

Engineering Servicing Report

LOT 5892 MARALLA ROAD BULLSBROOK

Stockland



JDS201899_Rev E

July 2023

INTEGRITY

We are open, honest, and consistent in our principles and conduct, so we're able to build trusted relationships with our clients and partners.

RESPECT

We treat everyone with respect and dignity and develop relationships founded on understanding and trust.

ACCOUNTABILITY

We always assume responsibility for our actions and make decisions in line with our economic, social, and ethical obligations.

EXCELLENCE

We pursue excellence in everything we do, challenging ourselves to look beyond the obvious and ensure ongoing improvement.

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Appendices

- A. District Structure Plan
- B. Feature Survey
- C. Approved Extraction Levels

DOCUMENT REVIEW					
Revision	Date Issued	Issue Type	Written By	Reviewed By	Approved By
Rev A	14/5/21	For Review	JG	SF	
Rev B	1/6/21	Issued for Final Review	JG	BW	
Rev C	3/6/21	Issued for DSP	JG	BW	SF
Rev D	2/3/22	Issued for DSP	JG	BW	
Rev E	6/7/23	Issued for DSP	BW		

1 Introduction and Key Objectives

JDSi Consulting Engineers (JDSi) have been commissioned by Stockland to prepare the Engineering Servicing Report to support a Business Case and future District Structure Planning applications for the proposed residential subdivision across the land holding. JDSi understand the proposed development consists of the following:

- ▶ 2200-2400 dwellings.
- ▶ Small local retail Precinct
- ▶ Primary School Site
- ▶ Public Open Space (POS) and new road and pedestrian networks.

Refer **Appendix A** DSP Concept Plan.

The investigations undertaken and preparation of the report have been largely based on desktop studies and some preliminary advice from the service authorities. The information is current as of February 2022 and may be subject to change as development progresses in the area.

The report summarises the results of a review of the civil and electrical engineering related elements of the development. The key objectives of this report are to:

- ▶ Provide commentary on the proposed development and background to the existing site location and conditions.
- ▶ Provide commentary on any earthworks and remediation required within the development area.
- ▶ Provide commentary on the existing roads, drainage, and utility services infrastructure within the vicinity of the development.
- ▶ Provide commentary on the proposed road network and any upgrades required to facilitate the proposed development.
- ▶ Provide commentary on the overall stormwater drainage strategy for the proposed development.
- ▶ Document the Water Corporation's servicing requirements for sewer and water reticulation.
- ▶ Document Western Power's servicing requirements for electrical reticulation.
- ▶ Document servicing requirement for telecommunication and gas reticulation.

2 Study Area

The subject site is located in the suburb of Bullsbrook and is in close proximity to residential housing within Ellenbrook. The site is bounded by Halden Road to the east, Maralla Road to the south and undeveloped land to the north and west.

The subject site is currently zoned General Rural under City of Swan's Local Planning Scheme No. 17 and is noted as Open Space within the North-East Sub-Regional Planning Framework (March 2018). The site has a total area of 162.98ha and is subject to an active mining tenement for sand extraction.



Figure 1: Site Location

The review undertaken has been based on a desktop study of existing services information and aerial imagery. The review is also based on bringing the necessary services to the sites to facilitate the creation of fully serviced lots generally in line with the concept structure plan below:

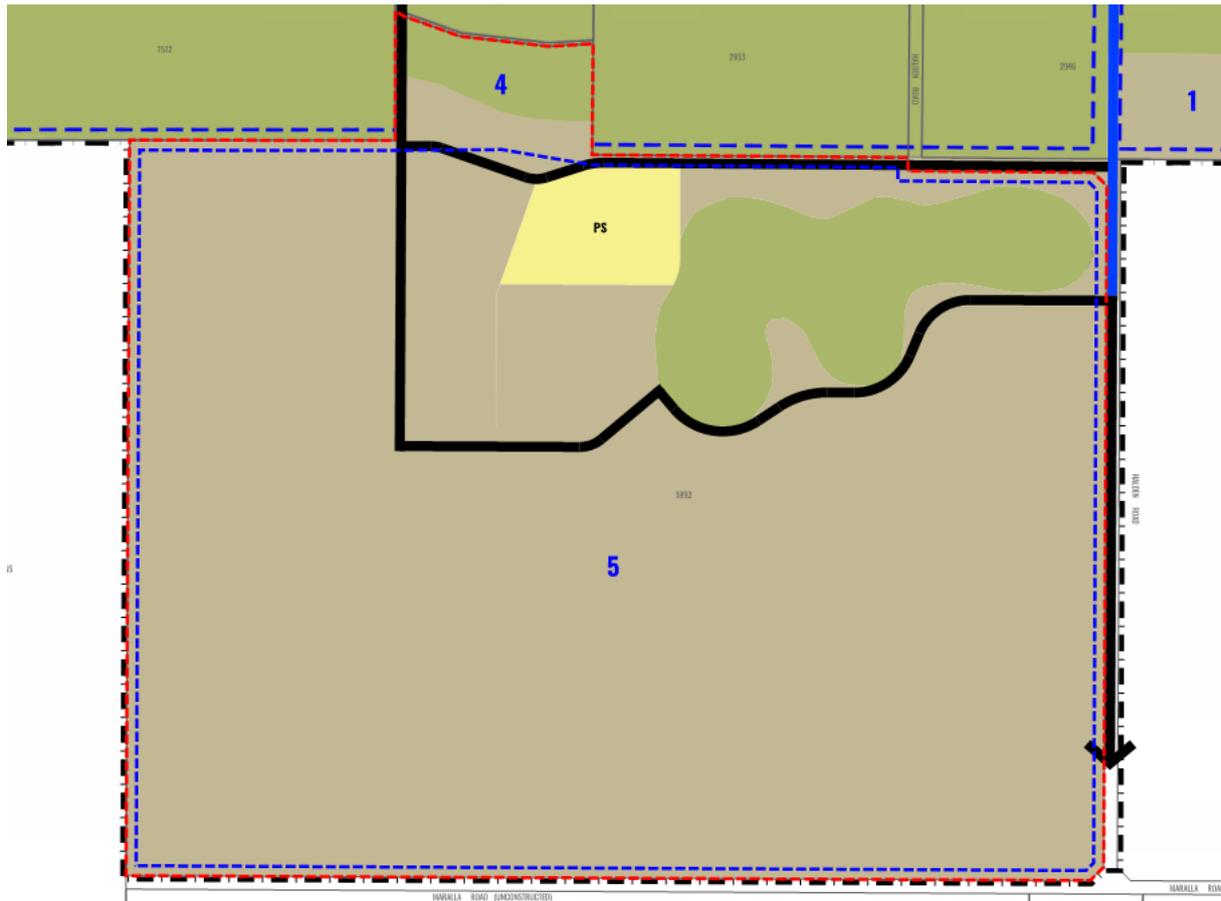


Figure 2: District Structure Plan

2.1 Topography

A topographical survey for the site has been undertaken by MNG and indicates that the existing surface levels vary from approximately 46m AHD to 76m AHD. The lower elevations of the site i.e. 46m AHD to 50m AHD generally coincide with the identified CCW's located on the subject sites. The site is generally undulating with the higher peaks and steeper slopes generally present over the southern half of the subject sites.

Refer **Appendix B** Feature Survey.

2.2 Groundwater

The site is included in the Department of Water and Environmental Regulation's (DWER) online Perth Groundwater Atlas. Based on the DWER's recorded groundwater levels the Historical Maximum Groundwater Level varies across the site, from approximately 53mAHD in the north-west corner to 47mAHD in the south-east corner. Groundwater flow is generally in a south-easterly direction.

JDSi understand that RPS have been commissioned to undertake further hydrological studies on the site, including detailed assessment of groundwater levels to inform the development.



Figure 3: Maximum GWL and UWPCA – DWER

Part of the subject site falls within the Gnangara Underground Water Pollution Control Area (UWPCA). Developers within a UWPCA need to fulfill their legal responsibilities including those covering 'land use' planning, environmental, health and building permit matters. The Department of Water and Environmental Regulation is responsible for managing and protecting Western Australia's water resources. Activities and land use in these areas are restricted and subject to the Department of Water and Environmental Regulation approval processes in accordance with the Western Australian Planning Commissions current State Planning Policy 2.7.

2.3 Geological Conditions

Published geological maps (Ref. Perth Metropolitan Region 1:50,000 Environmental Geology Series: Muchea) for the area indicates that the near surface geology, in its undisturbed natural state, comprises:

- ▶ Sand derived from Bassendean Sand (Bassendean Sand, S8) for the majority of the site, this unit is described as very light grey at surface, yellow at depth, fine to medium-grained, sub-rounded quartz moderately well sorted of eolian origin.
- ▶ Peaty Clay (Cps) - dark grey and black with variable sand content of lacustrine origin.

On site geotechnical investigation will be required to inform the detailed design for the site but it is anticipated that highly permeable Bassendean Sand extends to depths well below those required to facilitate construction works on site.

2.4 Acid Sulphate Soils

Acid Sulphate Soil mapping compiled by Department of Water and Environmental Regulation indicates the site is generally located within an area of “*moderate to low risk of acid sulphate soils occurring within 3 m of natural soil surface*”. All excavation works and dewatering in ASS must be carefully managed to avoid any potential damage to surrounding land and water ways.



Risk Class

-  1 – High to moderate risk of ASS occurring within 3m of natural soil surface
-  2 – Moderate to low risk of ASS occurring within 3m of natural soil surface but high to moderate risk of ASS beyond 3m of natural soil surface

Figure 4: WAPC ASS Mapping

3 Earthworks

3.1 Pre-Development Sand Mining

Lot 5892 is being actively mined for silica and general-purpose sand. The approved mining tenement covers 120ha. The total area of the site is 163h. Mining is taking place progressively from east to west. Lot 5892 is part of an extensive area that has been identified within a Significant Geological Supply for sand (SPP 2.4). Figure 5 shows Lot 5892 and the extent of this Significant Geological Supply, along with other SPP 2.4 extraction areas.



Figure 5: Significant Geological Supply - Basic Raw Materials

Mining for basic raw materials on private land is generally exempt from the tenement licensing requirements of the Mining Act, however silica sand is defined as a mineral under the Mining Act and as a basic raw material under SPP 2.4, and requires both a Mining Licence and a planning approval under the Planning and Development Act. Regardless of what Act the mine product is licensed under the 'mining operations' are required to comply with Department of Mines, Industry Regulation and Safety (DMIRS) under the Mining Act.

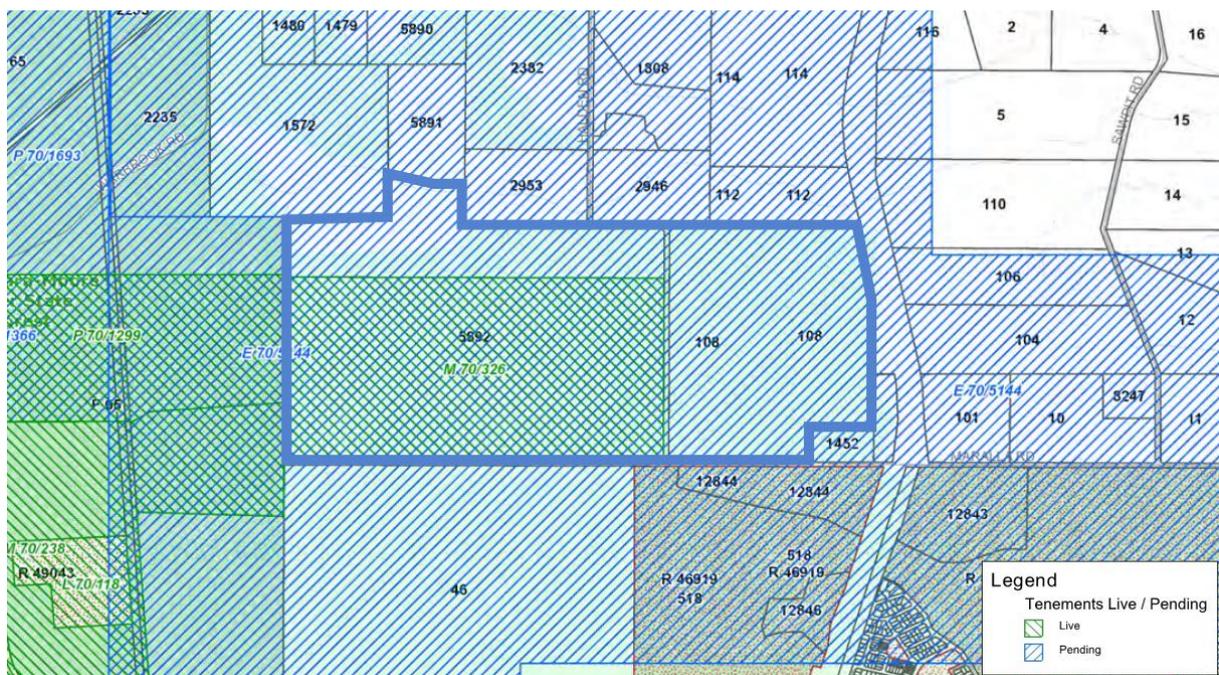


Figure 6: Mining Leases

Mining on Lot 5892 was originally approved in 1988 but excavation did not commence until about 2012. The holder of Mining Licence 70/326, issued under the Mining Act 1978, is Stefanelli Developments Pty Ltd, the owner of Lot 5892. The tenant and mine operator is Urban Resources Pty Ltd. The extent of the licensed area is depicted on Figure 6.

The mine also has an Extractive Industries Licence issued by the City of Swan and approval to commence development from the WAPC, which is required as a result of a Clause 32 resolution under the MRS for all extractive industries applications on land zoned 'Rural' in the MRS.

Current approved sand mining operations are progressively removing up to 120ha of Banksia woodland from Lot 5892 and simultaneously modifying the landform in a manner that makes rehabilitation of vegetation to its former state an unlikely outcome. The approved extraction levels have been conservatively modelled at a minimum of 2m above the Department of Water's historical maximum recorded groundwater levels. Refer **Appendix C** Approved Extraction Levels.

3.2 Earthworks

General topography extends from lower flats to undulating hill formations ranging from 46m AHD to 76m AHD. The natural vegetation occurring on the sites is classified as the Bassendean Complex-Central and North. This vegetation ranges from low open forest and low woodland of Banksia to low woodland of Melaleuca and sedge lands with part of Lot 5892 located over a Priority 3 (P3) Conservation Category Wetland (CCW).

As previously mentioned, Lot 5892 is subject to an active mining tenement for sand extraction which will see up to 120ha of vegetation stripped and natural surface levels lowered by up to 20m. These approved sand extraction works will be undertaken as per the approved extraction levels (refer **Appendix C**). The finished extraction levels will facilitate the future development of Class A lots without the requirement for fill importation or significant earthworks.

The developable portions of both lots will have sufficient separation to Maximum Ground Water Levels and are classified as having a Moderate to Low Risk of Acidic Sulphate Soils. However, any ground disturbing work in the vicinity of the CCW's may need to be assessed and possibly managed in accordance with the following DWER guides:

- ▶ Identification and investigation of acid sulphate soils and acidic landscapes (June 2015)
- ▶ Treatment and management of soil and water in acid sulphate soil landscapes (June 2015)

The proposed earthworks strategy will result in savings of up to \$20,000 per lot when compared against similar development sites in the locality that will require significant fill to realise the same site classification and required clearances to groundwater levels.

4 Wastewater Reticulation

The subject land is located within the Water Corporation licensed area for operating sewerage services. The Water Corporation has advised that the site does not currently fall within a Water Corporation Sewer District, and that no wastewater planning has currently been undertaken for the advertised DSP area, as the area was only recently identified for potential urban development as part of the 2018 Sub-Regional Planning Framework.

Due to the zoning of the subject sites, they currently fall between two Water Corporation designated sewerage areas being Bullsbrook and Ellenbrook. Servicing strategies to be investigated will involve the installation of an internal standard gravity reticulation network to Water Corporation requirements to an external discharge point. The external discharge point will be subject to detailed design and Water Corporation's future strategic planning.

Preliminary discussions with Water Corporation have highlighted two possible sewer servicing strategies to service the site. Both strategies involve the installation of an internal standard gravity reticulation network and pumping station to Water Corporation requirements but differ in the means of their external discharge to mains sewer.

Strategy 1 would involve construction of a sewer pressure main (1800m) from the internal pumping station to a discharge chamber on Halden Road. Water Corporation have already planned to extend their gravity mains to this location. Due to the additional flows an upgrade in size of the planned gravity sewer mains will be required.

Strategy 2 would involve the construction of a sewer pressure main (1300m) from the internal pumping station to a proposed discharge chamber at a high point on Maralla Road to the East. This option will require a 1.7km extension of the planned sewer gravity mains down Maralla Road from Sawpit Road. Preliminary checks of cover and grade requirements under Tonkin Hwy have been positive. Due to the additional flows an upgrade in size of the planned gravity sewer mains from Sawpit Road to the Bullsbrook PS No 1 will be required.

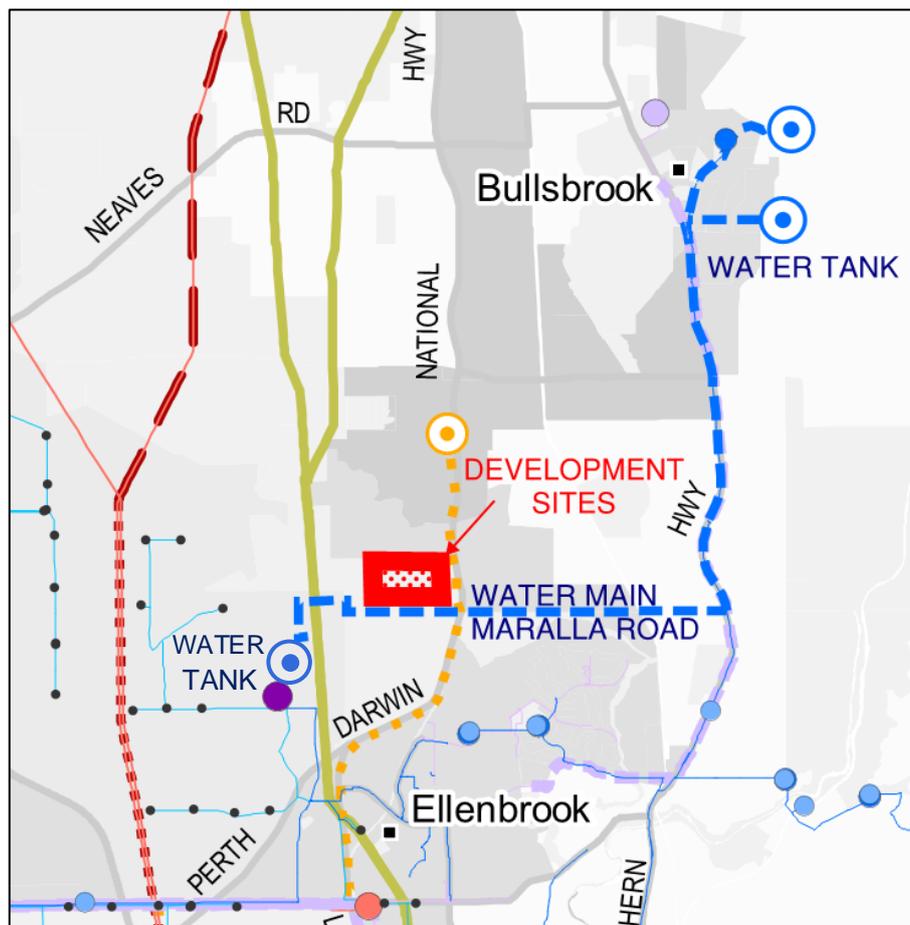
Initial review suggests a Type 90 Pumping Station would be required to service the subject site area. A Type 90 Pumping Station consists of two pump sets located in a circular common wet-wells constructed of reinforced concrete with an internal diameter of 3.0m. This type of pumping station is used for permanent or temporary installations where the proposed ultimate pumping rate is more than 40L/s and does not exceed 90L/s.

5 Water Reticulation

The subject land is located within the Water Corporation's licensed area for provision of a potable water supply service. The Water Corporation has advised that no water planning has currently been undertaken for the advertised DSP area, as the area was only recently identified for potential urban development as part of the 2018 Sub-Regional Planning Framework.

The North-East Sub-Regional Planning Framework (March 2018) outlines some planned improvements to the existing water supply system including the provision of new water tanks north-west of Ellenbrook (Gaskell Road, Lexia). The Ellenbrook reservoir will be the primary water storage facility to support future urban and industrial development in the northern parts of the sub-region (refer Figure 7). Bullsbrook is also noted as requiring several new water tank sites, development of which will need to be staged over time to serve the proposed expansion of the townsite.

The proposed route of the transfer main between the Gaskell Road and Bullsbrook Tanks is to be along the development's southern boundary within Maralla Road. This main should be of sufficient size to cater for the proposed development, however the possibility of this main being part of the future water planning solutions for the North Ellenbrook DSP's will be confirmed through discussions with the Water Corporation. Servicing of the individual lots would be via the installation of a series of reticulation mains as per Water Corporation standards



— — — — — Proposed Water Distribution Main

Figure 7: Plan 8 - North-East Sub-regional Planning Framework

There is also a significant existing water supply infrastructure system that services the Ellenbrook townsite. This includes a Water Corporation overhead tank that is located 2.7 km west of Ellenbrook and 3.8 km south of the proposed structure plan area. There are diameter 1200 mm and 900 mm

trunk mains that cross the Perth to Darwin Highway that feed smaller reticulation mains for distribution. Whilst there is currently no potable water supply servicing the structure plan area (or agreement between the Water Corporation as service provider and the proponents with regard to development and financing of these essential services), it is anticipated that reticulation extensions will come from this supply with alignment in future road reserves heading north to the structure plan area.

Capital funding for the new reservoir outlet and associated distribution mains is currently not on the Water Corporations capital investment program. In liaison with the Water Corporation, the proponents will need to further investigate the infrastructure alignment and resolve funding of any water headworks to enable development of the land prior to the 'lifting of Urban Deferment' process.

As Lot 5892 is located directly between the current approved DSP for North Ellenbrook West and existing Water Corporation infrastructure, Lot 5892 can readily be incorporated into the North Ellenbrook DSP west water planning investigation being undertaken by Water Corporation.

It is also to be noted that Water Corporation has only recently completed the installation of a DN400S / DN250 PVC distribution main from the existing Ellenbrook reservoir tank to the State's Centre for National Resilience. This new distribution main extends as a DN400 Steel pipeline to a location 700m immediately west of Lot 5892. The distribution main changes to a DN250 PVC main for the rest of the alignment along Warbrook Road to the currently closed Centre for National Resilience. The possibility of utilising this pipeline as a source for potable water for the Lot 5892 should be investigated.

6 Roadworks

The surrounding road network is under the control of the City of Swan and as such all works on and abutting the public roads will be subject to their approval. The existing roads abutting and surrounding the development are generally considered to be a rural standard. Tonkin Hwy abuts Lot 108 along the eastern boundary. Tonkin Hwy is a 'Red' category road and falls under the control of MRWA. Currently access to the subject land is via the Stock Road and Tonkin Hwy interchange approximately 5 kilometres to the north.

Based on the current proposed plans, access to the Development site will be via existing Halden Road and future road connections into the advertised DSP. Access off Tonkin Hwy is proposed to be at one of the two proposed interchange options in the advertised DSP.

The preferred location for the interchange is the southern option due to the following:

- ▶ It affects only one landowner
- ▶ Construction costs will be lower due to Tonkin Hwy being in 'cut' at this location and additionally the interchange will not clash with the existing watercourse which is the case with the northern option.
- ▶ A more direct access to an existing road to the west, "Halden Road".

The new road network within the development will be consistent with standard residential developments including kerbed and asphalted pavements and road cross-sections will be designed to align with the existing landform. In all cases the road cross sections will be designed to cater for utility services on standard verge alignments and appropriate stormwater management strategies.

It is expected that surrounding roads such as Halden Road and Maralla Road will require upgrades to urban residential standards.

JDSi understand that a Transport Impact Assessment would be required to be completed to inform any future Scheme Amendments and Local Structure Planning.

7 Stormwater Drainage

Urban Water Management (UWM) is now a key part of any development process incorporating principles of integrating water and land use planning, considering all water sources in water planning, integrating water use and natural water processes and a total catchment integration of natural resource use and management (Ref. Stormwater Management Manual for Western Australia, DOW, April 2004 the State Water Strategy 2003 and the State Water Plan 2007).

Stormwater drainage management is a major component of an overall UWM strategy for which achievement of the principles of the plan may be facilitated through the application of Water Sensitive Urban Design (WSUD) techniques during planning, design, and construction of urban development projects. Objectives of WSUD include but are not limited to the following:

- ▶ Detention of stormwater rather than rapid conveyance to maintain pre development flows for quantity management.
- ▶ Use of vegetation for filtering purposes and nutrient stripping for quality management.
- ▶ Use of stormwater to conserve potable water; and
- ▶ Water efficient landscaping.

JDSi understand that a DWMS would be required to be completed to inform any future Scheme Amendments and Local Structure Planning.

It is anticipated that the stormwater management strategy for the site will include the following:

- ▶ Maintain pre-development peak flow rates into and out of the site.
- ▶ Set habitable floor levels at least 0.3 m above the 1% AEP flood level of the urban drainage system.
- ▶ Utilise a pit and pipe network, or roadside swales where possible, to cater for flows up to 20% AEP rainfall events, while greater than 20% AEP flow will be conveyed via overland flow through the road network.
- ▶ Retain and infiltrate rainfall on site using basins and/or underground storage.
- ▶ The stormwater drainage design demonstrates that the land is capable of managing stormwater for all events up to the 1% AEP event.
- ▶ Controls used to improve stormwater quality will be included within roadside swales, open channels, and stormwater retention systems such as planting of specific vegetation and possible utilisation of an amended soil profile to assist in nutrient retention and breakdown.
- ▶ The use of native vegetation where practicable, minimal fertiliser application and soil amendment in major drainage areas will assist with the management of groundwater and surface water quality.

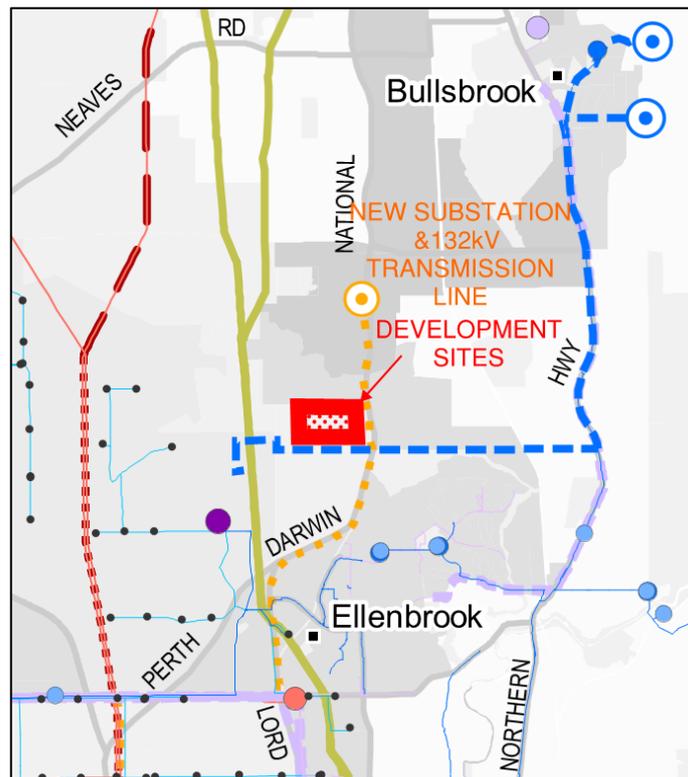
As the City of Swan will ultimately own and maintain all stormwater infrastructure the design and construction work will need to be undertaken in accordance with their guidelines and standards, as well as the Local Government Guidelines for Subdivisional Development (IPWEA).

8 Power Supply

8.1 Existing Power Network

The following advice is based on a JDSi desktop study and support information obtained from the Western Power NCMT (Network Capacity Mapping Tool) online database.

The North-East Sub-Regional Planning Framework (March 2018) outlines some planned improvements to the power reticulation network to cater for the planned urban development in the area. These works would see a new transmission line from the Muchea Zone Substation to a new Bullsbrook Substation with the proposed cable alignment along the eastern boundary of the subject land (refer Figure 8).



----- Proposed Western Power Transmission Line

Figure 8: Plan 8 - North-East Sub-regional Planning Framework

8.2 Proposed Power Network

The anticipated power demands of the site can be broken up as follows:

Lot 5892				
Load Type	Information	Load (kVA)/lot	No. Lot	Total (kVA)
Residential	Western Power DADMD Calculator	4.7	2208	10,378
Commercial	Western Power UDS Manual	200/hectare	0.5hectares	100
Primary School	Western Power UDS Manual	250	1	250
POS	Western Power UDS Manual	5	9	45
Proposed Total Load				10,773

Table 1: Power Load Breakdown – Lot 5892

Western Power's Network Capacity Mapping Tool (NCMT) forecasts the remaining capacity as for 2020 at the Muchea Substation to be 25-30MVA. However, access to the available capacity will be dependent on the installation of the planned 132kV transmission line and substation.

In the immediate term, there is an existing 22kV distribution overhead network approximately 700m north of the proposed development on Halden Road which may be suitable for connection of the development site's initial stages.

9 Gas

ATCO Gas own and maintain the existing underground gas network in the vicinity of the Development. Although no gas networks exist in the direct proximity of the subject sites it is expected that domestic reticulated gas will be progressively supplied as development progresses in the area.

Reticulated gas is not considered to be an essential service and as such is not required as a condition of subdivision. However, it is usual practice to install a gas reticulation network for a residential subdivision within a common civil services trench. If there is an extension required to connect to the nearest main or to bore under major roads the Developer will be required to pay for this as a headworks cost. All new gas installations will be designed by ATCO Gas and installed as part of the civil works.

10 Telecommunications

Whilst the Site is not currently within NBN's rollout footprint, there are numerous development areas in close proximity to the subject sites that will trigger expansion of the network without any significant backhaul costs applicable to this development. Similar to the other services reported in this assessment, it is anticipated that an interim servicing option can be achieved if required to service the initial stages of the development.

General communication services for the development will consist of the installation of a standard pit and pipe network in accordance with NBN Co guidelines and standards. The current design practice for road reserves, pavement and verge provisions will make adequate allowance for services in accordance with the agreed Utilities Service Providers handbook. There will be some local land requirements for equipment sites, similar to current provisions which will be accommodated at detailed subdivision stage.

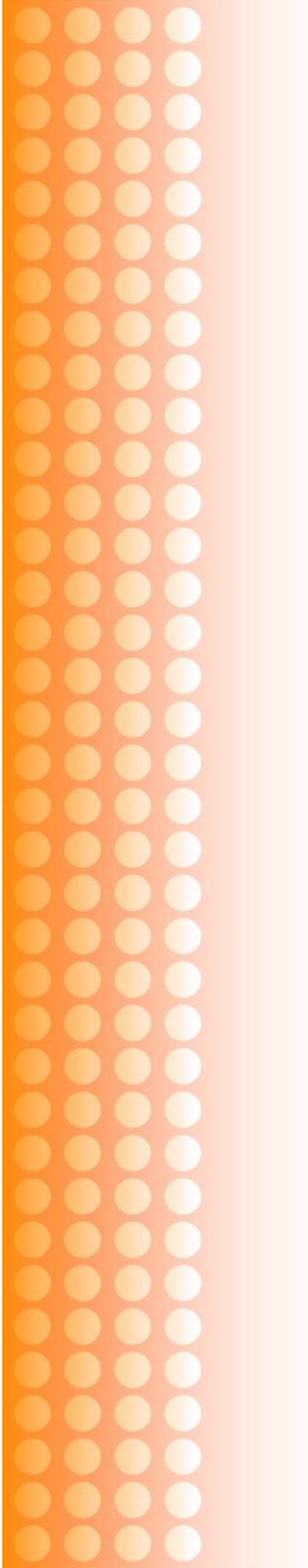
To progress the design and installation of a new communications network a New Development Application will need to be submitted to NBN and this agreement would confirm any Developer requirements. Developers will be required to cover the costs of trenching and ducting for the infrastructure, however NBN Co will cover the other costs of installing fibre infrastructure, including backhaul (subject to a feasibility assessment by NBN).

11 Disclaimer

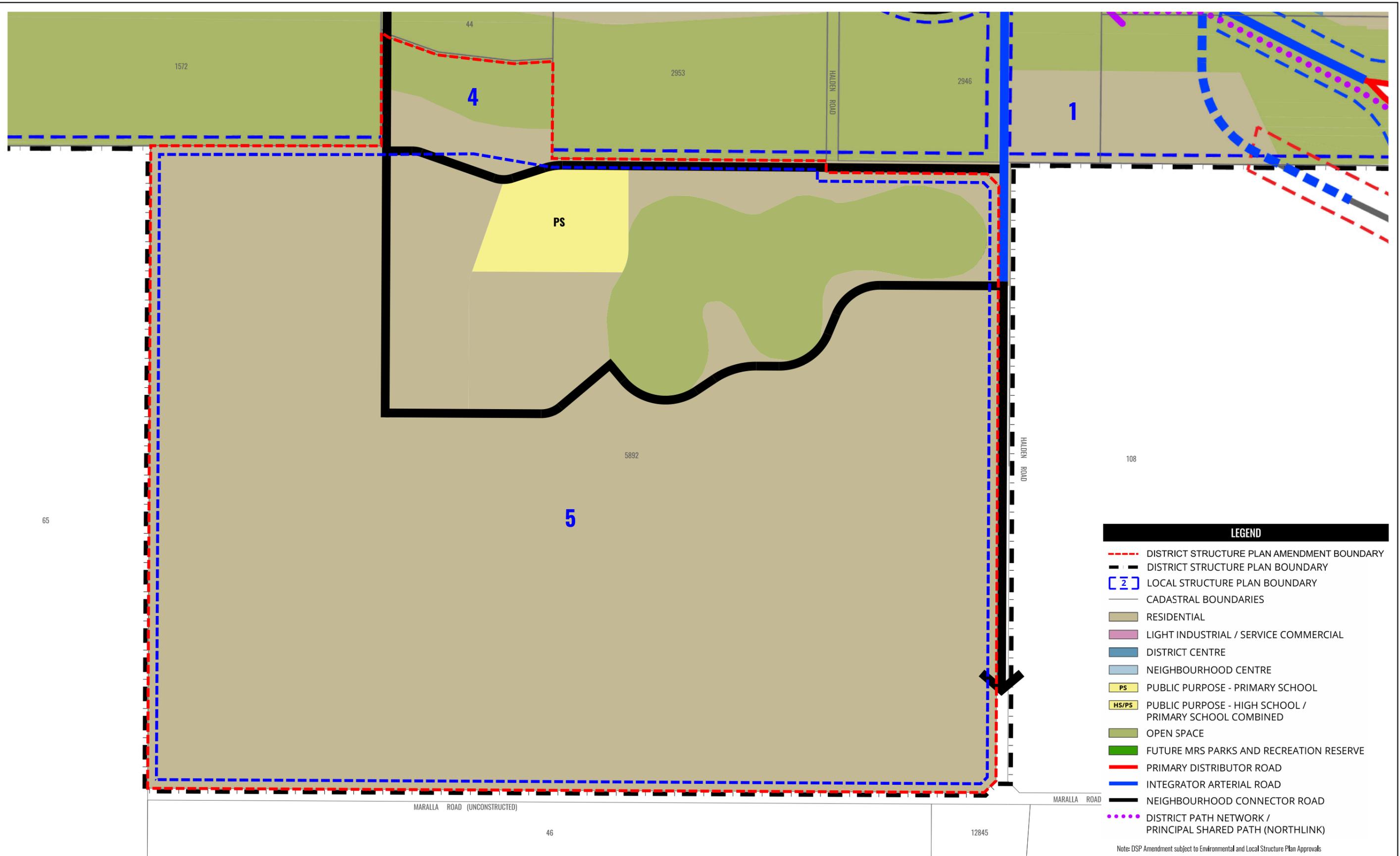
JDSi have undertaken this assessment based on a desktop study and preliminary discussions with service authorities and subsequently assumptions have been made which, if incorrect, have the potential to change the assessment and/or recommendations. Major cost implications exist through factors which cannot be assured at this time including, but not limited to, upgrading and provision of utility services, conditions of development, Local Authority Scheme Requirements, ground conditions and timing of adjacent developments.

While JDSi has taken all care in the preparation of the likely development requirements and has noted key assumptions, JDSi accepts no responsibility for the accuracy of this report and provides it only as an indicative summary of engineering requirements.

If any further information is required or should you wish to clarify any issue, please contact our office.



APPENDIX A
DISTRICT STRUCTURE PLAN



LEGEND

- DISTRICT STRUCTURE PLAN AMENDMENT BOUNDARY
- DISTRICT STRUCTURE PLAN BOUNDARY
- 2 LOCAL STRUCTURE PLAN BOUNDARY
- CADASTRAL BOUNDARIES
- RESIDENTIAL
- LIGHT INDUSTRIAL / SERVICE COMMERCIAL
- DISTRICT CENTRE
- NEIGHBOURHOOD CENTRE
- PS PUBLIC PURPOSE - PRIMARY SCHOOL
- HS/PS PUBLIC PURPOSE - HIGH SCHOOL / PRIMARY SCHOOL COMBINED
- OPEN SPACE
- FUTURE MRS PARKS AND RECREATION RESERVE
- PRIMARY DISTRIBUTOR ROAD
- INTEGRATOR ARTERIAL ROAD
- NEIGHBOURHOOD CONNECTOR ROAD
- DISTRICT PATH NETWORK / PRINCIPAL SHARED PATH (NORTHLINK)

Note: DSP Amendment subject to Environmental and Local Structure Plan Approvals

DISTRICT STRUCTURE PLAN
 Lot 5892 Maralla Rd, BULLSBROOK
 An Stockland Project

DRAFT

NORTH

Scale: 1:6000 @ A3

0 60 120 180m

PLAN: STONE-2-001 REVISION: A
 DATE: 09/02/2022 DRAWN: JP
 PROJECTION: PCG 94 PLANNER: BK
 DATUM: AHD CHECK: CH

cdp

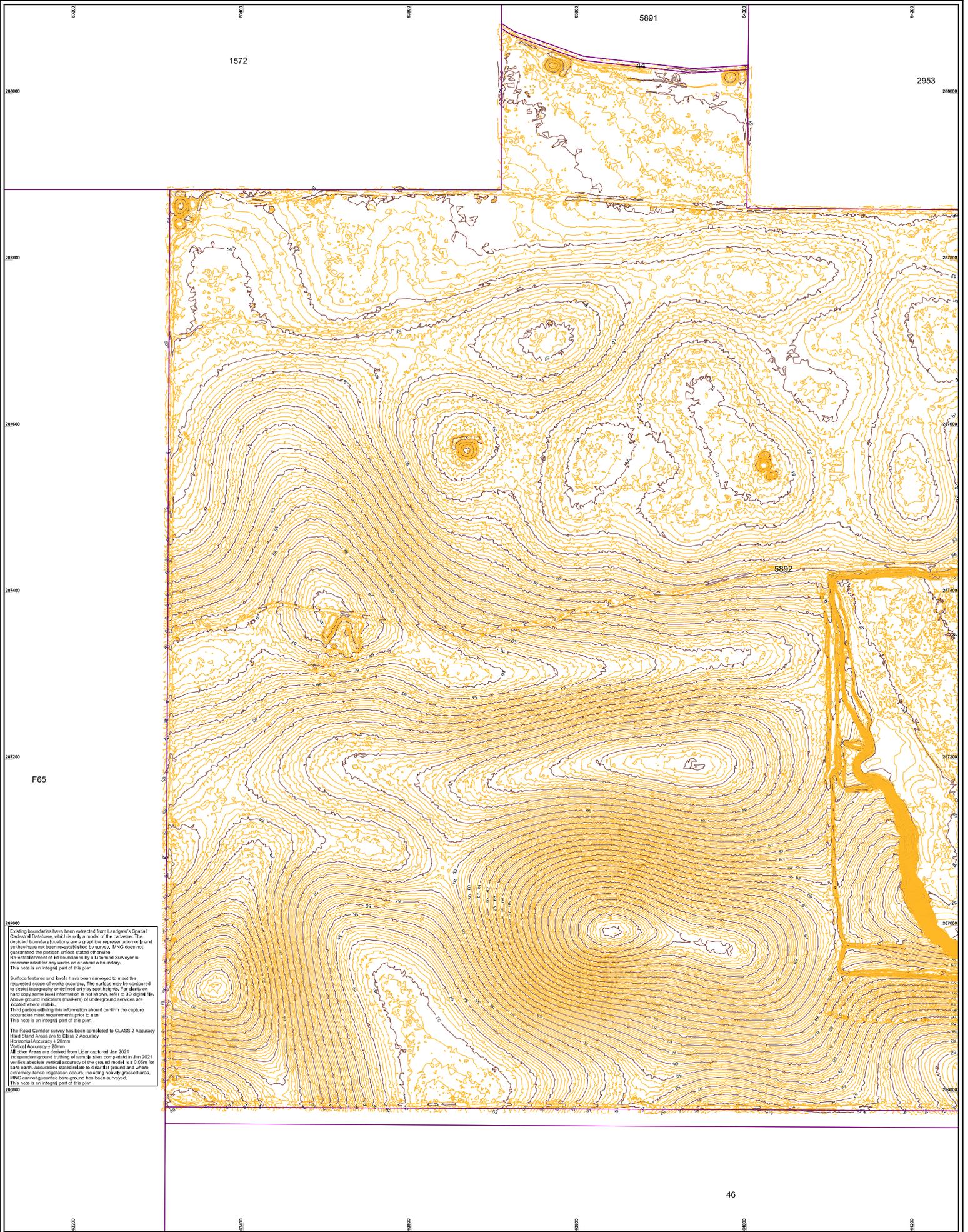
Town Planning & Urban Design

Unit 2, 464 Murray Street
 Perth WA 6000
 (08) 6333 1888
 info@cdpau.com.au
 www.cdpau.com.au

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APPENDIX B FEATURE SURVEY



Existing boundaries have been extracted from Landgate's Spatial Cadastral Database, which is only a model of the cadastre. The depicted boundary locations are a graphical representation only and as they have not been re-established by survey, MNG does not guarantee the position unless stated otherwise. Re-establishment of lot boundaries by a Licensed Surveyor is recommended for any works on or about a boundary. This note is an integral part of this plan.

Surface features and levels have been surveyed to meet the requested scope of works accuracy. The surface may be contoured to depict topography or defined only by spot heights. For clarity on hard copy some level information is not shown, refer to 3D digital files. Above ground indicators (markers) of underground services are located where visible.

Third parties utilising this information should confirm the capture accuracies meet requirements prior to use. This note is an integral part of this plan.

The Road Corridor survey has been completed to CLASS 2 Accuracy Here Shaded Areas are to Class 2 Accuracy
 Horizontal Accuracy ± 20mm
 Vertical Accuracy ± 20mm

All other Areas are derived from LIDAR captured Jan 2021
 Independent ground truthing of sample sites completed in Jan 2021 verifies absolute vertical accuracy of the ground model is ± 0.05m for bare earth. Accuracies stated relate to clear flat ground and where extremely dense vegetation occurs, including heavily grassed areas, MNG cannot guarantee bare ground has been surveyed. This note is an integral part of this plan.

Rev.	Initial Issue	Description	Drawn	Date	Checked
A					



GlobalMark.com.au®

Surveyor: JBL
 Survey Date: 30/04/2021
 Precal/Lead: SCDB



**LOT 5892 MARALLA ROAD
 BULLSBROOK
 DETAIL SURVEY (Sheet 1 of 2)**

CLIENT:
**STOCKLAND DEVELOPMENT
 PTY LTD**

The contents of this plan are correct and correct as of the date stated within the revision panel. All necessary and persons relating to this data should verify dimensions of this plan survey by contacting the MCGM Team Group.

Project No: 104027 - DE - 003 - A
 Client: Stockland Development Pty Ltd
 Date: 30/04/2021
 Plan No: 104027 - DE - 003 - A



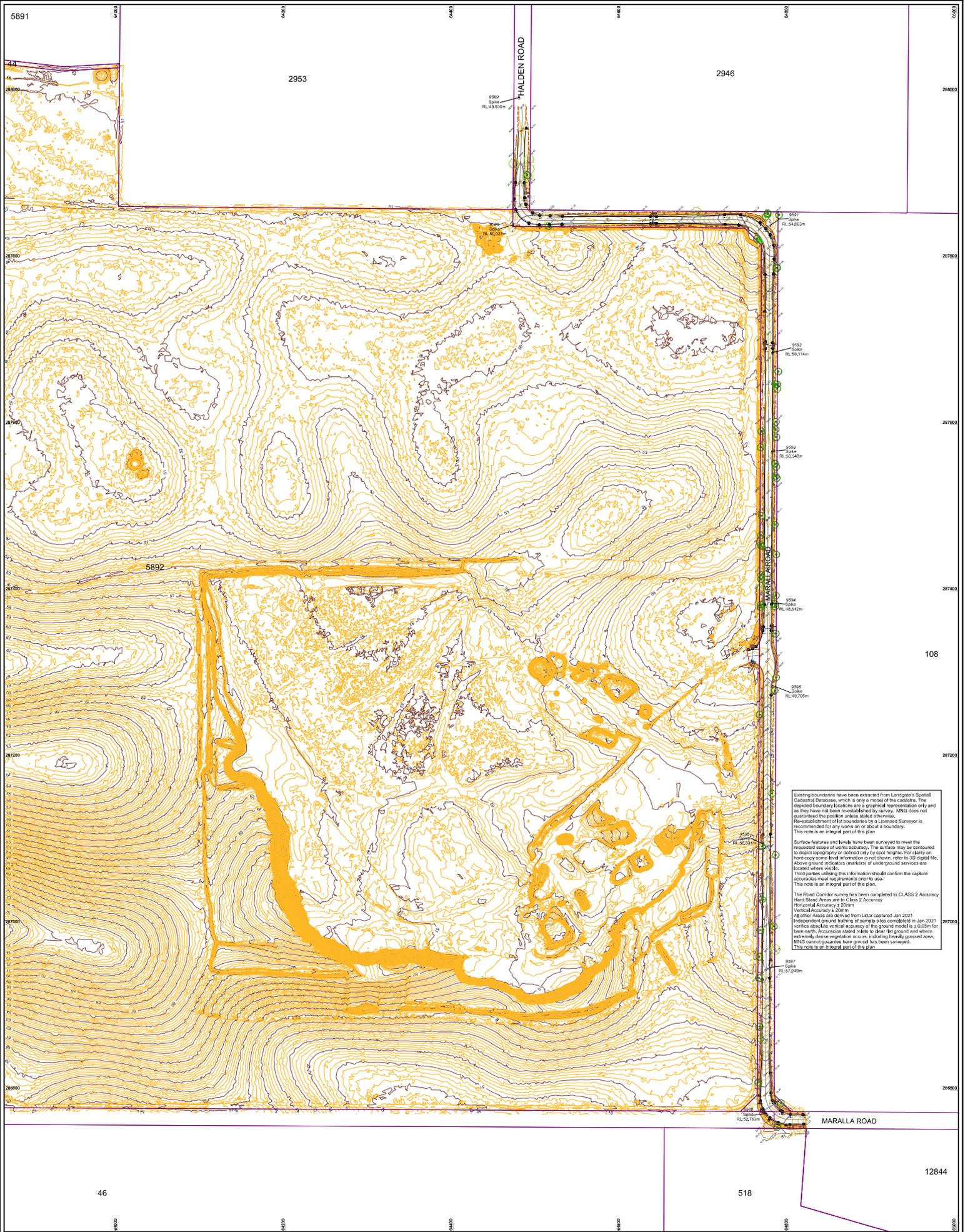
The boundaries shown on this plan were not re-established as part of this survey, therefore this plan does not guarantee their accuracy. Existing easements, encumbrance or interest are not depicted and a title search is recommended to obtain this information. Re-establishment of the cadastral boundaries is recommended for any proposed works on or near existing boundaries.



MCMULLEN INDIAN GROUP
 Level 1, 2 Sabre Crescent
 Jandakot, W.A. 6164
 PO Box 3526, Success
 W.A. 6964, Australia
 Offices in: Perth | Melbourne | Kimberley | South West W.A.

Tel: (08) 6436 1599
 Fax: (08) 6436 1500
 info@mngsurvey.com.au
 www.mngsurvey.com.au
 ABN 90 009 363 311

Project No	Client Name	Date	PCSA #/AMD
104027 - DE - 003 - A	Stockland Development Pty Ltd	30/04/2021	



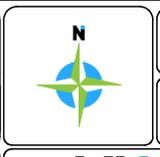
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Surface features and levels have been surveyed to meet the required scope of works accuracy. This surface may be contoured to depict topography or defined only by spot heights. For clarity on hard copy some level information is not shown, refer to 3D digital file. Above ground indicators (markers) of underground services are located where visible. Third parties utilising this information should confirm the capture accuracy meet requirements prior to use. This note is an integral part of this plan.

The Road Corridor survey has been completed to CLASS 2 Accuracy. Hard Stair Areas are to Class 2 Accuracy. Horizontal Accuracy ± 20mm. Vertical Accuracy ± 20mm. All other Areas are defined from Lidar captured Jan 2021. Independent ground truthing of sample sites completed in Jan 2021 verifies absolute vertical accuracy of the ground model by a factor of 10 or more. Accuracies stated relate to clear flat ground and where extremely dense vegetation occurs, including heavily grassed areas, MNG cannot guarantee bare ground has been surveyed. This note is an integral part of this plan.

Rev.	Initial Issue	Description	Drawn	Date	Checked
A			DRD	04/05/2021	CAY

Surveyor: JBL
 Survey Date: 30/04/2021
 Precal/Ead: SCDB

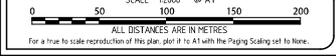


**LOT 5892 MARALLA ROAD
 BULLSBROOK
 DETAIL SURVEY (Sheet 2 of 2)**

CLIENT:
**STOCKLAND DEVELOPMENT
 PTY LTD**

The contents of this plan are correct and correct as of the date stated within the revision panel. All measurements and parameters relating to this data should comply with the standards of the Survey Act 1985.

Project No: 104027 - DE - 003 - A
 Date: 04/05/2021
 Plan No: 104027 - DE - 003 - A

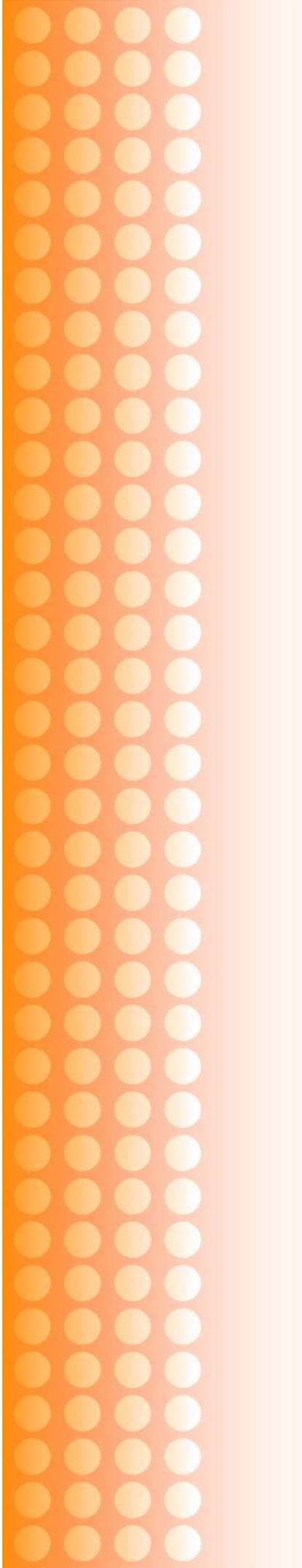


The boundaries shown on this plan were not re-established as part of this survey, therefore this plan does not guarantee their accuracy. Existing easements, encumbrance or interest are not depicted and a title search is recommended to obtain this information. Re-establishment of the cadastral boundaries is recommended for any proposed works on or near existing boundaries.

MCMULLEN INDIAN GROUP
 Level 1, 2 Sabre Crescent
 Jandakot, W.A. 6164
 PO Box 3526, Success
 W.A. 6964, Australia
 Offices in: Perth | Melbourne | Kimberley | South West W.A.

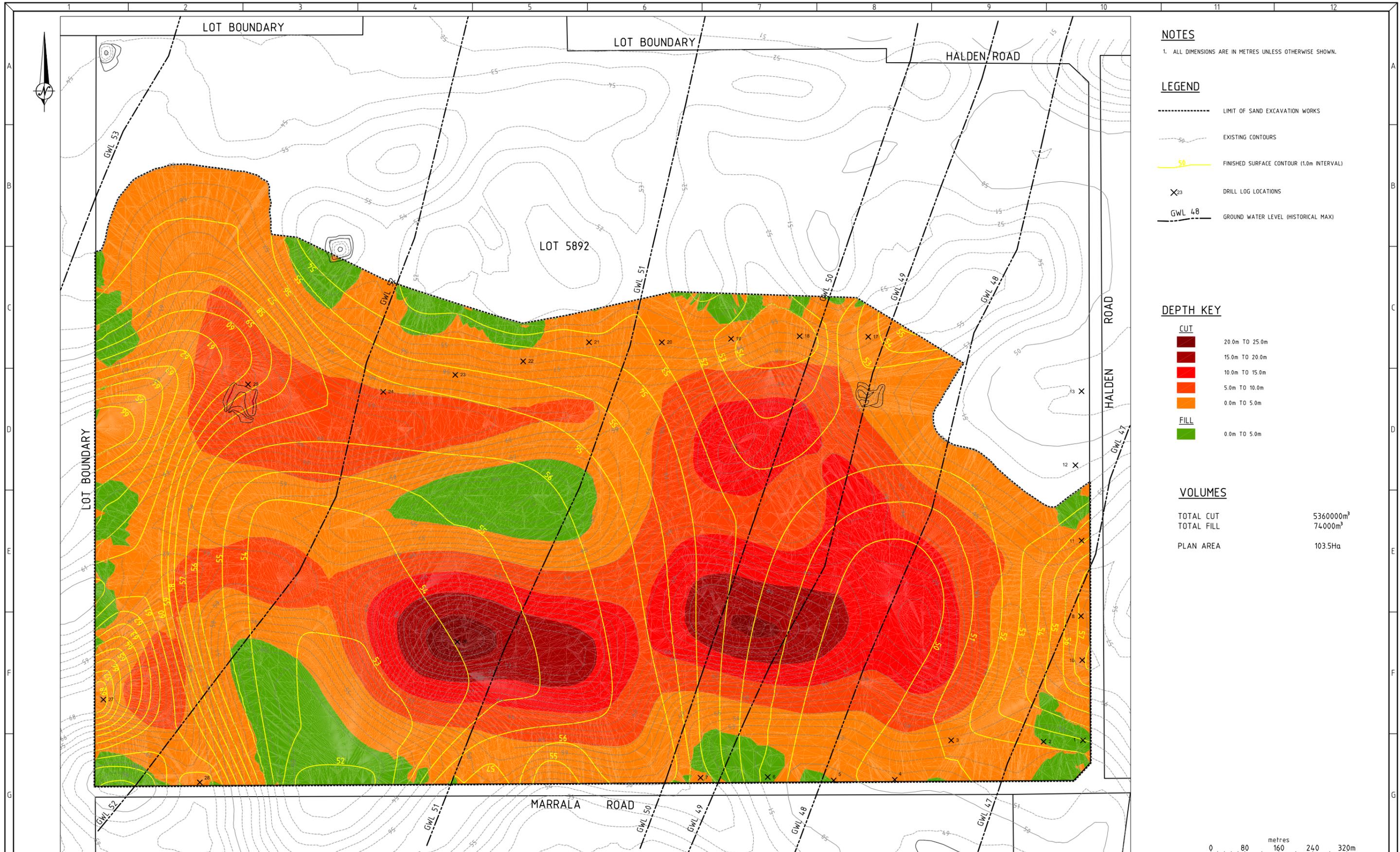
Tel: (08) 6436 1599
 Fax: (08) 6436 1500
 Email: info@mngsurvey.com.au
 www.mngsurvey.com.au
 ABN 90 009 363 311

Job No.	Type	Plan No.	Revision
104027	DE	003	A



APPENDIX C

APPROVED EXTRACTION LEVELS



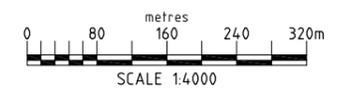
- NOTES**
1. ALL DIMENSIONS ARE IN METRES UNLESS OTHERWISE SHOWN.
- LEGEND**
- LIMIT OF SAND EXCAVATION WORKS
 - EXISTING CONTOURS
 - 50 FINISHED SURFACE CONTOUR (1.0m INTERVAL)
 - X₂₀ DRILL LOG LOCATIONS
 - GWL 48 GROUND WATER LEVEL (HISTORICAL MAX)

- DEPTH KEY**
- CUT**
- 20.0m TO 25.0m
 - 15.0m TO 20.0m
 - 10.0m TO 15.0m
 - 5.0m TO 10.0m
 - 0.0m TO 5.0m
- FILL**
- 0.0m TO 5.0m

VOLUMES

TOTAL CUT	5360000m ³
TOTAL FILL	740000m ³
PLAN AREA	103.5Ha

PLAN
SCALE 1:4000



REV	DATE	DRAWN	CHECKED	APPROVED	REVISION DESCRIPTION	REFERENCE DRAWINGS
A	22.08.07	DAH	JHG	MB	ISSUED FOR CLIENT REVIEW	

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NOTE
This drawing shall be preliminary only until the approved sections are signed.

JDSi
INFRASTRUCTURE & LAND DEVELOPMENT
3/5 Tully Road, East Perth Western Australia 6004
P: (08) 9225 4110 F: (08) 9225 4121

CLIENT:
**BRAJKOVICH HOLDINGS
STEFANELLI NOMINEES**

PROJECT:
LOT 5892 MARALLA ROAD
DRAWING TITLE:
EARTHWORKS PLAN

DRAWN DAVID HELLMUTH	SCALE 1:4000
DESIGNED JASON GRAY	DATUM AHD
PROJECT MANAGER MICK BEAVERSTOCK	CO-ORDS MGA 94
JDSi PROJECT No.: JDS07027	DRAWING No. C100
	REVISION A