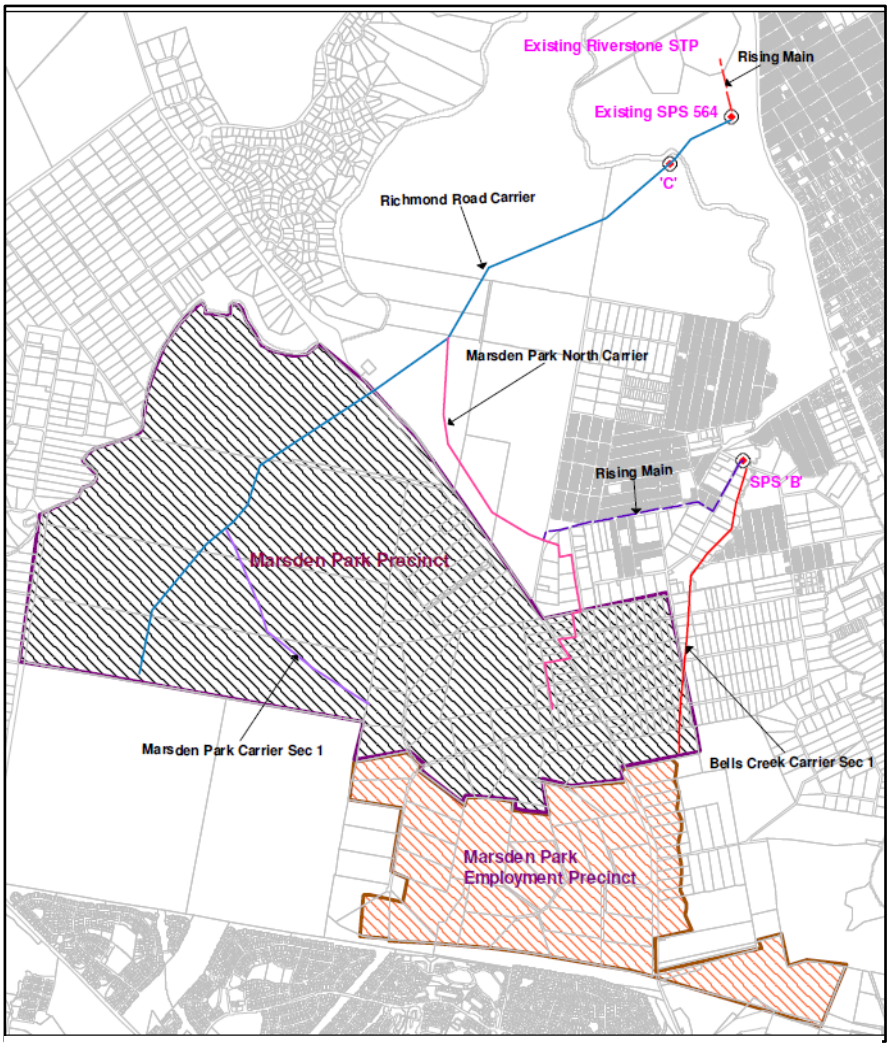


Figure 2 – Sydney Water's Ultimate Servicing Strategy

(Source: Area Plan – Wastewater Servicing Major Branch Lines, SWC, April 2009)

Sydney Water has stated that the Ultimate Strategy would be reviewed and revised in the near future, once the current investigations on the preferred servicing of the South West Growth Centre have been completed.

3.2 Preferred Waste Water Servicing Option

The Proponent has expressed its preference for the following option regarding the location of the sewage pump station (SPS):

1. Construct SPS within Marsden Park Precinct.
2. Construct DN375 rising main from Marsden Park Precinct SPS to existing SPS564.
3. SPS564 to transfer effluent to Riverstone WWTP.

Refer to Appendix C for details.

The Proponent proposes to install a DN375 rising main. SKM's Wastewater modelling report determined that a DN375 may service up to 5000 lots, thus Stage 1 and Stage 2 may be serviced.

Land acquisition for an easement is required for the transfer of wastewater from Marsden Park. The Proponent is undertaking discussions with affected land owners.

3.3 Staged Service Infrastructure Implementation Program

It is intended that a wastewater servicing option will be delivered before registration of the first residential lot; however Sydney Water has indicated that a temporary pump out system is an acceptable short-term solution if the infrastructure for the preferred wastewater servicing option is not completed. In a meeting held with

Sydney Water and DP&I on the 4th May 2012, Sydney Water confirmed that provision of a temporary pump out is an acceptable interim solution for a maximum of 300 lots or for a period of 12 months, whichever is first.

3.4 Funding of Infrastructure

The Proponent is responsible for the installation and funding for the staged delivery of wastewater servicing for the Marsden Park Precinct.

Table 5 – Indicative Wastewater Infrastructure Costs

Stage	Programme	Indicative Cost
Stage 1 & 2	Before 1 lot	$15,400,000

3.5 Endorsement of Infrastructure

Sydney Water has endorsed the transfer of wastewater from the Precinct to Riverstone Waste Water Treatment Plant. Endorsement for the location of the sewage pump station and the sewage alignment is to be provided once a specific strategy has been agreed upon. Henceforth the current endorsement supplied by Sydney Water is considered sufficient for satisfying the requirements of Clause 19.4 of the executed Marsden Park Planning Agreement.

Refer to Appendix D for the Sydney Water endorsement.

4 Electricity

The primary electricity supplier to the Precinct is Endeavour Energy, formerly known as Integral Energy. Endeavour has been consulted during the preparation of this report to confirm the extent of its existing utility network and to provide proposals for supplying the demands of the Precinct.

4.1 Services Infrastructure Implementation Plan

Existing Electricity Network

The Draft Services Infrastructure Strategy prepared by SKM (refer to Appendix E) states that the Precinct is currently serviced by above ground 11kV lines along Stony Creek Road and Richmond Road, which are supplied from Rooty Hill and Riverstone zone substations. Furthermore the proposed Schofields zone substation has been allocated to service other areas in the North West growth Centre and will not be able to service the Precinct.

Consultation with Endeavour Energy confirms the majority of SKM's report findings with the exception that the Schofields zone substation will have the capacity to supply initial stages of the Marsden Park Precinct development.

Proposed Electricity Network

The Draft Services Infrastructure Strategy prepared by SKM (refer to Appendix E) states that temporary electricity supply for initial stages of development will be provided by connecting into the proposed grid supplying Marsden Park Industrial Precinct. Once the capacity of this supply has been reached, the construction of a new zone substation is proposed for the Marsden Park Precinct, which will supply electricity for the entire precinct.

Consultation with Endeavour Energy subsequent to this advice to SKM provides an alternate supply method. With this advice Endeavour has provided additional detail commensurate with the requirements of the implementation plan. To provide temporary electricity supply to the Precinct, Endeavour Energy has advised that the developer is required to:

> Install the assets listed in Section 0 to provide electricity from Riverstone zone substation. This supply will temporarily service up to 400 lots
> Install the assets listed in Section 0 to provide electricity from Schofield's zone substation. This supply will temporarily service an additional 400 lots.

For supply of electricity to the remainder of precinct, Endeavour Energy has advised that a new zone substation will be required. Correspondence between SKM and Endeavour Energy in 2010 indicates that Endeavour will provide the infrastructure assets for the substation and feeders (Refer to SKM's Draft Services Infrastructure Strategy Attachment B in Appendix E).

4.2 Staged Service Demand Estimates

Endeavour use an after diversity maximum demand of 7kVA per lot to estimate the electricity demand placed on the reticulation assets within the development based on an average residential dwelling size of 230 – 270 sqm.

4.3 Staged Service Infrastructure Implementation Program

Stage 1A Implementation

Endeavour Energy has confirmed that electricity will be supplied for up to 400 lots in Stages 1A from the Riverstone zone substation via the following actions:

1. Install 7/4.50 All Aluminium Conductor (AAC) (overhead mains type) or equivalent along Garfield Road from the corner of Dromana Road to Substation 17832.
2. Install an Air Break Switch (ABS) in a suitable location along Garfield Rd between corner of Dromana Road and Substation 17832.
3. Install a Load Break Switch (LBS) in a suitable location between Richmond Road and Substation 17832.
4. Replace USL17710 with an ABS.
5. Install LBS in a suitable location between Substation 441 and Substation 22654.

6. Lay 240 sq.mm Aluminium Cross Linked Polyethylene (Al XLPE) (underground cable type) cable along Vine Street West and Richmond Road from a suitable location to the east of Under Sling Link (USL) to the first pad mount substation of the Marsden Park development.
7. Install a LBS in a suitable location along Vine Street West to the east of newly installed Underground to Overhead (UGOH) connection.
8. Replace USL 129 with an ABS.

Refer to Appendix C for a sketch indicating the proposed infrastructure.

Stage 1B Implementation

Endeavour Energy has confirmed that electricity will be supplied for an additional 400 lots in Stages 1B from Schofields zone substation via the following actions:

1. Lay 240 sq.mm Copper Cross Linked Polyethylene (Cu XLPE) (underground cable type) cable along Schofields Road, Junction Road, Advance Street, Railway Terrace, Grange Avenue and Carnarvon Road from Schofields zone substation to a suitable location to the north of ABS 6149.
2. Install new ABS in suitable location along Carnarvon Road to the north of the new developed UGOH.
3. Replace USL 119 with an ABS.
4. Install a LBS in suitable location along Clifton Road near USL 119.

Refer to Appendix C for a sketch indicating the proposed infrastructure. Endeavour Energy has stated that the development of the Schofields Precinct and the required interim supply from the Schofields zone substation is not relevant to the uptake of load in the Marsden Park residential precinct and that the Schofields zone substation has adequate capacity in the interim for both requirements.

Stage 1C Implementation and Onwards

Power will be secured by the developer of the first 800 lots. Endeavour Energy has indicated that the existing network does not have capacity for additional demands; therefore development may be halted until the zone substation is complete. Upon the completion of the zone substation the entire precinct may be serviced.

Before stage 1C can commence, Endeavour Energy has advised that a new zone substation will be required to supply electricity for any additional lots beyond 800.

Remainder of Precinct

The new zone substation required prior to Stage 1C commencement will have sufficient capacity to supply the whole of Marsden Park Precinct. A zone substation site has been nominated on the ILP. The Proponent and Endeavour Energy are currently undertaking due diligence investigations for the proposed site. Upon satisfactorily completing the due diligence of the site, it will be transferred to Endeavour Energy via a commercial exchange.

During development of the contract for land acquisition, Endeavour Energy and the Proponent will liaise in relation to the detail to be included in the land transfer contract. Endeavour Energy has a standard form of contract for site acquisitions in release precincts which it utilises with the conditions adopted according to their relevance to the actual site.

Delivery of the development of the zone substation will generally follow the following timeline:

> Undertake due diligence and agree site: 4 months (target completion June 2012)
> Transfer land to Endeavour Energy: 2-3 months (target completion August 2012)
> Construction and Commissioning of the zone substation: 24-36 months (target completion between August 2014 - August 2015)

4.4 Funding of Electrical Infrastructure

The Proponent will be responsible for the installation and funding of the “Connection Assets” in accordance with the “IPART determination for capital contributions” for the works associated with Stage 1A and 1B. The linkage point will be nominated after an application has been received by Endeavour Energy.

The Proponent will also responsible for part of the funding of the required distribution assets from the proposed new zone substation. Below are indicative costs for the infrastructure works.

Table 6 – Indicative Electrical Costs

Stage	Programme	Indicative Cost
Stage 1	Before lot 1	$590,000
Stage 2	Before lot 401	$1,440,000
Remainder of Precinct	Before lot 801	Refer below

* Endeavour Energy is responsible for funding the construction of the new zone substation and feeders.

4.5 Onsite Infrastructure Requirements

The electrical internal reticulation network will be situated below ground within the verge of the public road reserve. Pad mount substations, distribution pillars and light columns will be located above ground throughout the proposed development. It is the developer's responsibility to consult with Endeavour Energy through an ASP Level 3 during the detailed design phase of each development release in accordance with Endeavour Energy's requirements.

The network may be installed in accordance with the Shared Trenching Agreement, the NSW Streets Opening Conference guideline or the Endeavour Energy Technical Bulletin TB – 0105B. Of the above guidelines, the most current at the time of application is to be used. Below is the minimum cover requirement for electrical reticulation.

Table 7 – Electrical Cover Requirements

Utility	Minimum Cover (under road)	Minimum Cover (not under road)
Low voltage electricity	600mm	600mm
High voltage electricity	950mm	950mm

4.6 Endorsement of Infrastructure

Endeavour Energy has reviewed the proposed implementation plan and has provided endorsement satisfying the requirements of Clause 19.4 of the executed Marsden Park Planning Agreement.

Refer to Appendix D for the Endeavour endorsement.

5 Telecommunications

Since 1 January 2011 the Federal Government has agreed that NBN Co will be the wholesale provider of fibre communications networks in new developments within or adjacent to its long term fibre footprint. NBN Co has been consulted during the preparation of this report to confirm the works required in providing fibre communications to Marsden Park Precinct that it would be responsible for.

5.1 Services Infrastructure Implementation Plan

Existing Telecommunications Network

The Draft Services Infrastructure Strategy prepared by SKM (refer to Appendix E) states that above ground telecommunications services currently exist along Stony Creek Road and Richmond Road, however this network is not capable of providing services that can meet the demands of modern residential zones.

Consultation with NBN Co confirms the findings in SKM's report, with the closest Fibre Access Node (FAN) being located in Riverstone.

Proposed Telecommunications Network

NBN Co has proposed that its network will be extended from the Riverstone FAN via fibre capable pits and pipes along Garfield Road West and Richmond Road to the Marsden Park Precinct (refer to Appendix C)

5.2 Staged Service Demand Estimates

No demand has been calculated for telecommunication infrastructure as it cannot be estimated in the same manner as other utilities. However in general terms the following demands for residential zones can be expected:

> Telephone services;
> High speed broadband services;
> Free-to-air services;
> FOXTEL / Pay TV;
> Internet Protocol Television.

5.3 Staged Service Infrastructure Implementation Program

Stage 1 Delivery

NBN Co has confirmed that telecommunications services will be supplied to the Precinct by extending the network from the Riverstone FAN along the communications trench in Garfield Road West. The infrastructure to be provided and its capacity will be based on the most current project master plan, ILP and staging plan as of April 2012. NBN Co is currently proposing to commence works 12 months prior to the registration of the first lot for the Marsden Park Precinct. Furthermore the following actions and considerations are expected from NBN Co:

> Provision of at least one joint per kilometre;
> Provision of pits with consideration to the future Richmond Road and Garfield Road alignments;
> Assessment of existing infrastructure to determine whether existing pits and pipes will be used or whether new infrastructure will be required.

Refer to Appendix C for a diagram indicating the proposed infrastructure.

Remainder of Precinct

Telecommunications services will be provided to the remainder of the Precinct via pits and pipes. The construction of these assets is the responsibility of the developer and must meet NBN Co specifications and guidelines. Once deemed fibre-ready, ownership of these assets will be transferred to NBN Co and fibre will be installed.

Telecommunications will be provided for the ultimate development before the delivery of Stage 1A, therefore development elsewhere in the Precinct is achievable.

5.4 Funding of Infrastructure

As per NBN Co Limited's policy, NBN Co will be responsible for funding all required infrastructure and fibre between the Riverstone FAN and Marsden Park Precinct. The developer will be responsible for funding and installing fibre-ready pit and pipe infrastructure within the Precinct and will transfer ownership of these assets to NBN Co in exchange for fibre installation.

5.5 Onsite Infrastructure Requirements

Telecommunications pits and pipes to be installed by the developer must meet the specifications outlined in NBN Co Limited's policy (refer to Appendix E) to be deemed fibre-ready.

All telecommunications infrastructure will be aligned along the Precinct's proposed road verges in the alignment allocated for telecommunications under the Road Clear Ways Act 1991.

5.6 Endorsement of Infrastructure

NBN Co has reviewed the proposed implementation plan and has provided endorsement satisfying the requirements of Clause 19.4 of the executed Marsden Park Planning Agreement.

Refer to Appendix D for the NBN Co. endorsement.

6 Natural Gas

The primary natural gas supplier to the precinct is Jemena. Jemena was consulted during the preparation of this report to confirm the extent of its existing utility network and proposals for supplying the demands of the precinct.

6.1 Services Infrastructure Implementation Plan

Existing Natural Gas Network

The Draft Services Infrastructure Strategy prepared by SKM (refer Appendix E) states that there is currently no existing infrastructure for low pressure residential gas connection inside the precinct. The SKM strategy states that an existing high pressure gas main (1050kPa) is currently located on the eastern side of Richmond Road.

Consultation with Jemena confirms the SKM report findings. In addition Jemena has confirmed that the existing high pressure gas main terminates at the Richmond Road|South Street intersection.

Proposed Natural Gas Network

The Draft Services Infrastructure Strategy prepared by SKM (refer Appendix E) states that gas supply for the precinct will be provided with an extension of the existing high pressure gas main along the Richmond Road corridor.

Consultation with Jemena confirms the SKM report findings. In addition Jemena has provided additional detail commensurate with the requirements of the implementation plan. To supply natural gas to the precinct Jemana will:

> Extend the existing high pressure gas main from South Street in the Richmond Road corridor to approximately 1km south of the Richmond Road|South Creek crossing. The high pressure gas main proposed is a DN150 diameter yellow jacketed carbon steel pipe and will be section welded with cathodic protection.
> Install a natural gas receiving station within the road corridor (verge) of the proposed precinct entry roads to reduce the pressure from high to low suitable for internal low pressure reticulation suitable for residential supply.

Refer to Appendix C for a map indicating the proposed natural gas supply for the precinct.

6.2 Staged Service Demand Estimates

Jemena uses an energy demand of 19GJ/dwelling/year to estimate the average annual domestic usage of natural gas for residential dwellings. For 10,000 dwellings Jemena confirmed that the proposed high pressure gas main will provide capacity to serve the entirety of the staged development of the precinct based upon the land uses proposed under the current ILP.

6.3 Staged Service Infrastructure Implementation Program

Stage 1 Delivery

Jemena has confirmed that the proposed extension of the high pressure gas main from South Street and the installation of the receiving station will be in place and operational prior to the planned delivery of Stage 1A in April 2014.

Refer to Appendix C for a sketch indicating the proposed infrastructure.

If development outside the Stage 1 or Stage 2 area occurs earlier than expected, the developer will be able to connect to the proposed gas main in Richmond Road.

Remainder of Precinct

The high pressure gas main extension proposed has sufficient capacity to provide natural gas to the remaining stages of the precinct. Internal low pressure gas reticulation will provide natural gas for Stages 2, 3 and 4.

An additional receiving station may be required for Stage 5 and this will be undertaken by Jemena before the commencement of development works for this stage. Ongoing consultation with Jemena is required.

6.4 Funding of Infrastructure

Jemena has undertaken internal feasibility assessments and plans to fund the high pressure gas main extension and installation of receiving stations.

6.5 Onsite Infrastructure Requirements

The low pressure gas reticulation network will be situated below ground within the verge of the public road reserve. It is the developer's responsibility to consult with Jemena during the detailed design phase of each development release in accordance with Jemena's requirements. Refer to Appendix C.

The network may be installed in accordance with the Shared Trenching Agreement or the NSW Streets Opening Conference guideline. Below is the minimum cover requirement for low pressure natural gas conduits.

Table 8 – Natural Gas Cover Requirements

Utility	Minimum Cover (under road)	Minimum Cover (not under road)
Low pressure natural gas	750mm	550mm

6.6 Endorsement of Infrastructure

Jemena has reviewed the proposed implementation plan and has provided endorsement satisfying the requirements of Clause 19.4 of the executed Marsden Park Planning Agreement.

Refer to Appendix D for the Jemena endorsement.

7 Conclusion

This Implementation Plan details and confirms agreed actions and deliverables from each primary utility provider to service the Marsden Park Precinct. The plan has been prepared on the basis of information available at this point in time and will be updated on an annual basis to reflect more detailed information as it is prepared or made available..

Refer below for a summary of utilities.

Table 9 – Utility Summary

Utility	Description	Estimated Cost to Proponent	Stage of Implementation	Precinct Serviced
Potable Water Stage 1	DN450 water main	$12,800,000	Before 1 lot	2,680 lots
Potable Water Stage 2	DN450 water main	$900,000	Before 2,680 lot	2,860 lots
Wastewater	Transfer to Riverstone Waste Water Treatment Plant	$15,400,000	Before 1 lot	5000 lots
Electricity Stage 1A	Augmentation	$590,000	Before 1 lot	400 lots
Electricity Stage 1B	Augmentation	$1,440,000	Before 401 lot	800 lots
Electricity Stage 1C	Zone substation	-	Before 801 lot	All of Precinct
Communications	NBN Co. fibre	-	Before 1 lot	All of Precinct
Natural Gas	DN150 pressure pipe	-	Before 1 lot	All of Precinct

Marsden Park

APPENDIX A

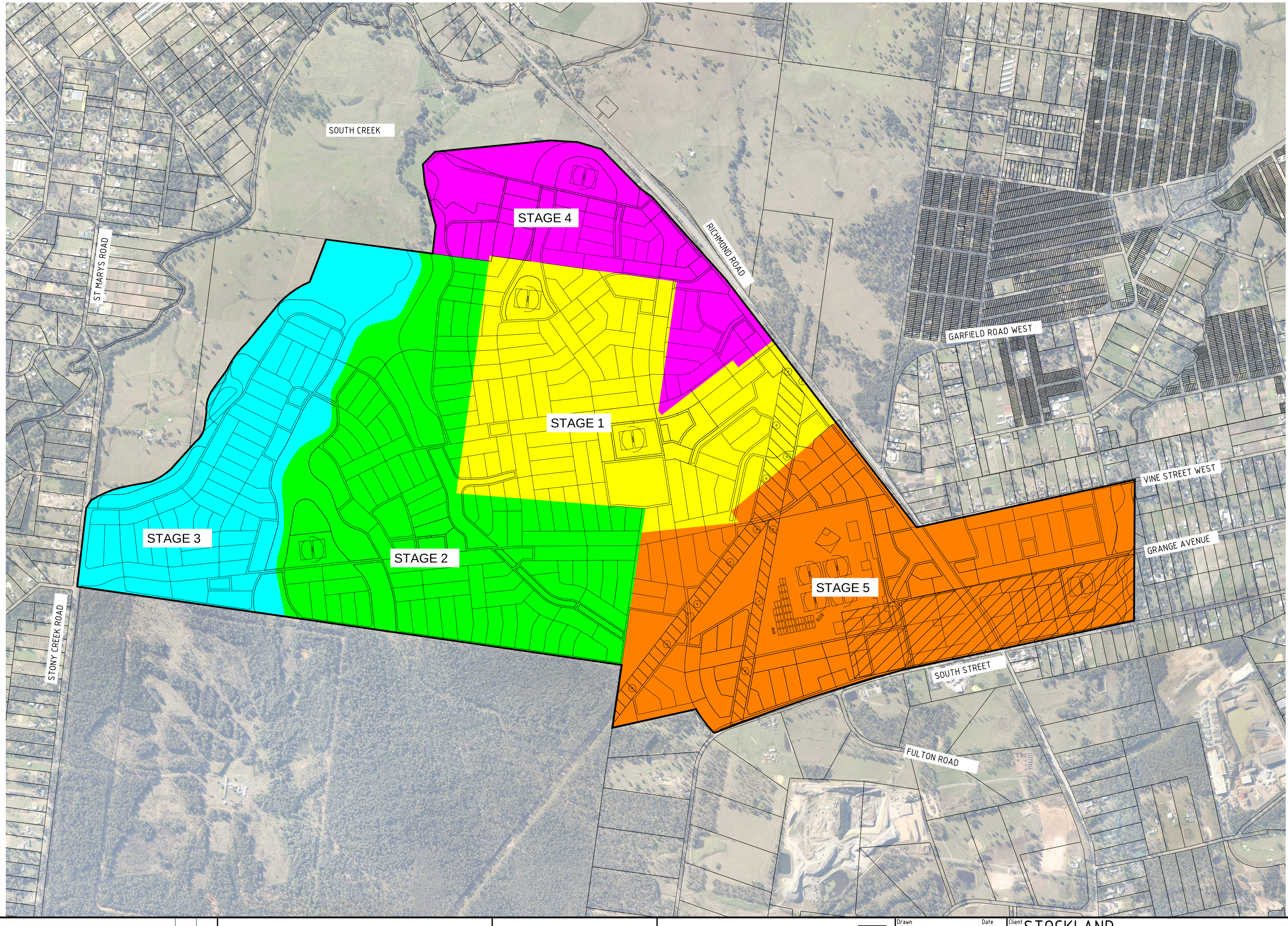
INDICATIVE LAYOUT PLAN

Marsden Park

APPENDIX B

STAGING PLAN

DATE PLOTTED: 21 August 2012 2:21 PM BY : SHAWN HOTONG (SYDNEY)



XREF's: X-GRP-A1-SHT; X-SYD-A1-Logo; NEARMAP; X-Masterplan_Cadastre_2011; X_Draft ILP_v6_r2
CAD FILE: N:\Urban\6000 - 6099\600340 - Marsden Park\5 DRAWINGS\1 Build\00 Masterplan\Sketches\600340-SK004(3).dwg

Rev	Date	Description	Drawn	Appr.
3	21/08/2012	UPDATE FOR IMPLEMENTATION PLAN	SHH	DC
2	24/07/2012	UPDATE WITH ILP 6.2	SHH	CEV
1	21/03/2012	ISSUE FOR INFORMATION	SHH	CEV

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Drawn	SHH	Date 21/08/2012
Checked	CEV	Date 21/08/2012
Designed	–	Date
Verified	–	Date
Approved	CEV	Date 21/08/2012

Client STOCKLAND

MARSDEN PARK
MASTERPLANNING

STAGING PLAN

Status: NOT FOR CONSTRUCTION

Date	Datum	Scale	Size
21/08/2012	AHD	1:10000	A1

Drawing Number: 600340-SK004
Revision: 3

0 10 20 30 40 50 60 70 80 90 100 110 120 130 140 150mm ON A1 ORIGINAL