ADW JOHNSON PTY LIMITED
ABN 62 129 445 398

Sydney
Level 35 One International Towers
100 Barangaroo Avenue
Sydney NSW 2000
02 8046 7411
sydney@adwjohnson.com.au

Central Coast
5 Pioneer Avenue
Tuggerah NSW 2259
02 4305 4300
coast@adwjohnson.com.au

Hunter Region
7/335 Hillsborough Road
Warners Bay NSW 2282
02 4978 5100
hunter@adwjohnson.com.au

Engineering

Working Beyond Expectations

Engineering Report Encompassing Civil Infrastructure, Flooding and Servicing

Link Road Holding

Planning Proposal for Amendment of Newcastle LEP 2012 & Lake Macquarie LEP 2014

Client
Eden Estates (Newcastle) Pty Ltd

Date:
December 2020

Document Control Sheet

Issue No.	Amendment	Date	Prepared By	Checked By
A	Draft	4/11/2020	AL	RK
B	Updated Issue	10/12/2020	AL	RK
C	Updated Issue	18/12/2020	AL	RK

Table of Contents

1.0 Introduction

ADW Johnson (ADWJ) has been engaged by Eden Estates to prepare this engineering report to support the Planning Proposal for an amendment to the Lake Macquarie Local Environmental Plan (LMLEP) 2014 and the Newcastle Local Environmental Plan 2012 in relation to a 574-hectare parcel of land within the suburbs of Glendale, Edgeworth, Cameron Park, Wallsend and Elermore Vale (hereafter referred to as 'the site'). The site is owned by Eden Estates (Newcastle) Pty Ltd.

This report provides commentary on the engineering principles which underpin the developability of the site.

Figure 1 shows the site location and **Figure 2** shows the site context with respect to land ownership.

The site is one of the most strategically well-located housing release areas within the Greater Newcastle Metropolitan Plan Area. It is the closest housing release area to the metropolitan core. It sits within a regionally significant catchment and growth area. The site is well connected to the City and inter-regional road and rail connections providing an opportunity to enhance local multi-model transport options. The site sits within the catchment of regional and local open space, recreation and sporting areas that continue to be enhanced and expanded.

The planning proposal is supported by a preliminary structure plan (drawing 055.WS.010-04 prepared by Urbanco), which is shown in **Figure 4.**

In addition to the site, there is adjacent land that, with the consent of the owners and planning authorities can logically be planned in conjunction with the site. This land includes;

- Road Reserves within the site (20ha);
- The area between the site and Maryland Creek in the vicinity of Boundary Road and Downie Lane (9ha). This area is currently rural acreage with a number of private owners;
- The area between the site and an unnamed tributary of Ironbark Creek (10ha). The land is in one ownership and is currently zoned R2;
- A parcel of land within the site owned by Hunter Water (2ha).

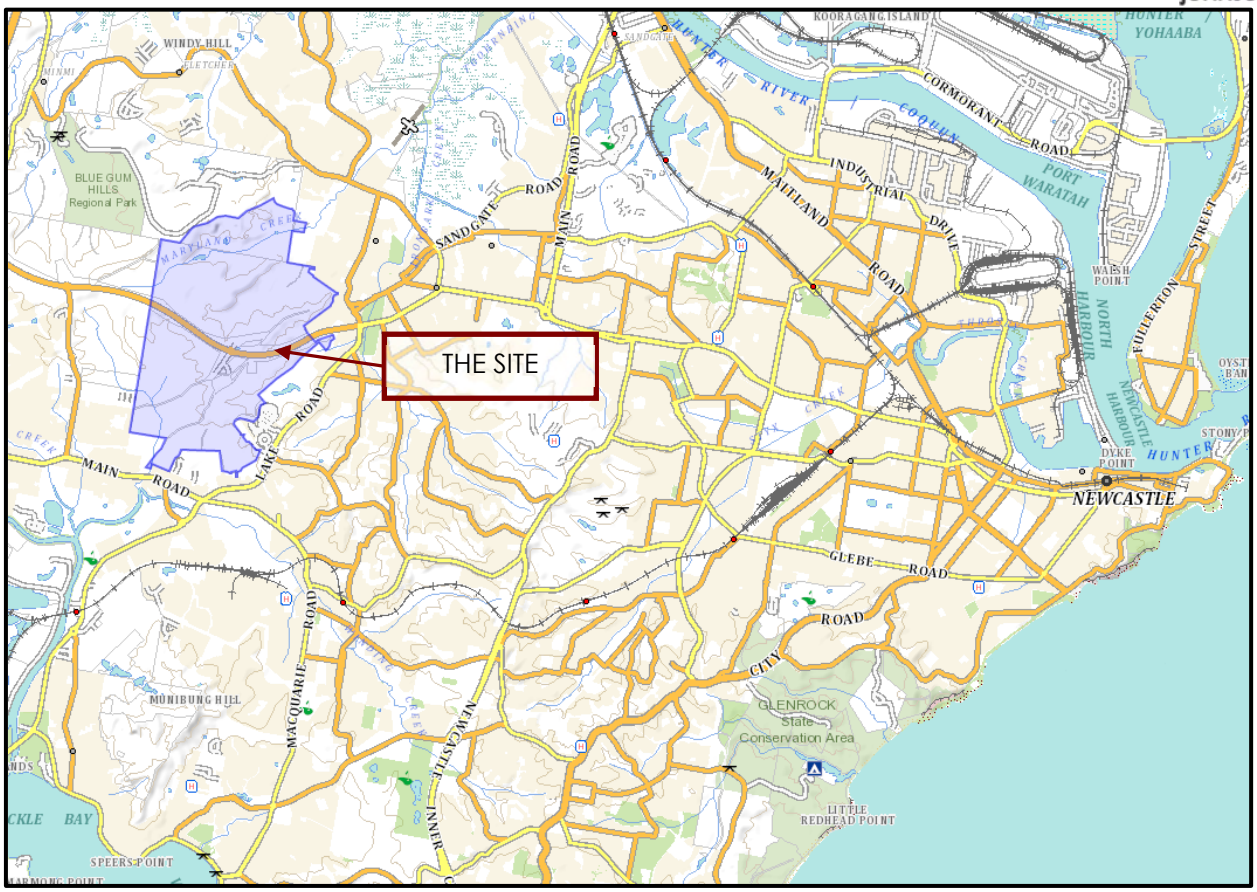


Figure 1: Site Location.

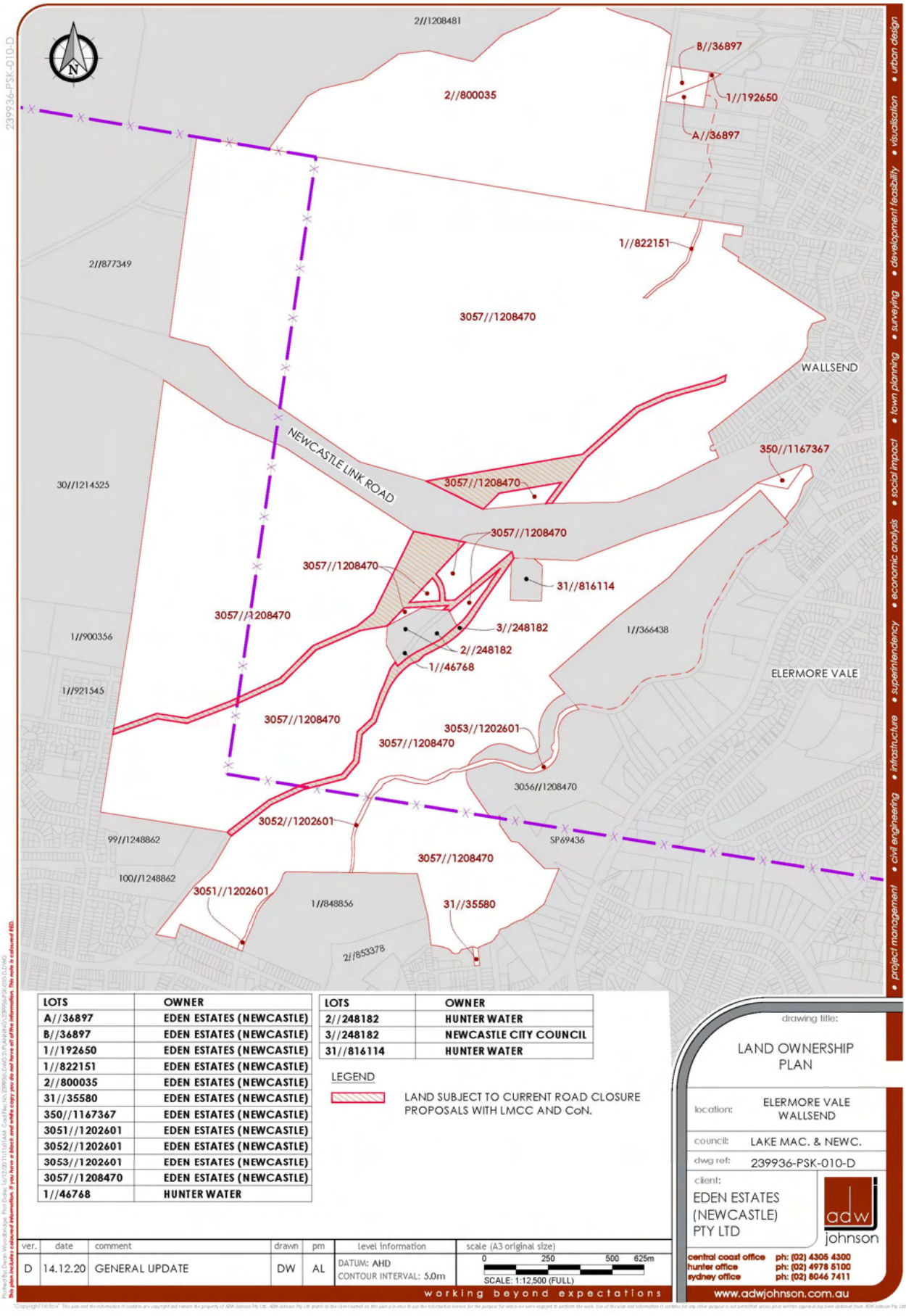


Figure 2: Land Ownership

1.1 LOCATION/EXISTING LAND USE

The site is approximately 574ha comprised of eleven separate properties as identified in ***Figure 2***. The site is located within the suburbs of Glendale, Edgeworth, Cameron Park, Wallsend and Elermore Vale. The north-eastern portion of the site is in the City of Newcastle (CoN) Local Government Area (LGA) and the south-western portion of the site is in the Lake Macquarie City Council (LMCC) LGA.

The site is former mining land with a history of underground and concentrated areas of surface mining. The site has been remediated under a mine closure plan.

We note the following site attributes:

- The site is bound by the Summerhill Waste Management Centre to the north;
- The site is bound by existing residential and commercial land to the east;
- The site is bound by future residential development (Winten's Minmi development) to the west;
- The site is bound by residential land and the Glendale TAFE campus to the south;
- The site is bisected by the Newcastle Link Road;
- The site surrounds the Elermore Vale Water Reservoirs;
- Maryland Creek and tributaries run through the site towards the north-eastern edge of the site;
- A tributary of Ironbark Creek runs west to east through the site in the south-eastern corner of the site; and
- Brush Creek and tributaries, and a tributary of Winding Creek run north to south through the site in the southern-western corner of the site.

The site is currently vacant.

1.2 TOPOGRAPHY

The site comprises a generally undulating landscape, with local high points, ridges and gullies traversing the site.

Ground-truthed LIDAR survey indicates that surface levels within the site range from its lowest point, being approximately RL 7m AHD around the watercourse in the south-western corner of the site, to approximately RL 95m AHD on a ridge in the northern portion of the site.

The majority of the site is of moderate slope (5-15% in grade) although some sections of the site have steep slopes (exceeding 20%). The steeper slopes are primarily associated with the ridgeline that runs north-south through the site.

The site is largely vegetated noting cleared areas, the result of former surface mine workings and infrastructure.

The existing topography is illustrated by the topographic plan in ***Figure 3***.

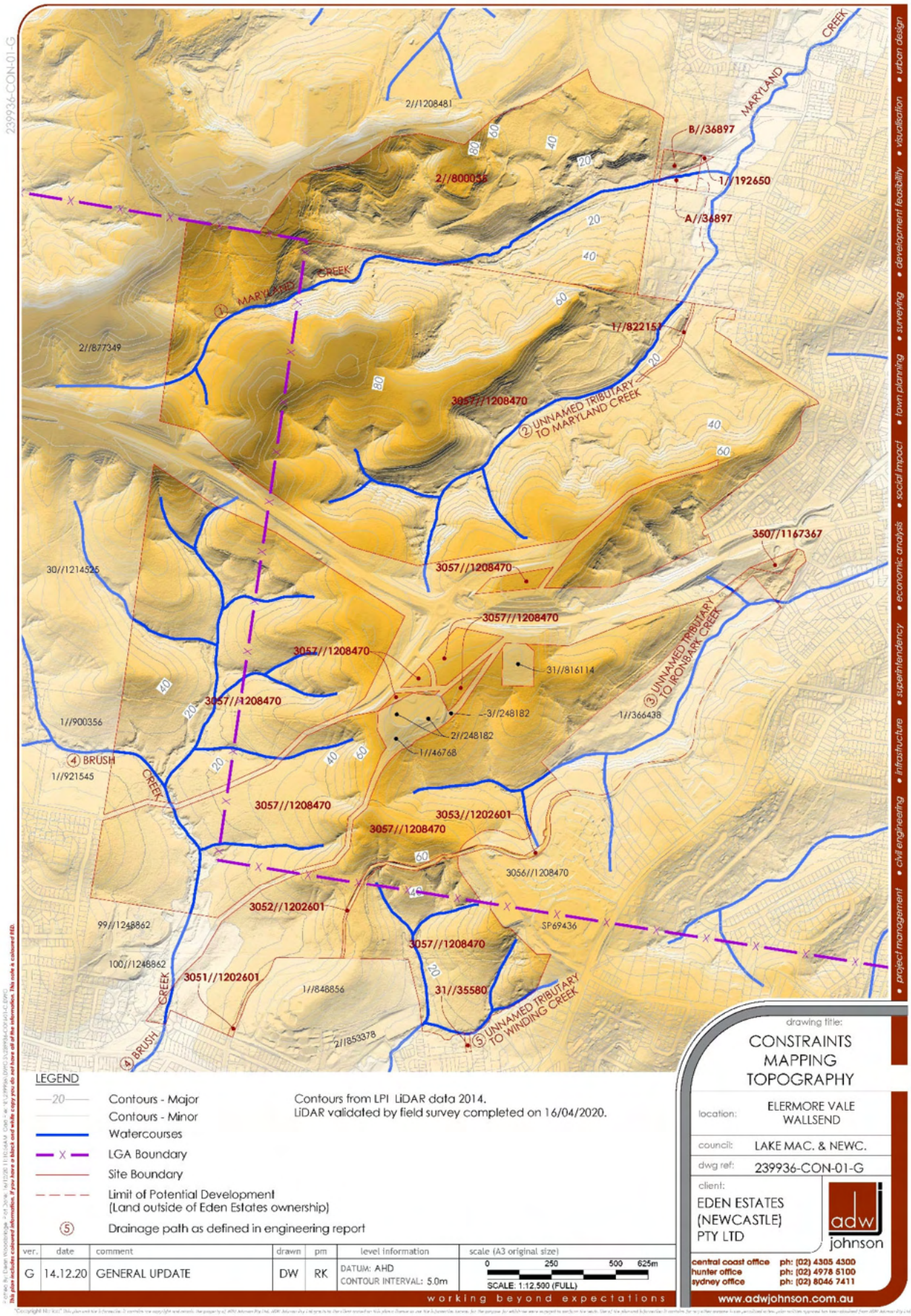


Figure 3: Topographic Plan

1.3 EXISTING DRAINAGE

Five watercourses drain the majority of the site as follows;

1. Maryland Creek - Traverses the site, exiting at a north-eastern boundary before meandering in a north-easterly direction before joining Ironbark Creek and discharging to the Hunter River;
2. Unnamed Tributary to Maryland creek – Exits the site at a north-eastern boundary before joining watercourse 1 (Maryland Creek);
3. Unnamed Tributary of Ironbark Creek – Exits the site at an eastern boundary before meandering in a northerly direction and joining Ironbark Creek;
4. Brush Creek – Unnamed tributaries join Brush Creek within the site before Brush Creek exits the site at a south-western boundary. Brush Creek meanders in a southerly direction before joining Cockle Creek and discharging to Lake Macquarie;
5. Unnamed Tributary of Winding Creek – Exits the site at a south-eastern boundary before joining watercourse 4 (Brush Creek).

It is noted that approximately 1200m of Maryland Creek has been realigned adjacent to former mining operations to follow a 330kV electrical easement.

The watercourse network is shown in ***Figure 3.***

2.0 Intended Land Use

2.1 INTENDED LAND USE

Urbanco have prepared a Preliminary Structure Plan for the site describing potential development areas. The Structure Plan indicates the following intended land uses;

- Conservation Land;
- Residential;
- Commercial;
- Employment;
- Open Space / Recreation;
- Education.

The Structure Plan is shown in ***Figure 4***.

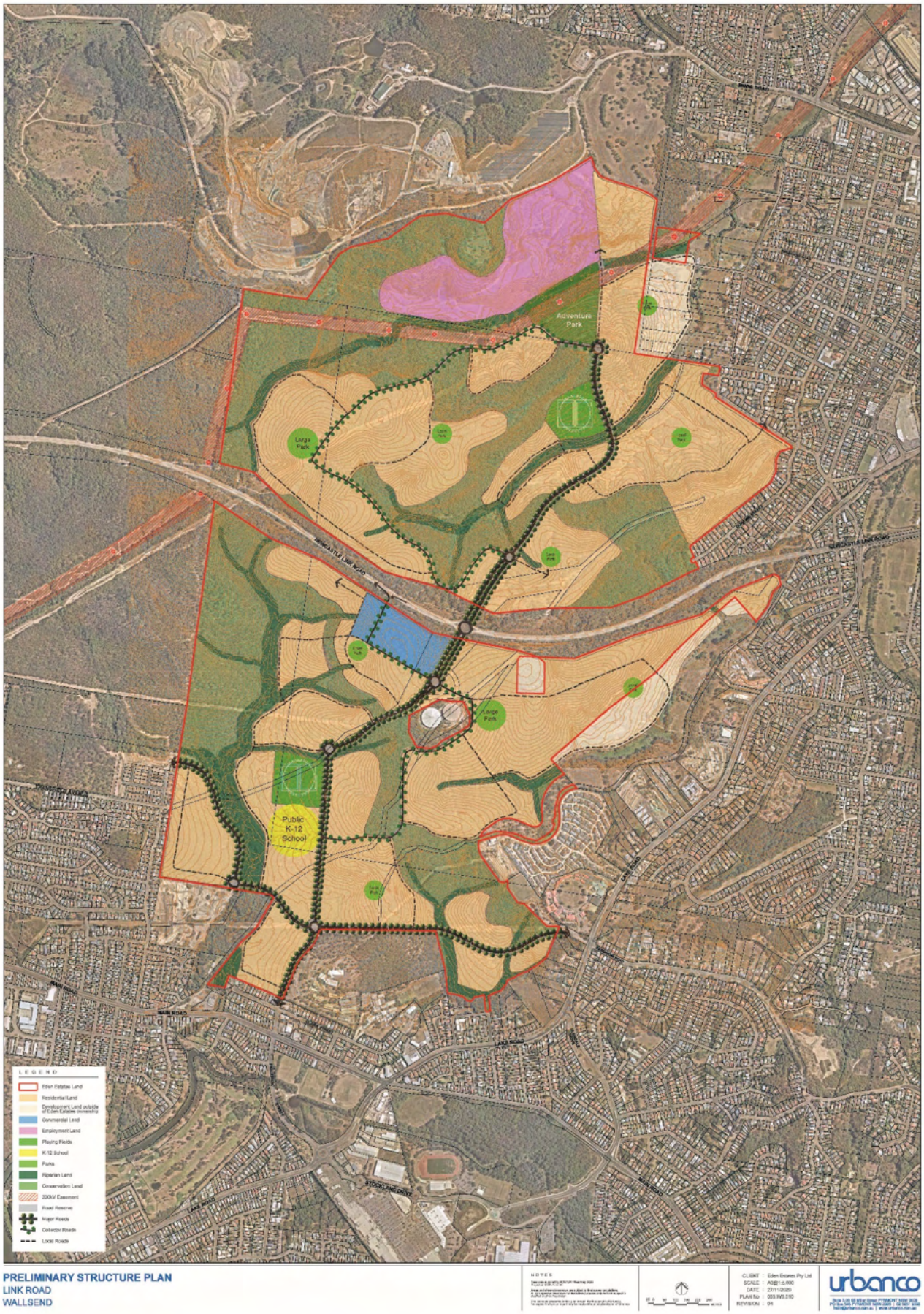


Figure 4: Preliminary Structure Plan (Urbanco Dwg 055.WS.010-04)

3.0 Engineering Principles

3.1 FLOODING

A review of LMCC and CoN flood mapping indicates that the developable areas of the site are unaffected by regional flooding. Flood planning maps have been obtained from both LMCC and CoN LEPs and flood prone land is identified in ***Figure 5***.

Stormwater controls, discussed in ***Section 3.3,*** shall be provided in order to control local flooding as a result of the development.

Flooding does not inhibit the developability or potential rezoning of the site, noting minor impacts at the south-western extremity of the site which is contained to riparian land which will remain undeveloped.

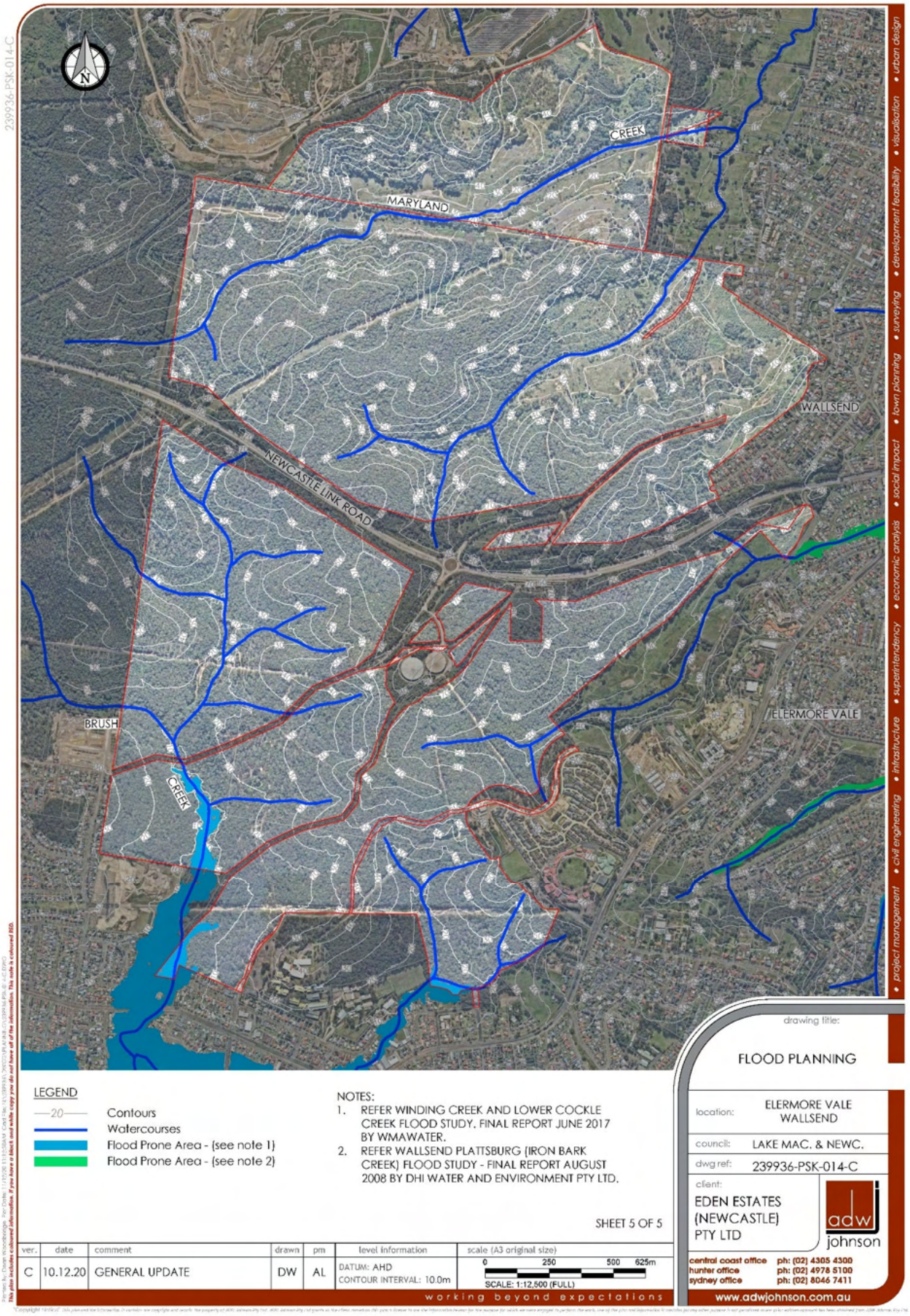


Figure 5: Flood Planning Map

3.2 BULK EARTHWORKS

The topography of the site is a generally undulating landscape, with local ridges and gullies traversing the site. The majority of the site is of moderate slope (5-15% in grade) although some sections of the site have steep slopes (exceeding 20%).

A slope analysis of the site has been undertaken. ***Figure 6*** highlights the areas within the site with slopes of 20-25%, 25-30% and >30%.

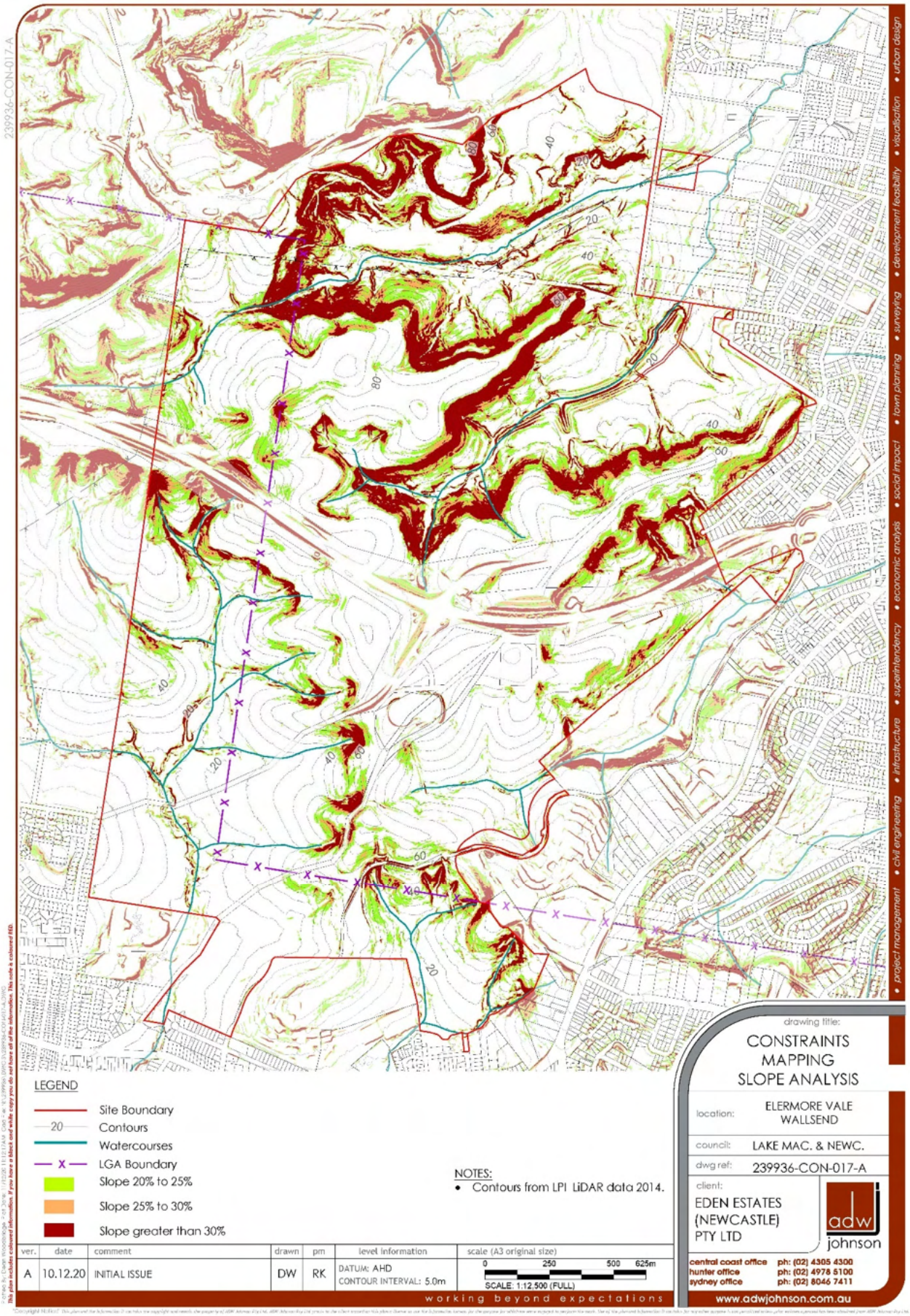


Figure 6: Slope Analysis Plan

Areas of slope >20% have generally been excluded from the proposed development footprint noting discrete areas which will allow reshaping using normal engineering practices to create road connections and some smaller pockets and edges within footprint areas.

It is proposed to bench areas with a grade of 5-10% with retaining walls between residential lots. Site grading of this nature is also ideal in providing adequate drainage for a subdivision development.

Bulk earthworks are proposed in areas of grades between 10-20% to generate a landform more suitable for urban development and realise the development potential of the site. The resultant landform will also be benched and retained.

It is intended that material excavated from cut areas will be reused in fill areas as engineering fill compacted under geotechnical supervision to achieve appropriate lot classifications supporting residential foundations (typically raft slab). It is anticipated that bulk earthworks operations will be undertaken in a number of stages.

The site's landform is appropriate for development. The majority of the site (grading at less than 20%) can be developed utilising standard engineering and construction practices. The site is also surrounded by completed and approved development, emphasising the developability of the area's topography.

3.2.1 Areas of Fill Relating to Previous Surface Mining

Areas of the northern portion of the site were subject to surface mining operations. Douglas Partners have carried out site investigations, including underground investigation to identify the extent, composition and depth of the areas of fill. The outcomes of the Douglas Partners investigations are detailed in their report 91610.05 dated December 2020.

These areas of fill are shown in ***Figure 7*** and are located in the north-eastern portion of the site, around the former Wallsend No. 2 Colliery pit top areas. The surface mining operations resulted in deep excavations that have been filled with material won as a result of mining operations.

Within report 91610.05, Douglas Partners discuss the ability to achieve the following hierarchy of land uses with consideration for combustibility, acid generation potential and geotechnical condition of the existing fill;

- No development (allow the area to regenerate bushland / Biodiversity Stewardship);
- Open Space (such as sporting fields);
- Commercial development; or
- Residential development, including roads, services and buildings.

Report 91610.05 outlines possible avenues to achieve each land use. In most cases the pathway to each land use involves earthworks such as removal, replacement and compaction of material and/or blending or capping of material. Based on our experience on similar and adjacent sites, these outcomes are achievable with industry-standard earthworks techniques.

Areas of former surface mining operations and resulting deep fill do not inhibit the developability and potential rezoning of the land. These areas can be remediated to achieve a number of land uses through earthworks techniques which have been considered in the selection of the development footprint.

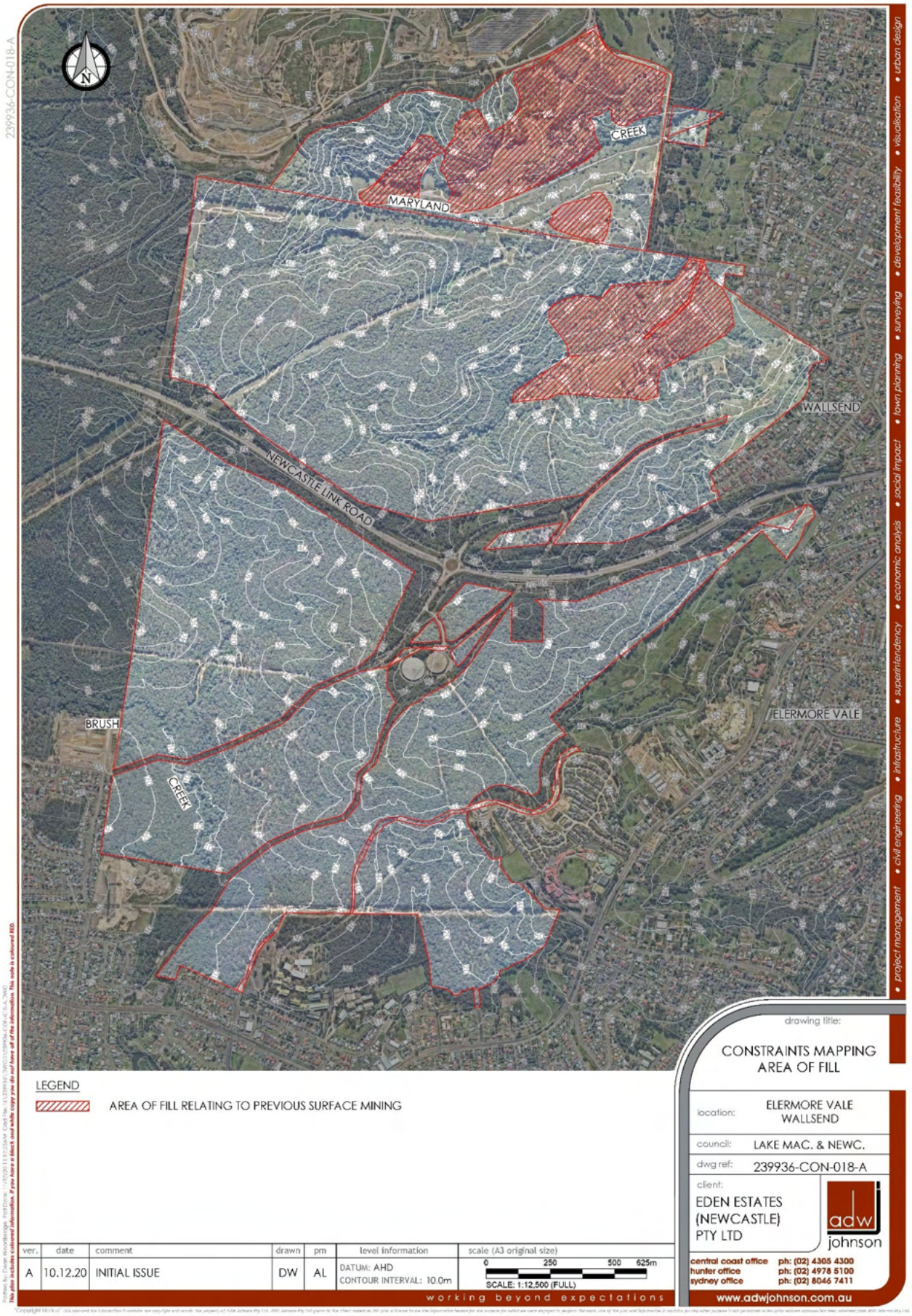


Figure 7: Areas of Fill Relating to Previous Surface Mining

3.3 STORMWATER

As outlined in Section 1.3 "Existing Drainage", five main watercourses drain the vast majority of the site. Stormwater runoff across the site currently flows towards the existing watercourses as a consequence of the fall of the natural topography. Watercourses in the north flow via Maryland Creek and Ironbark Creek toward the Hunter River and watercourses in the south flow via Brush Creek and Cockle Creek toward Lake Macquarie. A portion of the southern area of the site flows to Winding Creek before it joins Brush Creek.

The future development of the site will alter the existing landform and generate impervious areas which in turn will lead to an increase in stormwater runoff from the site. The increased post-development stormwater runoff will be detained on-site to match pre-development conditions in accordance with standard development practices adhering to LMCC and CoN engineering requirements.

The topographic features of the site, specifically the location of ridges and gullies, creates up to seventeen stormwater sub-catchments across the development area. A catchment plan for the site is shown in ***Figure 8***.

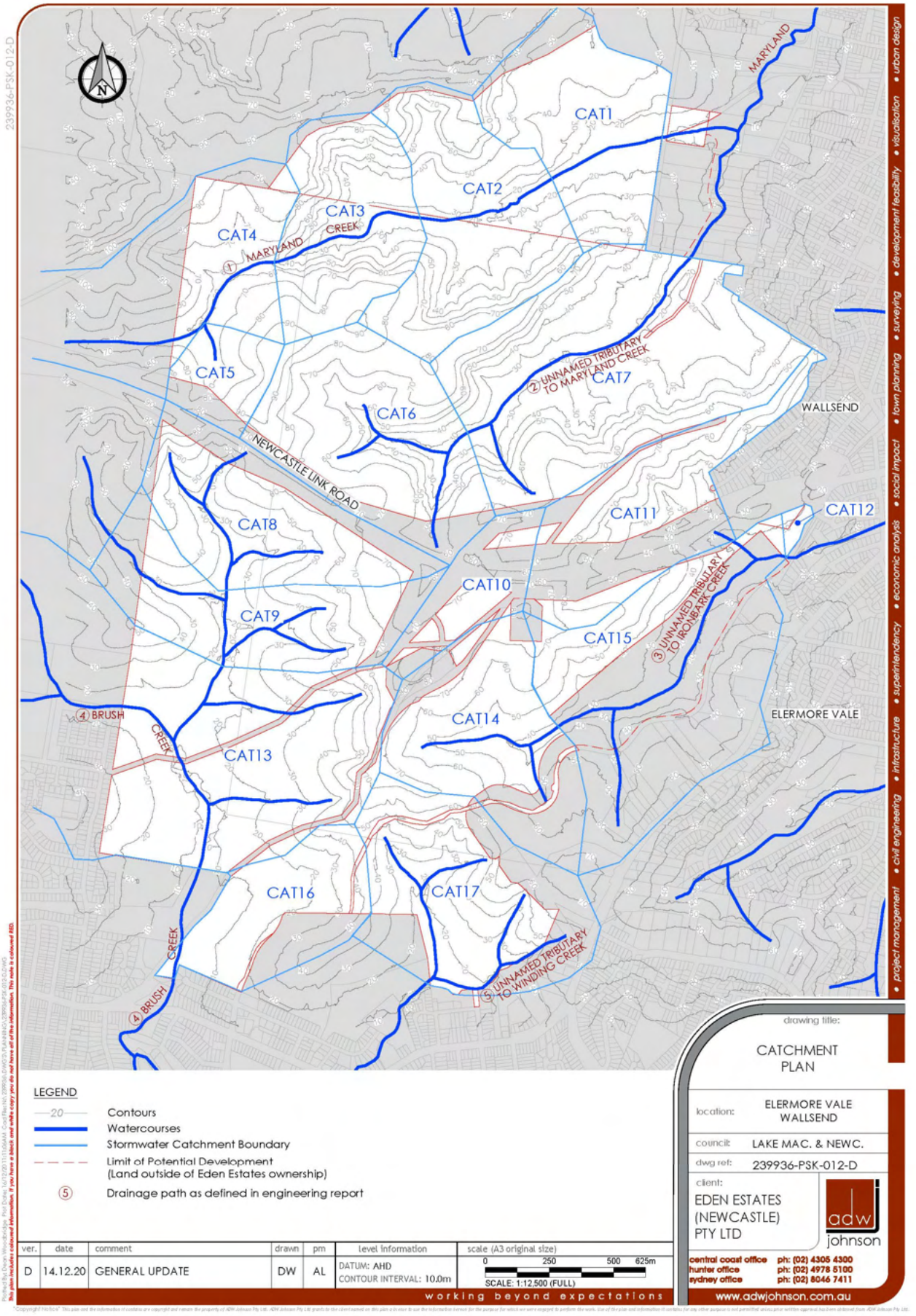


Figure 8: Catchment Plan

These sub-catchments drain to the five existing discharge points. It is possible to consolidate flows from a number of the sub-catchments into more central locations to minimise the number of detention basins required which will also assist in reducing ongoing future maintenance costs. The ideal location for the majority of these detention basins would be directly adjacent to the existing watercourses or on-line within the first-order streams. Existing dams on-line within watercourses will be utilised for stormwater management where possible. An example is the existing dam within Maryland Creek.

It is typical for watercourses within or directly adjacent to development to be protected, restored and rehabilitated in order to maintain and/or improve the shape, stability and ecological functions of each watercourse under agreed principles for;

- riparian corridor widths;
- riparian corridor rehabilitation;
- riparian buffers and planting densities; and
- detention basin locations.

These works would be carried out in accordance with the Natural Resources Access Regulator (NRAR) guidelines as required. We note that riparian realignment and removal is also catered for within the guidelines and is typically subject to a Vegetation Management Plan to provide compensatory riparian land and biodiversity offsets where necessary. The structure plan maintains all but one watercourse (1st Order) and provides additional riparian land within vegetation corridors along Brush Creek to compensate for the removal.

A high-level concept design has been prepared on the following basis;

1. Existing dams could be retrofitted and used for detention/water quality purposes;
2. New basins (where required) could be constructed "online" or adjacent to the riparian corridor with integrated stormwater quality and detention management in accordance with Council and NRAR guidelines;
3. Some stormwater quality and detention management will occur within future development infrastructure prior to discharge to watercourses.

Figure 9 demonstrates a possible strategy for stormwater management based on a high-level review. We note that this is one possible option to demonstrate an outcome is achievable and we acknowledge that the final outcome will be subject to approval under the Development Application (Council) and Controlled Activity (NRAR) processes including consideration of ecological and Aboriginal value and outcomes as they evolve.

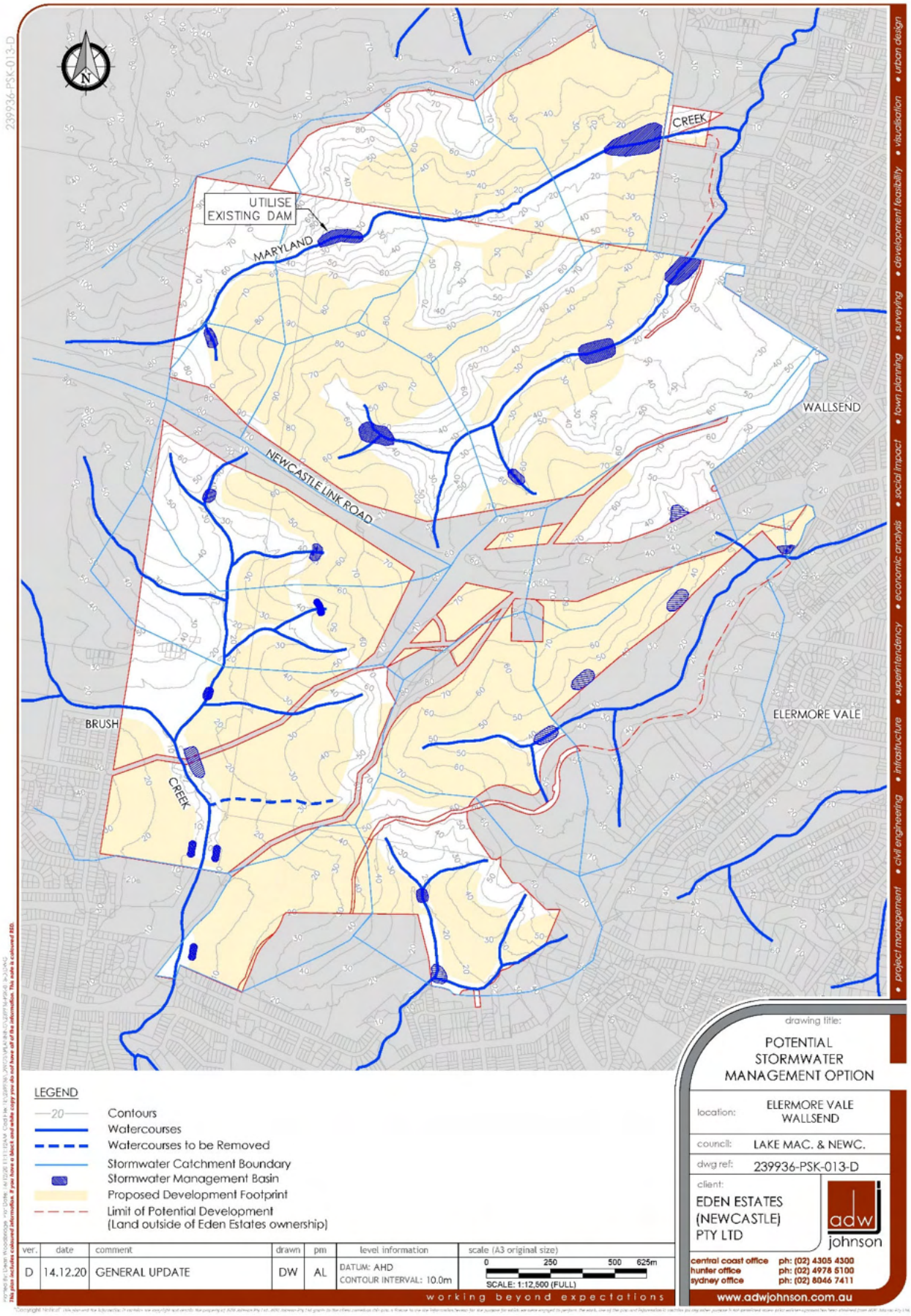


Figure 9: Concept Stormwater Management Plan

Detailed stormwater quality control measures will be incorporated into the future subdivision design to ensure that all water leaving the site meets the required pollutant reduction criteria. Gross pollutant traps, swale drains, constructed wetlands/ponds and sedimentation basins are controls that could be implemented to meet the target objectives for stormwater quality in accordance with Council and NRAR requirements. Details of water quality controls will be provided as part of a stormwater management plan to be completed during the development application process.

Our concept stormwater design demonstrates that the development can be drained with industry standard drainage techniques in accordance with LMCC and CoN engineering requirements. We note that the site carries the following site-specific efficiencies further demonstrating its developability:

- **Moderate sloping topography (minimising stormwater system sizes);**
- **Possibility of reusing existing dams; and**
- **Minimal trunk drainage infrastructure requirements (culverts).**

3.4 SERVICES

We have carried out a review of servicing requirements for the development of the site including:

- Water;
- Wastewater;
- Electrical;
- Communication; and
- Gas.

Water – Hunter Water Corporation

We have held consultation with Hunter Water Corporation (HWC) with regard to development of the site based on the preliminary structure plan by way of two meetings and additional telephone discussions. We have received Preliminary Servicing Advice from HWC and it is attached at ***Appendix A***. The Preliminary Servicing Advice acknowledges that the structure plan can be serviced and that details of water infrastructure and connection requirements are to be confirmed by a developer-funded water strategy as is normal development practice.

The site is supplied by the Elermore Vale Reservoirs located within the site. Large diameter water trunk mains, supplied by the reservoirs, run through the site and connection to these existing trunk mains is possible. The location of existing water infrastructure is shown in ***Figure 10.***

The Elermore Vale Reservoirs are located with a top water level of RL88m. Development land within the site above RL66m will require a booster pumping station. Development land below RL28m may require pressure reduction measures such as a pressure reducing valve.

The Preliminary Servicing Advice acknowledges the large scale and preliminary nature of the development proposal and provides only broad connection information that will form the base information for development of the water strategy

The full site is able to be serviced by water infrastructure. Due to the proximity to, and capacity within the existing water network, water infrastructure works to service the site are considered minimal with regard to normal development practices.

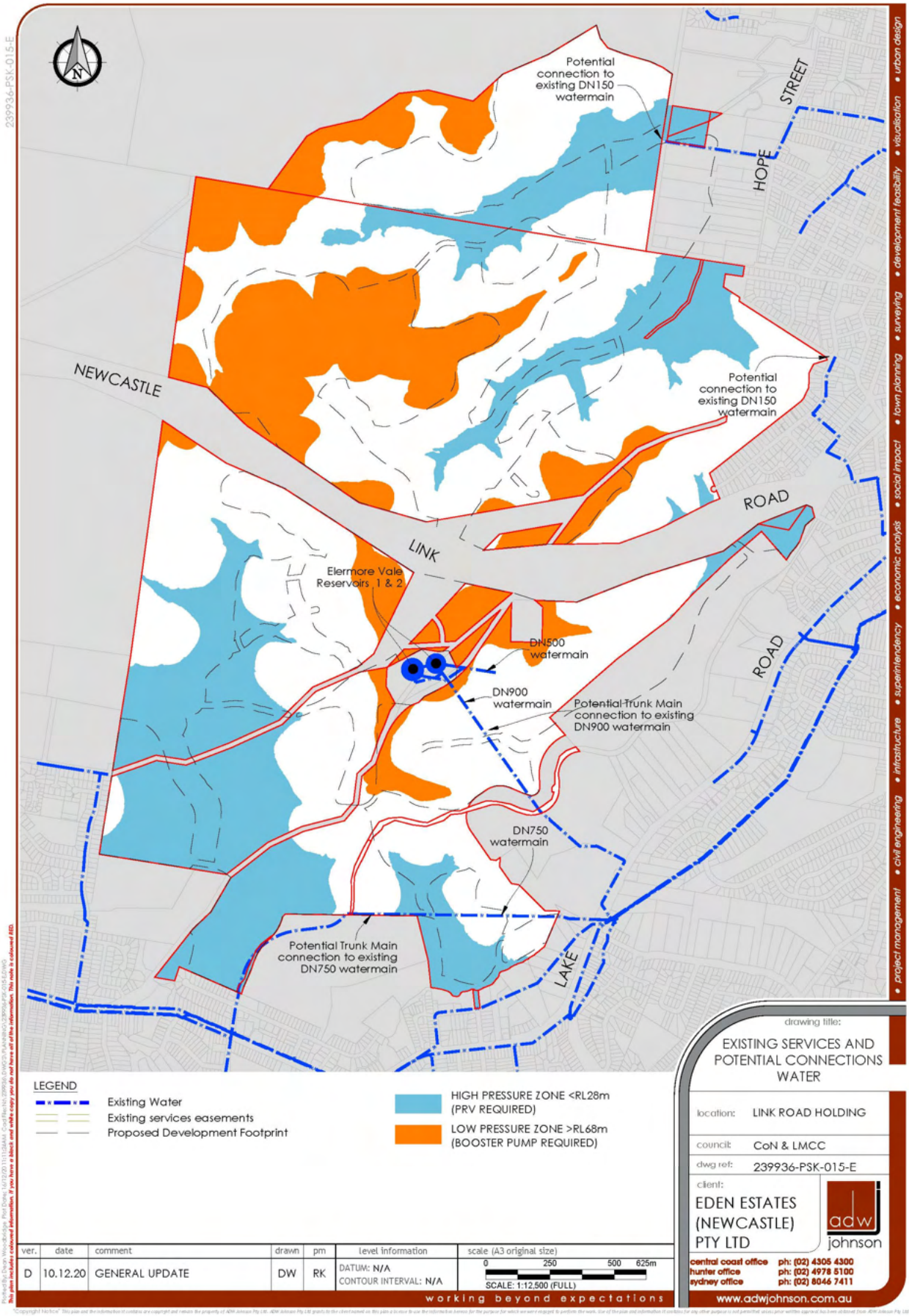


Figure 10: Existing Water Infrastructure and Potential Connections

Wastewater – Hunter Water Corporation

We have held consultation with Hunter Water Corporation (HWC) with regard to development of the site based on the preliminary structure plan by way of two meetings and additional telephone discussions. We have received Preliminary Servicing Advice from HWC and it is attached at ***Appendix A***. The Preliminary Servicing Advice acknowledges that the structure plan can be serviced and that details of wastewater infrastructure and connection requirements are to be confirmed by a developer-funded sewer strategy as is normal development practice.

The topography of the land divides the site into four sewer catchments. Catchments 1 and 3 will ultimately drain to Edgeworth Wastewater Treatment Works and Catchments 2 and 4 will drain to Shortland Wastewater Treatment Works. The sewer catchments are shown in ***Figure 13***.

A potential wastewater servicing strategy for each catchment is as follows;

- Catchment 1 – South West;

  Catchment 1 is likely to be serviced by making connection to the existing DN225 gravity main draining to the Cardiff No. 1 Waste Water Pump Station (WWPS) catchment. The main was recently constructed by adjacent development and allows spare capacity for development of a portion of the site.

- Catchment 2 – East;

  Catchment 2 is likely to require a new gravity main to drain the catchment to the Wallsend SF WWPS catchment with likely connection near Wallsend Oval.

- Catchment 3 – South East;

  Catchment 3 is likely to require a new gravity main to drain the catchment to the Cardiff No.1 WWPS catchment, likely via Ferndale Street and Stephens Street with connection into an existing DN225 main in Lake Road.

- Catchment 4 – North of the Link Road;

  Catchment 4 is likely to require a new Wastewater Pump Station (WWPS) along with a rising main to discharge into the Wallsend SF WWPS catchment area.

The potential upgrade of the sewer network aligns with HWC growth policies and recent NSW Government Investment in the surrounding network (Minmi 3 Wastewater Pump – Housing Acceleration Funding).

HWC have been supportive of this approach in our consultation with them and the above will be one option included in the wastewater strategy.

The sewer catchments, existing trunk infrastructure and potential servicing connections are shown in ***Figure 11***.

The full site is able to be serviced by sewer infrastructure. Due to its proximity to, and capacity within the existing network, sewer infrastructure works to service the site are considered to be low with regard to normal development practices.

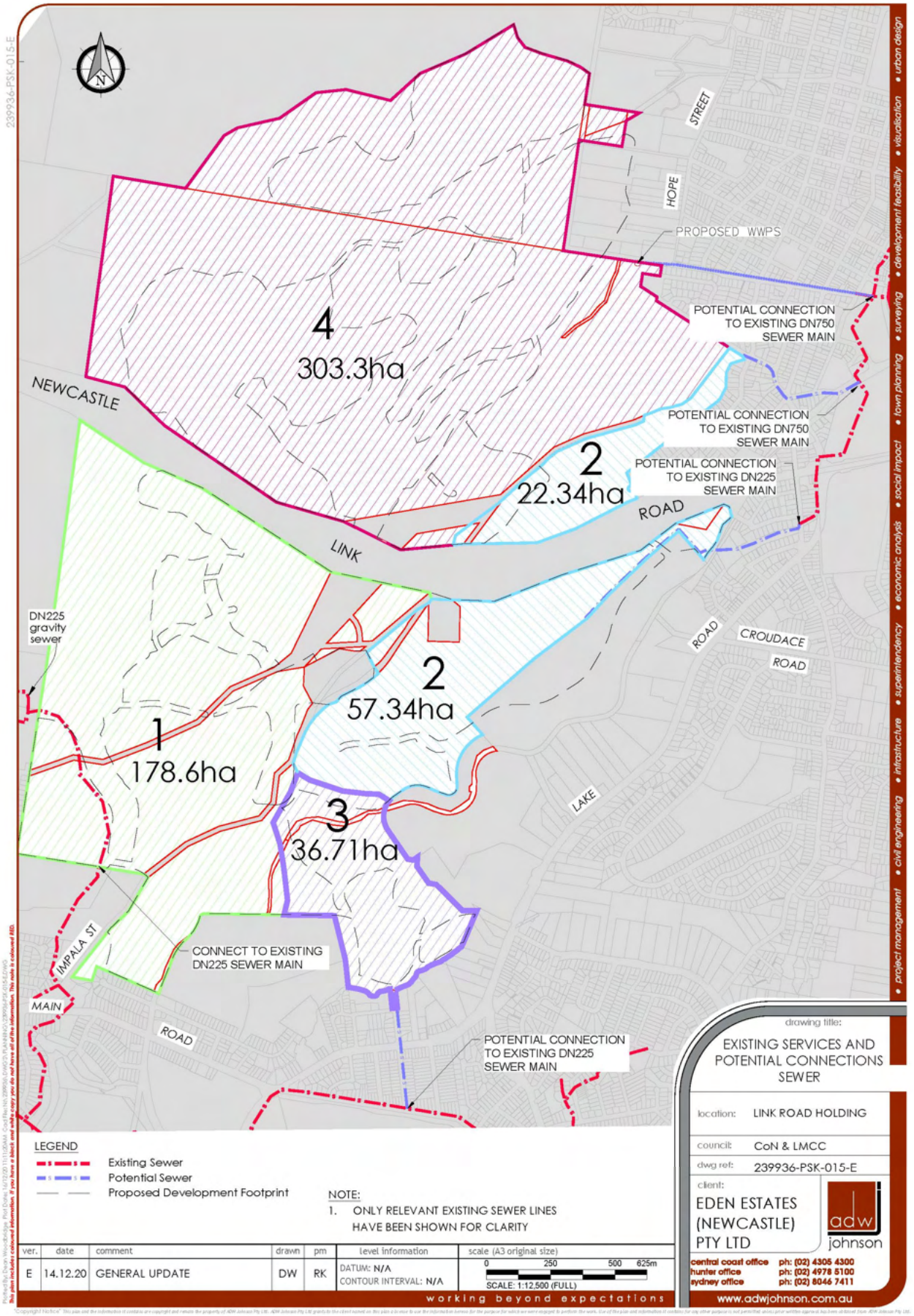


Figure 11: Existing Wastewater Infrastructure and Potential Connections

Electricity – Ausgrid

An electrical infrastructure overview has been undertaken by Power Solutions Pty Ltd for the site ***(Appendix B)***. Existing electrical infrastructure is shown in ***Figure 12***.

Power Solutions have confirmed that the site is likely capable of being serviced by the two existing Ausgrid 11kV feeders within the site. It is also noted that the Maryland Zone Substation has two spare 11kV feeders, to which connection can be made if required.

Two Ausgrid 132kV transmission lines traverse the site and are unsuitable for connection to the site. It is noted that these lines may be relocated (underground or overhead) in accordance with Ausgrid's network standards in order to complement the final development footprint.

It is proposed that the 330kV TransGrid line that traverses the site is left undisturbed.

The proposed development has access to two existing Ausgrid 11kV feeder with additional redundancy available via Maryland Zone Substation. The development can be serviced via the standard Ausgrid Contestable process.

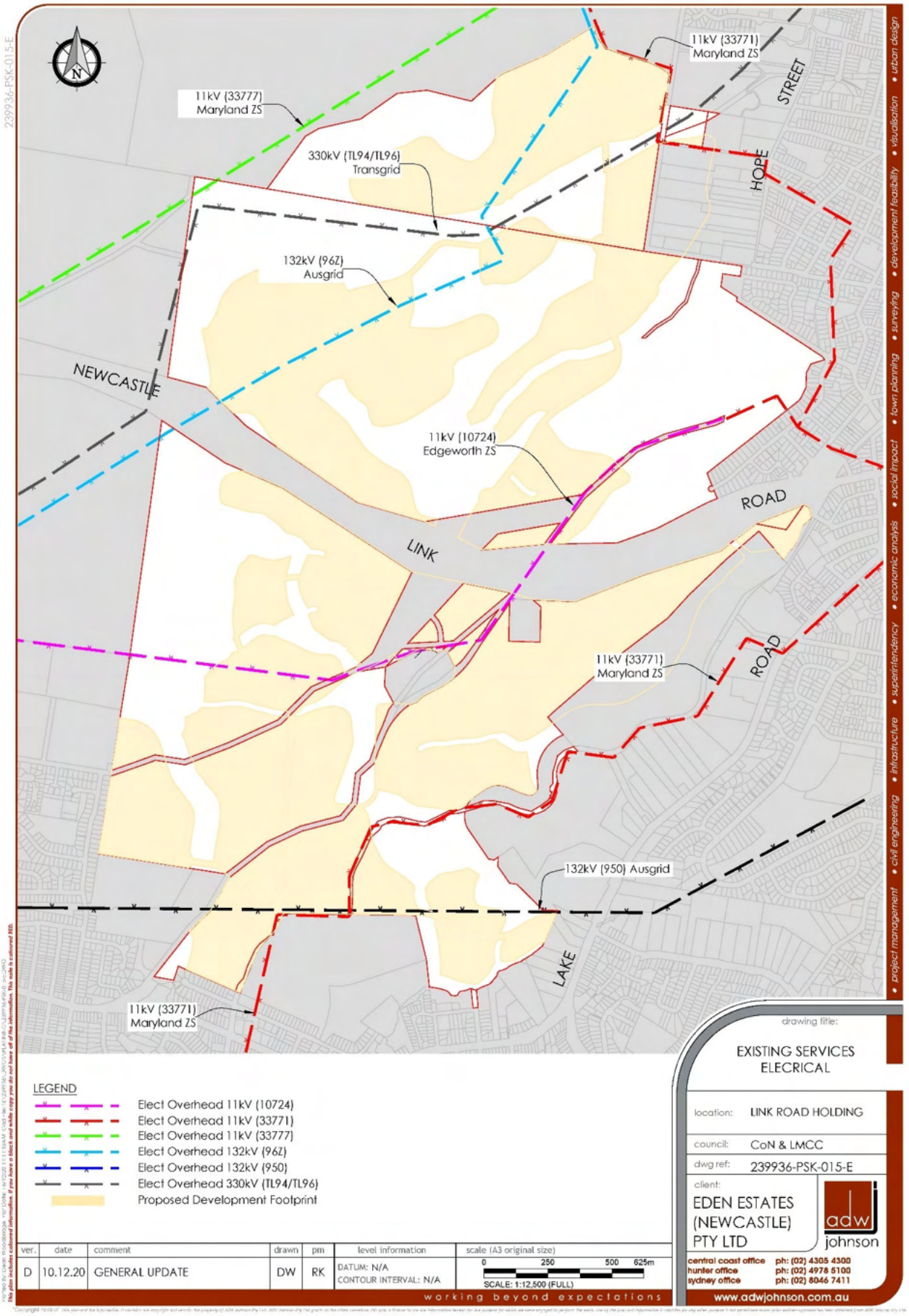


Figure 12: Existing Electrical Infrastructure

Communications – NBN Co.

NBN Co are obligated to provide NBN telecommunications connection to all new developments. It is noted that there is existing NBN infrastructure in both the Newcastle Link Road, which bisects the site, and on Lake Road, immediately adjacent to the site to the east. It is likely that some infrastructure backhaul will be required; the extent of works will be determined by NBN Co once an application for connection is made. It is noted that this is routine development practice.

Communications infrastructure will be available as development proceeds and as such, communications servicing does not inhibit the developability and potential rezoning of the site.

Gas – Jemena

There is an existing high-pressure gas main that runs along Rundle Avenue and Lake Road to the east of the site and Main Road to the south of the site. Jemena will not provide conclusive servicing advice until a connection application is made. It is noted that where supply is available that Jemena will typically provide mains and reticulation at no cost where a common services trench is provided to them. Although it is not essential to the development, it appears that gas connection is available, however this cannot be confirmed until a connection application is made.

Gas is not a necessity for the development process however, it appears that connection can be made. Gas servicing does not inhibit the developability of the site.

4.0 Conclusion

We have carried out a review of engineering principles related to planning of the site in accordance with the structure plan.

Our review included investigation of the following principles to ascertain the developability of the site in support of the rezoning;

- Flooding
- Bulk Earthworks
- Areas of Fill Related to Previous Surface Mining
- Stormwater Management
- Services Infrastructure
    - Water – Hunter Water Corporation
    - Wastewater – Hunter Water Corporation
    - Electricity – Ausgrid
    - Communications – NBN Co.
    - Gas - Jemena

Our review and investigation found the following;

Flooding
Flooding does not inhibit the developability or potential rezoning of the site. We note minor impacts at the south-western extremity of the site contained to riparian land which will remain undeveloped.

Bulk Earthworks
The site's landform is appropriate for development. The majority of the site (grading at less than 20%) can be developed utilising standard engineering and construction practices. The site is also surrounded by completed and approved development, emphasising the developability of the area's topography.

Areas of Fill Relating to Previous Surface Mining
Areas of former surface mining operations and resulting deep fill do not inhibit the developability and potential rezoning of the land. These areas can be remediated to achieve a number of land uses through earthworks techniques which have been considered in the selection of the development footprint.

Stormwater Management
Our concept stormwater design demonstrates that the development can be drained with industry standard drainage techniques in accordance with LMCC and CoN engineering requirements. We note that the site carries the following site-specific efficiencies further demonstrating its developability:

- Moderate sloping topography (minimising stormwater system sizes);
- Possibility of reusing existing dams; and
- Minimal trunk drainage infrastructure requirements (culverts).

Services

Water – Hunter Water Corporation
The full site is able to be serviced by water infrastructure. Due to the proximity to, and capacity within the existing water network, water infrastructure works to service the site are considered minimal with regard to normal development practices.

Wastewater – Hunter Water Corporation
The full site is able to be serviced by sewer infrastructure. Due to its proximity to, and capacity within the existing network, sewer infrastructure works to service the site are considered to be low with regard to normal development practices.

Electricity - Ausgrid
The proposed development has access to two existing Ausgrid 11kV feeder with additional redundancy available via Maryland Zone Substation. The development can be serviced via the standard Ausgrid Contestable process.

Communications – NBN Co.
Communications infrastructure will be available as development proceeds and as such, communications servicing does not inhibit the developability and potential rezoning of the site.

Gas – Jemena
Gas is not a necessity for the development process however, it appears that connection can be made. Gas servicing does not inhibit the developability or potential rezoning f the site.

Our review of engineering principles including civil construction, flooding and infrastructure servicing supports development of the site on the basis that the development outcomes are achievable utilising standard engineering and construction practices. In the case of stormwater, water, wastewater and electrical servicing the site can be developed with greater efficiency than many other release areas in the Hunter owing to existing infrastructure on site and the site's proximity to, and capacity within the existing services networks.

Appendix A

HUNTER WATER CORPORATION PRELIMINARY SERVICING ADVICE

Hunter Water Corporation
ABN 46 228 513 446

PO Box 5171
HRMC NSW 2310
36 Honeysuckle Drive
NEWCASTLE NSW 2300
1300 657 657 (T)
(02) 4979 9625 (F)
hunterwater.com.au

15 December 2020

Ref: 2020-1334

The Newcastle Wallsend Coal Co Pty Ltd
C/- ADW Johnson Pty Ltd
7/335 Hillsborough Road
Warners Bay NSW 2282

Attention: Adam Gaul

Dear Adam,

PRELIMINARY SERVICING ADVICE

Hunter Water offers the following preliminary servicing advice for the provision of water and sewerage facilities to the preliminary application for the proposed Residential Subdivision at Lot 3057 DP 1208470 & various lots, 39 Bulkara Street, Wallsend NSW 2287.

General information on water and sewer issues relevant to the proposal is included in this correspondence. This information is based on Hunter Water's knowledge of its system performance and other potential development in the area at the present time.

As the development may be subject to rezoning and approval by Council(s) any information offered by Hunter Water is only preliminary and may be subject to significant change prior to proceeding.

The preliminary servicing advice offered is not binding on Hunter Water. Once Development Consent has been granted and you wish to proceed with your development you will be required to lodge an application for Notice of Requirements from Hunter Water and comply with these requirements prior to the issue of a Section 50 Compliance Certificate.

Hunter Water's preliminary servicing advice provides general information on water and sewer issues relevant to the proposed development. The information provided is based on Hunter Water's knowledge of current system performance and other potential development in the area. There could be significant change prior to lodging a Development Application and therefore these preliminary requirements maybe different to the Notice of Requirements provided in the future.

Network Infrastructure and Delivery

1 Water Supply

The site of the proposed development is located in the West Lakes Water Supply System, and is supplied from the Elermore Vale Reservoir 1 and 2. Unfortunately, due to the large scale and preliminary nature of this development, only broad details of the likely connection points and associated boundary conditions can be provided at this time.

The maximum serviceable level from the two existing Elermore Vale Reservoirs, located within the development site, is approximately 60 m. Lots above this level will require the construction of a booster water pump station to meet minimum pressure requirements.

A water servicing strategy and modelling report will be required to confirm the interim and ultimate trunk servicing arrangement, water pump station(s) and future reservoir location. Strategy development is explained further in Item 4 below.

Potential initial development areas on the periphery of existing residential areas have been explored in more detail;

Southern – Frederick Street
There are trunk water mains along Main Rd that would be able to provide capacity for initial lots. There is no spare capacity in the 100mm reticulation main in Frederick St.

South West – Transfield Avenue
A 200mm watermain is available at the eastern extent of Transfield Avenue to provide some capacity for initial stages in this area.

South East – Ferndale Street
There is minimal capacity within the existing reticulation mains along Ferndale Street and Lakes Road for development within this catchment. Connection from the trunk mains in the vicinity of the Lake/Reservoir Rd intersection may be required.

Eastern– Turrama Street
There are no significant mains to service beyond a small number of initial lots in the far eastern end of the development. Upgrades would be required from the trunk network on Rundle Avenue.

North East – Bulkara Street
There is limited capacity within the existing watermains on Bulkara Street for lots at lower elevations. The reticulation network would need to be modelled in further detail to determine upgrades required as there is no trunk system in this area.

North West – proposed mixed use zone
There are no existing mains in this area.

Central
Servicing of the central portions of land to the north and south of Newcastle Link Road would likely involve a new trunk network from the Elermore Vale Reservoirs. A new Water Pump Station will be required for elevations above approximately 60m.

2 Wastewater Transportation

The available capacity over the sewer network is as follow:

North East Boundary

Maryland 4 WWPS has 190 ET spare capacity - DN150 upgrade for 150m and extend 380m of DN150 PVC of sewer to be able to service through Downie Lane.

East Boundary

Wallsend 1 WWPS has 10 ET spare capacity and could not carry significant loads of the development. Therefore, alternative options such as a gravity connection to Maryland 4 WWPS may be explored.

South Boundary

Argenton 1 WWPS has been upgraded to 2021 flow of 2125 L/s. With 2019 ET and pump flows, it has about 200 L/s spare capacity. It is a large catchment with multiple hotspots throughout the network. However with recent WWPS upgrade has improved performance in vicinity.

3 Wastewater Treatment Network

Northern Boundary could drain to the Shortland WWTW through Maryland WWPS. While southern boundary is pumped to Edgeworth WWTW. Both WWTW have capacities at the current connected capacity to cater for extra loads. The available capacity depends on the time frame of the connected development accordingly.

The proposed development will drain toward the Shortland and Edgeworth WWTW. Both WWTW have sufficient capacity for the proposed development.

4 Strategy Development

The above connection points should be confirmed via completion of a detailed developer – funded water and sewer servicing strategy. The strategy will be required to investigate the infrastructure necessary to service the proposed development and any augmentation to Hunter Water's existing water and sewerage systems.

The water and sewer strategies should address, but not be limited to, the following matters:

- Adjacent development areas;
- Development layout, staging and timing;
- Infrastructure required to service the proposed development;
- Existing asset constraints;
- Alternative connection points;
- Preliminary sizing and layout of the water and wastewater transport system.
- Any necessary augmentations to Hunter Water's existing water and wastewater supply system;
- Security of supply;
- Boosting for high level areas;
- Pressure Reducing Valves;
- Options to provide trunk main capacity to the development and to any other developments in the area and the likely timing of these developments;
- Identify and assess all possible wastewater servicing options mentioned above and any other feasible options available; and
- Estimated capital and operational costs of the proposed water and wastewater transport infrastructure.

Hunter Water recommends that you liaise further with our Development Planning and Relations team before commencing the strategy so that the following matters can be addressed:

- Presentation of an overview of development, including location, expected water supply and wastewater demand parameters, major construction challenges, staging options and any other relevant known aspects that may impact Hunter Water's network;
- Discussion of any known system constraints that may affect the proposed development;
- Presentation and discussion of possible connection points to existing Hunter Water assets; and
- Agreement of the study area to be presented in strategy.

These preliminary requirements are not commitments by Hunter Water and maybe subject to significant change prior to this development proceeding.

Yours Sincerely

Wesley Jones
R/ Account Manager Major Development

Enquiries: Wesley Jones
Tel: 0411 796 911
Email: wesley.jones@hunterwater.com.au

Appendix B

POWER SOLUTIONS ELECTRICAL SERVICING REPORT

power solutions

Quality designs in a guaranteed time

Wednesday, 30 September 2020

Eden Estates (Newcastle) Pty Ltd
C\- Harrington Estates
18 Myer Way
Oran Park NSW 2570

Attention: Trevor Jensen

Dear Trevor,

Subject: Electrical Infrastructure Overview for Gateway
Power Solutions was engaged to complete an electrical infrastructure overview for the proposed Gateway development.

High Voltage (11kV)
A residential development requires the reticulation of High Voltage (11kV) which supplies development kiosk substations and Low Voltage (415V) which supplies pillars and streetlights. Each kiosk substation transformers the 11kV supply into usable low voltage. An assessment of the existing High Voltage network regarding its accessibility, capacity and likely requirements for future upgrades has been completed. The proposed site has access to two existing Ausgrid 11kV feeders, namely 10724 from Edgeworth Zone Substation (ZS) and 33771 from Maryland ZS.

Edgeworth ZS is an older Ausgrid substation which currently supplies much of Edgeworth and Cameron park to the West of this development and is located to the South West of the site. Feeder 10724 supplies the Eastern edge of Cameron park and the Brush Creek development to the South. It is anticipated that there would be some spare capacity available for its use.

Maryland ZS is a newer Ausgrid substation which currently supplies Maryland, Fletcher and the Western parts of Wallsend. It is located to the North of the development site. It has two spare 11kV feeders, either of which could be utilised if Ausgrid determine an additional 11kV feeder is required for this development. It is anticipated that the existing feeder 33771 would be able to provide most, if not all, of the development load. This will be confirmed by Ausgrid during the High Voltage masterplan assessment completed during detailed design. Some upstream augmentation on feeder 33771 may be required to allow for the development load.

Transmission (>132kV)
The site has three existing overhead transmission lines traversing it including a 330kVA TransGrid line (TL94/TL96), and two Ausgrid 132kV transmission lines (96Z) and (950). These powerlines are part of the backbone electricity supply for the Newcastle and Lake Macquarie area. They are not suitable for connecting the proposed subdivision which is to be connected to the High Voltage (11kV) as outlined above. These powerline routes will be considered in forming the development layout. The 132kV powerlines are able to be relocated either underground and overhead in line with Ausgrid's network standards if required and as such will not inhibit development.

Assessment
The proposed development has access to two existing Ausgrid 11kV feeders with additional redundancy available via Maryland Zone Substation. The development presents no unusual electrical supply risks and can be serviced via the standard Ausgrid Contestable process.

Yours faithfully,

POWER SOLUTIONS PTY LTD
Scott Clothier

Postal
PO Box 278
Charlestown NSW 2290

Head Office
The Landmark
C106/215 Pacific Highway
Charlestown NSW

Sydney Office
810 Pacific Highway
Gordon NSW 2072

Phone 1300 732 293
office@powersol.com.au
www.powersol.com.au

TO MARYLAND ZONE SUB

11kV (33777) Maryland ZS

Maryland Zone substation has 2 spare 11kV feeders

132kV (96Z) Ausgrids

11kV (33771) Maryland ZS

330kV (TL94/TL96) Transgrid's

11kV (10724) Edgeworth ZS

Ausgrid 11kV Feeders **10724** & **33771** provide suitable connection locations

132kV (950) Ausgrids

TO EDGEWORTH ZONE SUB

LEGEND

LGA Boundary

DRAWN: Scott Clothier
DATE: 30/09/2020
Feeder locations are approximate only

ELECTRICAL LOADINGS;
Residential Lots: 1500
Approximate Load: 5MVA

ver.	date	comment	drawn	pm	level information	scale (A3 original size)
A	30.09.20	first issue	MS	RK	DATUM: AHD CONTOUR INTERVAL: □□	0 250 500 625m SCALE: 1:12,500 (FULL)

working beyond expectations

CONSTRAINTS □□ APPING

ELERMORE VALE
WA □LSEND

counc □□ LAKE MAC. & NEWC.

dwg □□□ 239936-CON-016-A

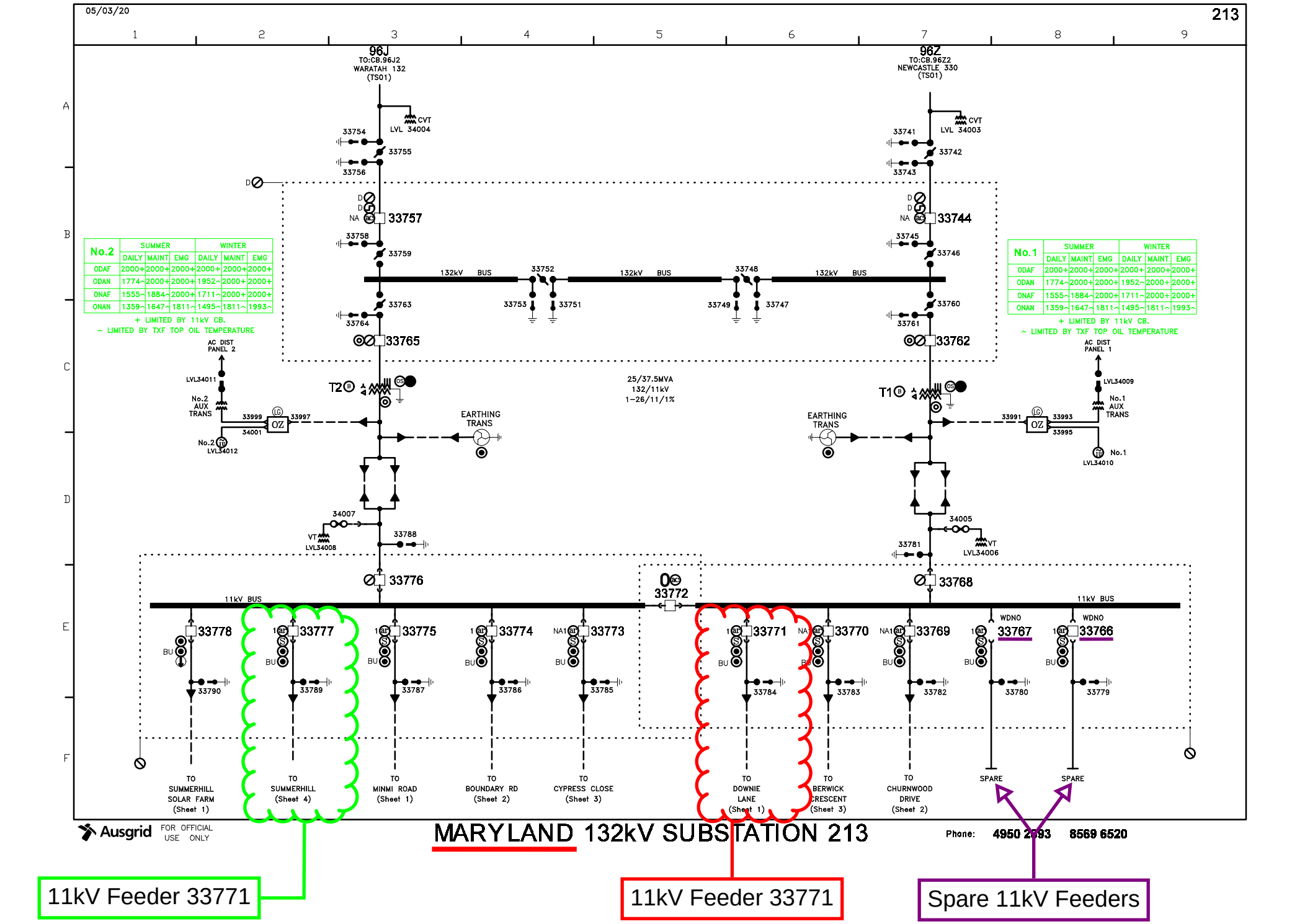
□□□□□
HARRINGTON ESTATES

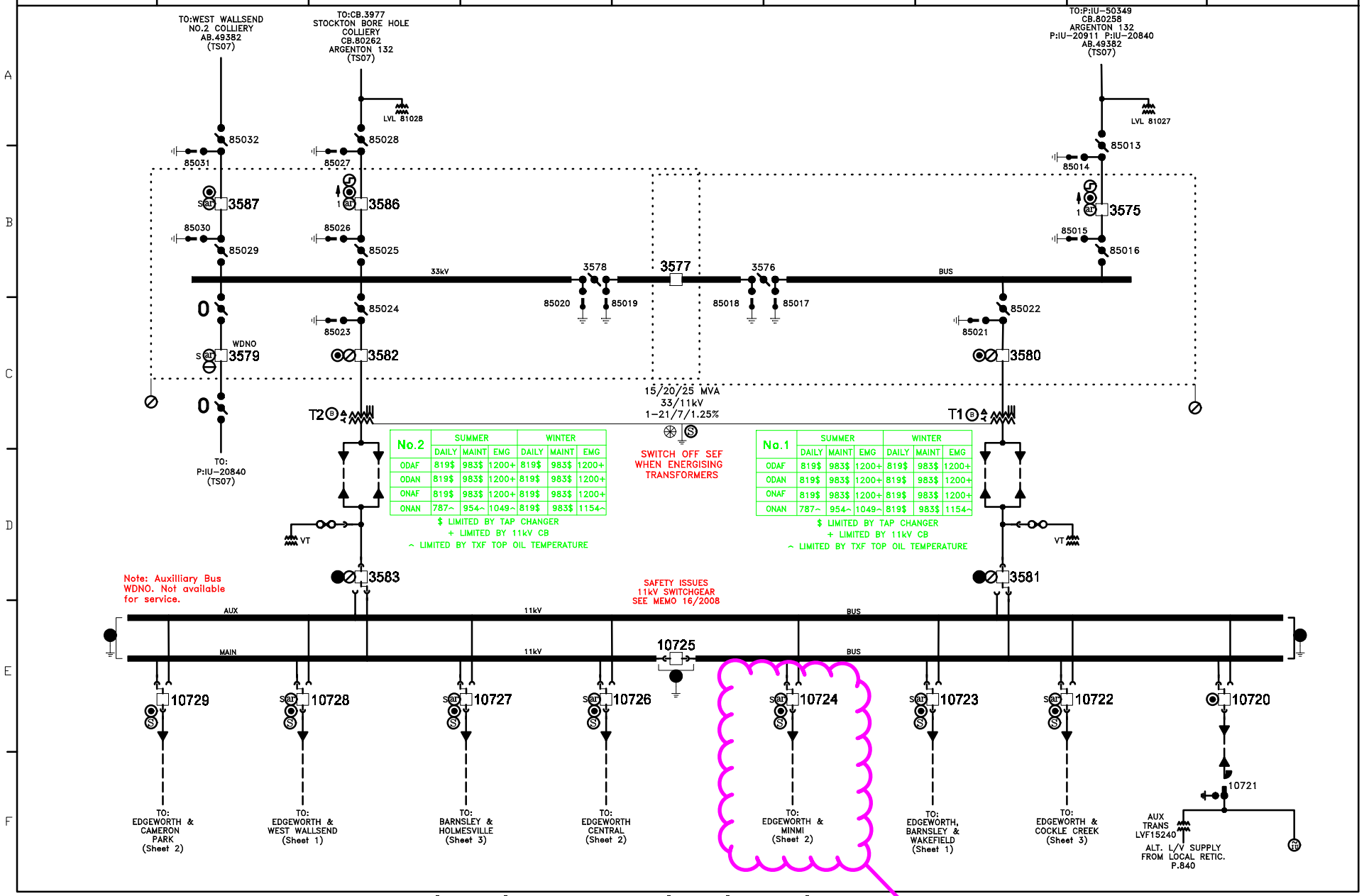
adw johnson

central coast office ph: (02) 4305 4300
hunter office ph: (02) 4978 5100
sydney office ph: (02) 8046 7411
www.adwjohnson.com.au

• civil engineering • project management • infrastructure • superintendency • town planning • social impact • economic analysis • development feasibility • visualisation • urban design

This plan includes coloured information. If you have a black and white copy you may not have all of the information. This note is coloured RED.


05/03/20
213
96J
TO:CB.96J2
WARATAH 132
(TS01)
96Z
TO:CB.96Z2
NEWCASTLE 330
(TS01)
CVT
LVL 34004
CVT
LVL 34003
33754
33755
33756
33741
33742
33743
33757
33744
33758
33759
33745
33746
132kV BUS
33752
33753
33751
33748
33749
33747
33763
33764
33765
33760
33761
33762
No.2
SUMMER
WINTER
DAILY MAINT EMG DAILY MAINT EMG
ODAF 2000+ 2000+ 2000+ 2000+ 2000+ 2000+
ODAN 1774~ 2000+ 2000+ 1952~ 2000+ 2000+
ONAF 1555~ 1884~ 2000+ 1711~ 2000+ 2000+
ONAN 1359~ 1647~ 1811~ 1495~ 1811~ 1993~
+ LIMITED BY 11kV CB.
~ LIMITED BY TXF TOP OIL TEMPERATURE
No.1
SUMMER
WINTER
DAILY MAINT EMG DAILY MAINT EMG
ODAF 2000+ 2000+ 2000+ 2000+ 2000+ 2000+
ODAN 1774~ 2000+ 2000+ 1952~ 2000+ 2000+
ONAF 1555~ 1884~ 2000+ 1711~ 2000+ 2000+
ONAN 1359~ 1647~ 1811~ 1495~ 1811~ 1993~
+ LIMITED BY 11kV CB.
~ LIMITED BY TXF TOP OIL TEMPERATURE
AC DIST PANEL 2
LVL34011
No.2 AUX TRANS
No.2
LVL34012
T2
25/37.5MVA
132/11kV
1-26/11/1%
T1
AC DIST PANEL 1
LVL34009
No.1 AUX TRANS
No.1
LVL34010
EARTHING TRANS
EARTHING TRANS
33999
33997
34001
33991
33993
33995
34007
VT
LVL34008
33788
34005
VT
LVL34006
33781
33776
33772
33768
11kV BUS
11kV BUS
33778
33790
33777
33789
33775
33787
33774
33786
33773
33785
33771
33784
33770
33783
33769
33782
WDNO
33767
33780
WDNO
33766
33779
TO SUMMERHILL SOLAR FARM (Sheet 1)
TO SUMMERHILL (Sheet 4)
TO MINMI ROAD (Sheet 1)
TO BOUNDARY RD (Sheet 2)
TO CYPRESS CLOSE (Sheet 3)
TO DOWNIE LANE (Sheet 1)
TO BERWICK CRESCENT (Sheet 3)
TO CHURNWOOD DRIVE (Sheet 2)
SPARE
SPARE
Ausgrid FOR OFFICIAL USE ONLY
MARYLAND 132kV SUBSTATION 213
Phone: 4950 2993 8569 6520
11kV Feeder 33771
11kV Feeder 33771
Spare 11kV Feeders



No.2	SUMMER			WINTER		
	DAILY	MAINT	EMG	DAILY	MAINT	EMG
ODAF	819$	983$	1200+	819$	983$	1200+
ODAN	819$	983$	1200+	819$	983$	1200+
ONAF	819$	983$	1200+	819$	983$	1200+
ONAN	787~	954~	1049~	819$	983$	1154~

$ LIMITED BY TAP CHANGER
+ LIMITED BY 11kV CB
~ LIMITED BY TXF TOP OIL TEMPERATURE

No.1	SUMMER			WINTER		
	DAILY	MAINT	EMG	DAILY	MAINT	EMG
ODAF	819$	983$	1200+	819$	983$	1200+
ODAN	819$	983$	1200+	819$	983$	1200+
ONAF	819$	983$	1200+	819$	983$	1200+
ONAN	787~	954~	1049~	819$	983$	1154~

$ LIMITED BY TAP CHANGER
+ LIMITED BY 11kV CB
~ LIMITED BY TXF TOP OIL TEMPERATURE

11kV Feeder 10724