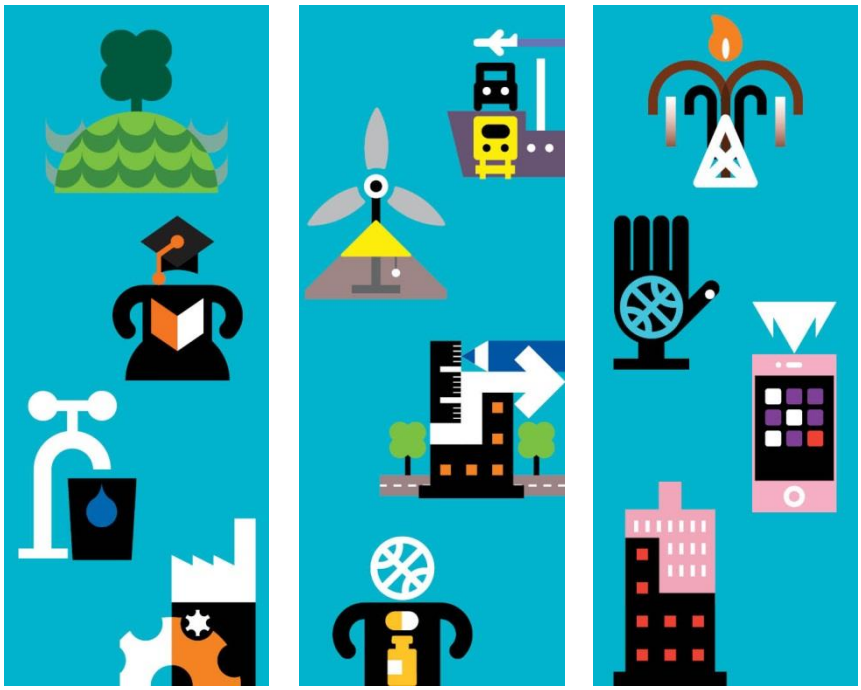

Ropes Creek Infrastructure Report

Indicative Servicing Strategy

November 2016

NSW Department of Planning and Environment

NSW GOVERNMENT Planning & Environment

Mott MacDonald

Ropes Creek Infrastructure Report

Indicative Servicing Strategy

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A	03/02/2016	A. Zou	G. Lee	C. Avis	DRAFT
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C	02/11/2016	R. Higgisson	G. Lee	C. Avis	For Exhibition

Contents

Executive Summary

To provide supports to the development of Lot 10 in DP 1157491, Mott MacDonald (MM) was engaged by the Department of Planning and Environment (DPE) to undertake an infrastructure services investigation at Ropes Creek Precinct.

Forming as part of the master planning process for the proposed development at Ropes Creek Precinct, this investigation is to identify any servicing opportunity and possible constraints for the proposed development on the industrial land.

A high level servicing strategy for the site has been developed for each of the following utilities:

- Water;
- Sewer;
- Electrical;
- Gas;
- Telecommunications; and
- Alternative servicing options

Water

There are two reservoirs situated in the vicinity of the project area that the one within in Erskine Park may not have sufficient capacity to service the proposed development. Potable water, therefore, would be sourced from the Elevated Minchinbury Reservoir as per Sydney Water Corporation's (SWC) Scheme Plan.

SWC will be the service provider to the proposed development at Ropes Creek Precinct. Capacity, indicative locations and costs of existing and proposed infrastructure within the study area have been analysed in the following sections.

Sewer

Waste water generated on site will be discharged to the Ophir Street Carrier Extension, which has recently been constructed in December 2015. Rising mains will convey sewage for further gravity discharge and the waste water will be treated in St Mary's STP.

All the sewer mains will be operated and maintained at the cost of SWC's, however, the cost of minor lead-in facilities will be at developers' expense.

Electrical/TransGrid

To cater for the electrical demands associated with the proposed development of the Ropes Creek Precinct, it is anticipated that the electrical reticulation can be supplied from North Eastern Creek Zone Substation and Eastern Creek Zone Substation. The existing network may have limited capacity to supply initial connection once this has been exhausted, the development must be supplied from two (2) new feeders from each zone substations respectively.

Part of the land has been dedicated as easement for TransGrid transmission lines. Some land uses are permitted to occur in the easement, where adequate clearance along the route of transmission lines is achieved. All works within the easement need to be approved by TransGrid.

Gas

Gas supply can be provided to the site via an extension of the existing secondary gas main along the Archbold Road. The extension of the secondary gas main network would occur in conjunction with the local development within the Ropes Creek Precinct with mains located in new road verges as per Indicative-Layout-Plan prepared by DPE.

It is noted that the gas services are not considered as a critical service to the industrial land. Ropes Creek Precinct and will generally only be provided gas supply where applications have been lodged with Jemena. Based on the recent discussions with Jemena, there is sufficient capacity to service the proposed development.

Telecommunications

New telecommunications infrastructure will be required to service the site consists of the following:

- Provision of new telephone exchanges; and
- Provision of high speed data services via the National Broadband Network (NBN). Cable containment infrastructure would be provided at developers' expense whereas cabling and associated infrastructures are to be covered by NBN.

Alternative Servicing Options

A number of sustainable energy technologies can be considered to service the site with a lower expense and low carbon emission.

- Recycled water;
- Onsite rainwater harvesting;
- Reuse of greywater and blackwater;
- Bio gas;
- Hydroelectricity;
- Solar power;
- Low-carbon cogeneration;
- Wind power; and
- Wireless.

This investigation report has been assessed against the current ILP, which is subject to further refinement at the detailed design stage.

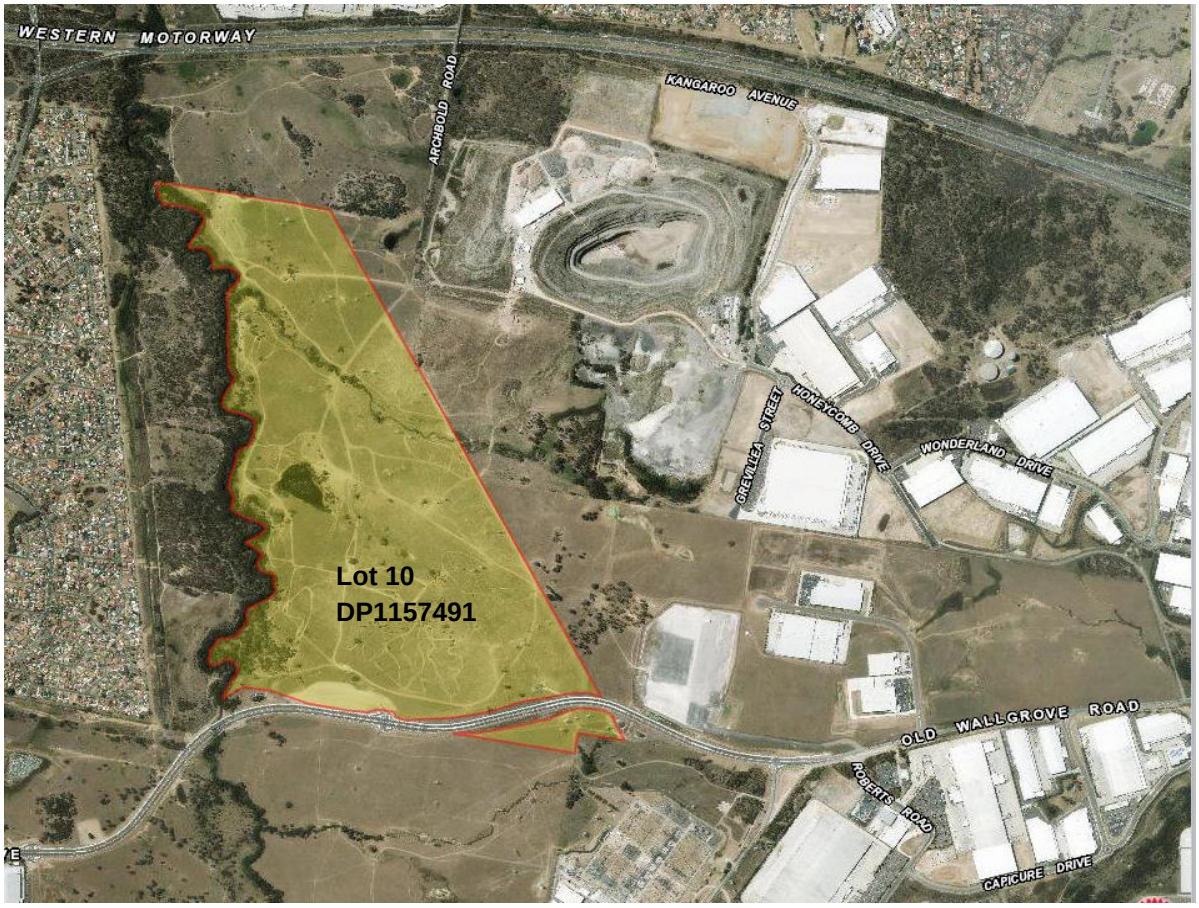
1.0 Introduction

This report is primarily based on information provided by Dial Before You Dig (DBYD) and discussions with utility authorities. Where additional information or confirmation was unable to obtained, Mott MacDonald (MM) has made assumptions with the best available information at the time. It is understood that this investigation is subject to future refinement by utility authorities as more detailed information becomes available.

1.1 Project Overview

The proposed development at Ropes Creek is approximately 128 hectare in area. Considering the transmission line easement along the eastern boundary of the site and any set-back for the 100-year-flooding along the Ropes Creek reduce the developable land area to approximately 90 ha. The northern boundary of the site (*Figure 1.1*) is approximately 500m south of M4 Western Motorway and then the land extends approximately 1.7km south to Lenore Drive. The development site is bound by Ropes Creek to its west and six existing overhead transmission lines to its east. The site will be accessible from the north-east via future Archbold Road extension and from the south via Lenore Drive.

Figure 1.1: Site Locality



Source: NSW Government Land & Property Information

The site is located within Precinct A of the Broader Western Sydney Employment Area (BWSEA) and also in the vicinity of the residential precinct of Erskine Park. The highest point of the site is situated in the south-east corner and the topography falls in a westerly direction towards Ropes Creek by approximately 2% to the lowest point in the north-west corner.

It is proposed to develop this precinct to accommodate general industrial/commercial complex that is similar to those facilities in the surrounding area. An Indicative Layout Plan (ILP) has been prepared by the Department of Planning and Environment (DPE) for assessment (*Figure 1.2*). The ILP is provided as a development option. Conservative estimates of future service capacities have been made so that there is flexibility in the final layout.

1.2 Deliverables and Methodology

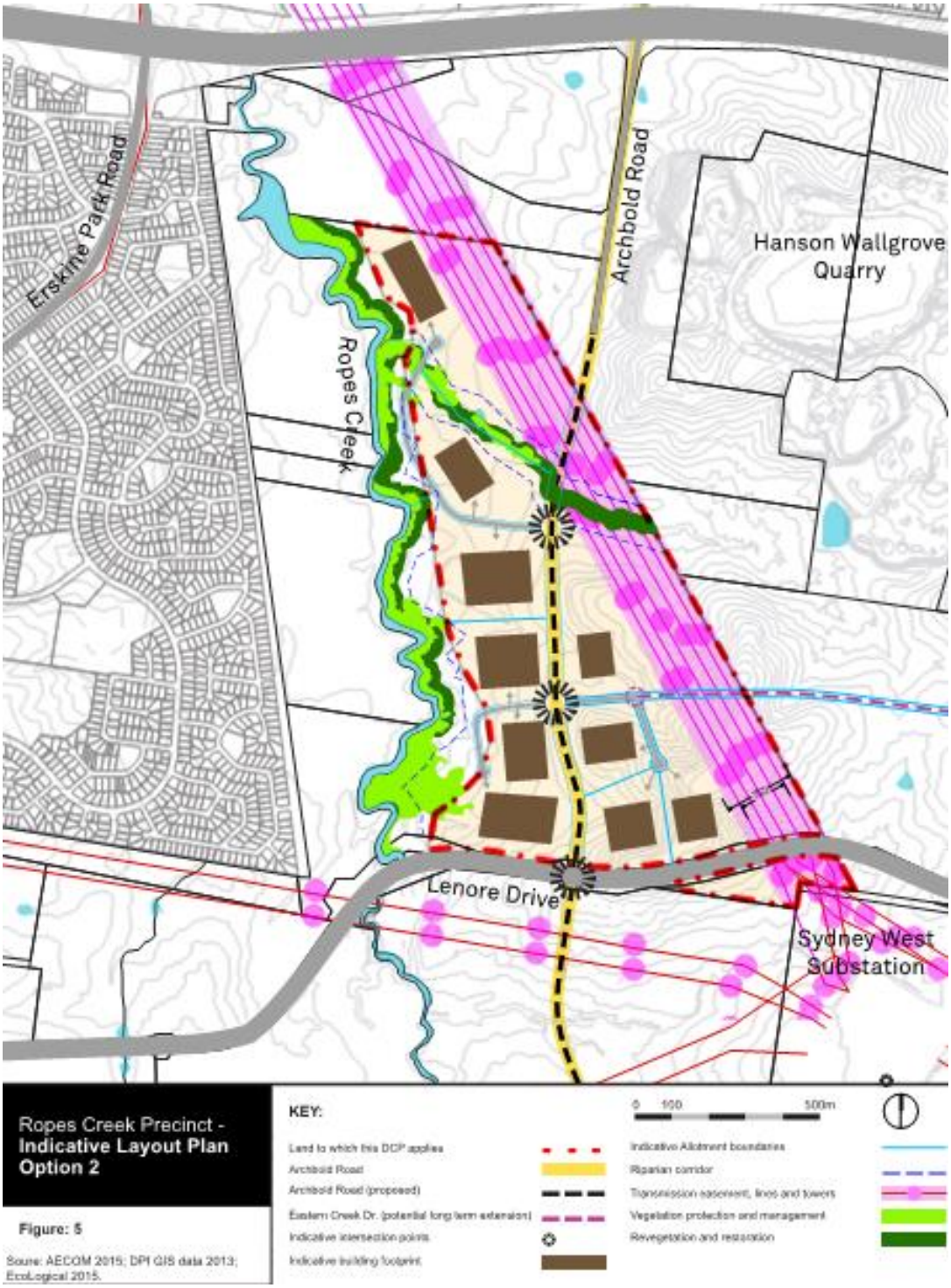
The general methodology for delivering this project is following the below procedures:

- Review all relevant previous studies;
- DBYD enquiry;
- Confirm servicing capacity, timeframe and indicative staged strategy with each utility authority;
- Lodge feasibility study with each utility authority to seek any planned future utility service in the project area;
- Assess future servicing strategy against current ILP and document received; and
- Assess alternative servicing options.

The following deliverable will be prepared:

- A high level services infrastructure plans identifying opportunities, constraints and staging considerations where applicable;
- A summary report indicating key issues and servicing strategy, including alternative servicing options.

Figure 1.2: Indicative Layout Plan of Ropes Creek



Source: Department of Planning and Environment (prepared by AECOM)

2.0 Preliminary Service Investigation

Previous studies in the project area have been undertaken by Hughes Trueman (HT) dated back in 2005. New Dial Before You Dig (DBYD) enquiries have been re-submitted on August 12th 2015 for the proposed development at Ropes Creek (Job Number: 9529072 & 9523088). The service searches help to identify which utility authority have assets on the site; however, DBYD data only include underground cables and/or pipelines. Separate requests to the relevant utility authorities were also made for the existing overhead infrastructure on site. A list of affected utility authorities is shown as below:

- Sydney Water Corporation (SWC) - Potable Water and Waste Water;
- Endeavour Energy – Low voltage electrical reticulation;
- TransGrid – High voltage transmission lines;
- Jemena – Gas; and
- Telstra & National Broadband Network (NBN) – Telecommunications.

Please refer to *Appendix A* for the copy of the DBYD enquiry details from each of the above asset owners and *Appendix B.1* for a base map presenting all existing utility infrastructures within the study area.

2.1 Potable Water

Based on the service search done via DBYD (*Appendix A.1*), no existing watermains have been found within the site boundary; however, SWC has a number of major watermains in the vicinity area. In order to have a better understanding of existing water assets that may be affected by the proposed development, *Table 2.1* and *Figure 2.1 – 2.2* below presents the findings of the service investigation.

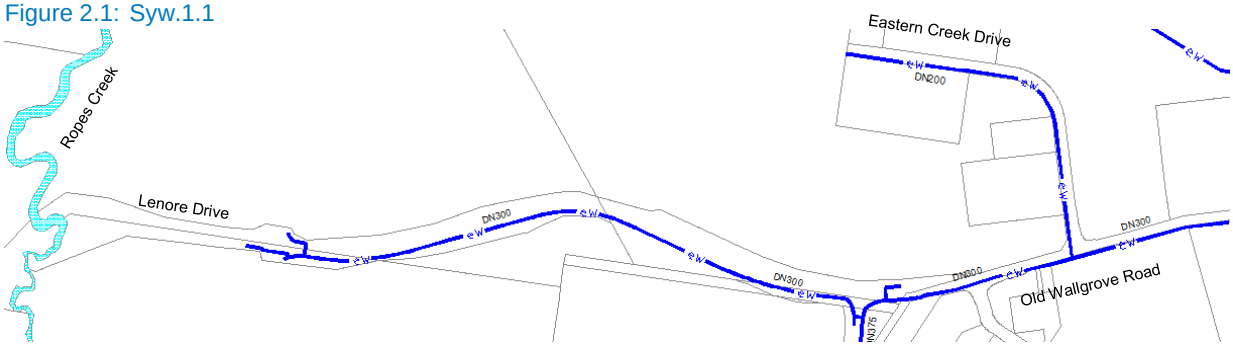
Please refer to *Appendix B.1* for a service plan indicating the detail of existing watermains.

Table 2.1: Existing SWC Watermains Nearby

Existing Asset Description	Asset Reference	Comments
DN300 uPVC along the Lenore Drive and Old Walgrove Road	Syw.1.1	Supply potable water to a range of local developments within a 40ML elevated reservoir (Minchinbury Reservoir) service area. It is highly likely to obtain water supply from the Minchinbury Elevated Reservoir via connecting into existing watermains at the South of the project area at Lenore Drive.
A potable water reticulation network in the Erskine Park residential area	Syw.1.2	Supply potable water from a 4ML elevated reservoir (Erskine Park Reservoir). It is less likely to have enough capacity to supply water from Erskine Park Reservoir.
DN375 DICL coming out of Minchinbury Reservoir	Syw.1.3	Supply potable water to a range of local developments within a 40ML elevated reservoir (Minchinbury Reservoir) service area. Alternatively, an extension of existing watermain to supply potable water to the proposed development from the North of the site.

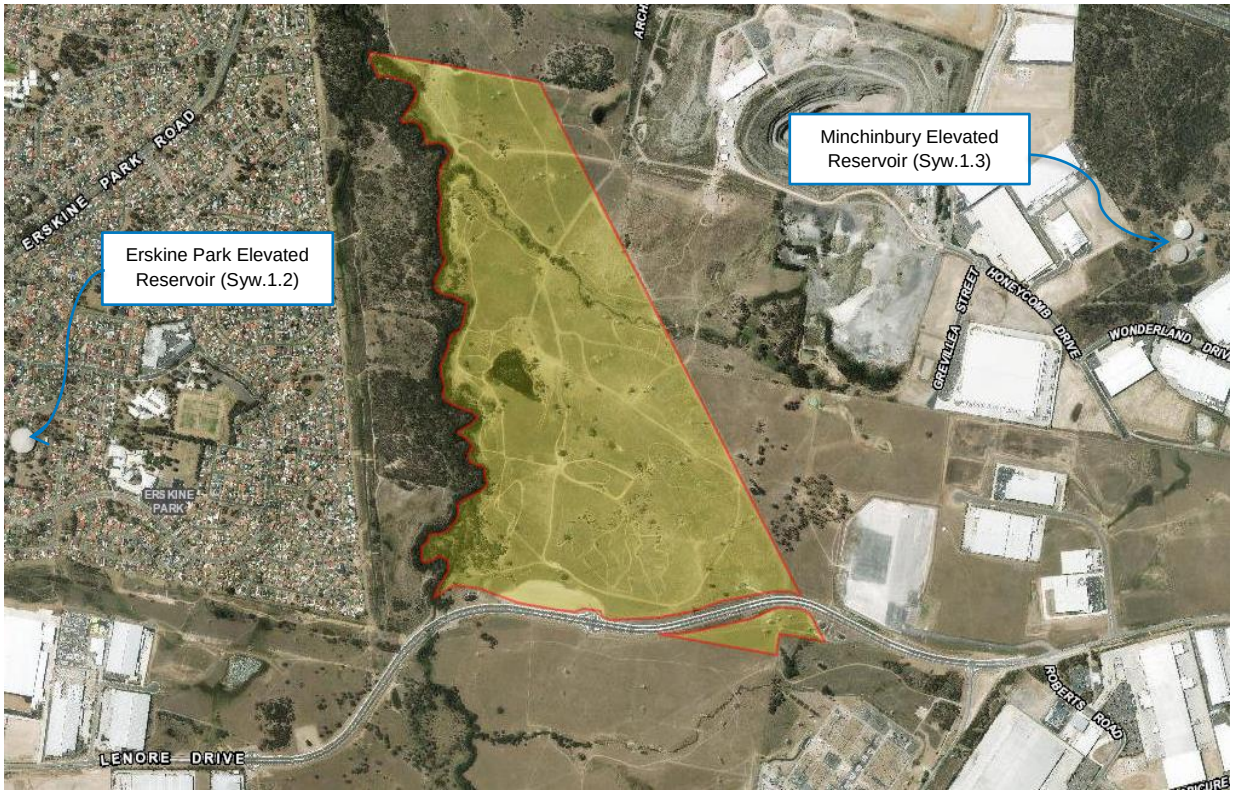
Source: Sydney Water Corporation (SWC)

Figure 2.1: Syw.1.1



Source: MMD-357627-C-SK-DPE-XX-0200 (prepared by Mott MacDonald)

Figure 2.2: Syw.1.2 & Syw.1.3



Source: SIX Map – NSW Land and Property Information

2.2 Waste Water

SWC is also the sewer mains and sewage treatment plant (STP) servicing provider for the project area. Based on the DYBD service search (*Appendix A.2*), it is identified that a trunk sewer (East St Clair Carrier) is situated to the west of Ropes Creek Precinct on the eastern boundary of the Erskine Park residential area. Through preparing this infrastructure investigation, SWC has advised that, a proposed realignment of the Ophir Street carrier extension has been completed within the project area by December 2015. *Table 2.2* and *Figure 2.3* summarizing the findings have been provided as below.

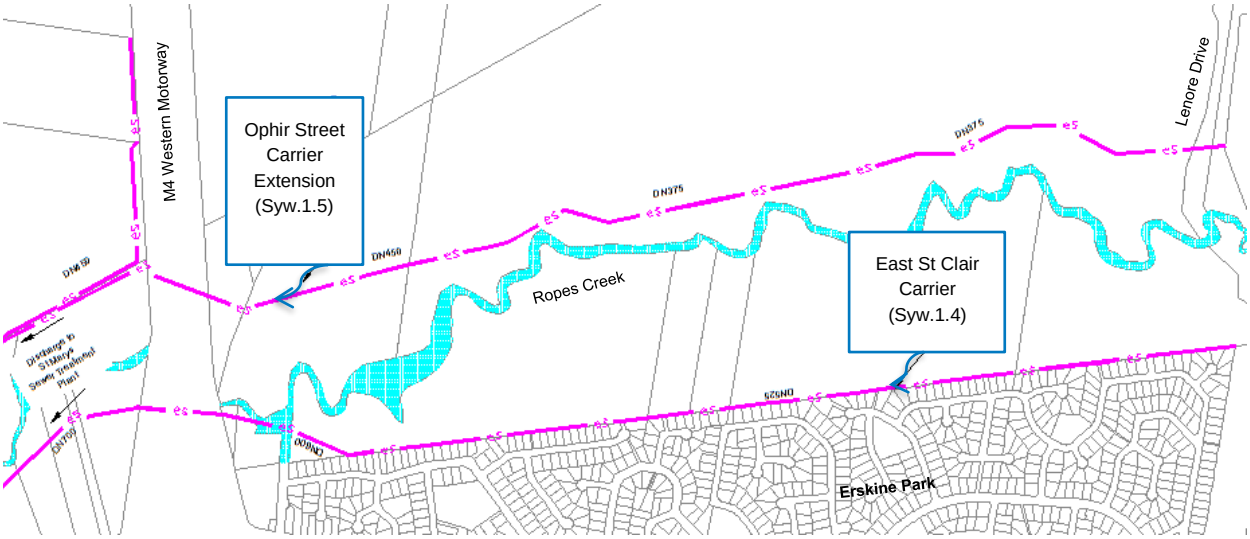
Please refer to *Appendix B.1* for a service plan indicating the detail of existing sewer mains in the vicinity of the site.

Table 2.2: Existing SWC Sewer Mains Nearby

Existing Asset Description	Asset Reference	Comments
A DN525 vitrified clay (VC) sewer main is to service the Erskine Park residential area and leading into a DN600 concrete sewer main	Syw.1.4	The existing East St Clair Carrier will head north before discharging sewage to the St Marys STP, which situated at further North to the project area. It is possible to connect into the existing East St Clair Carrier with constructing lead-in mains at developers' expense.
DN375 and DN450 polypropylene (PP) pipes	Syw.1.5	The newly constructed Ophir Street Carrier extension will head North before discharging sewage to the St Marys STP, which situated within the project area. It is more cost effective to connect into the existing East St Clair Carrier with constructing lead-in mains at developers' expense.

Source: Sydney Water Corporation (SWC)

Figure 2.3: Syw.1.4 & Syw.1.5



Source:MMD-357627-C-SK-DPE-XX-0300 (prepared by Mott MacDonald)

2.3 Electrical

A review of existing electrical infrastructure in the project area and its surrounding area has been completed via DBYD. The service searches have attached in *Appendix A.3* and *Appendix A.4* identifying electrical assets owned by Endeavour Energy and TransGrid.

In general, Endeavour Energy will be the service provider for the low voltage underground electrical reticulation whereas TransGrid will be the service operator for the high voltage overhead transmission lines. *Table 2.3* and *Figure 2.4 – 2.5* are used to provide an indication of all the electrical assets identified on site and in its surrounding area.

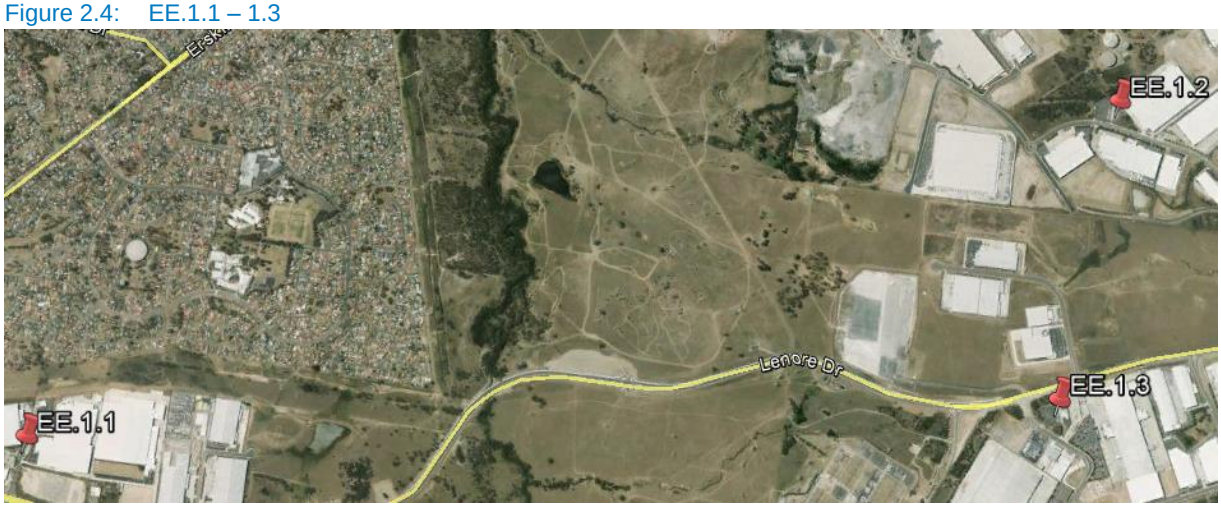
Please refer to *Appendix B.1* for a service plan indicating the detail of existing electrical infrastructure.

Table 2.3: Existing Electrical Infrastructure Nearby

Utility Authority	Existing Asset Description	Asset Reference	Comments
Endeavour Energy	Mamre Zone Substation	EE.1.1	Supply low voltage electrical reticulation to the Erskine Park residential precinct. It may not have sufficient capacity to cater for electrical demands in the project area.
	North Eastern Creek Zone Substation	EE.1.2	Supply low voltage electrical reticulation to local development. It may have sufficient capacity to service the project area.
	Eastern Creek Zone Substation	EE.1.3	Supply low voltage electrical reticulation to local development. It may have sufficient capacity to service the project area.
TransGrid	Sydney West Transmission Substation	TG.1.1	Supply high voltage transmission lines to surrounding zone substations.
	Overhead transmission lines running along the Eastern boundary of the project area	TG.1.2	Feeder Number 14: Sydney West – Sydney North No.1 330kV Feeder Number 20: Sydney West – Sydney North No.1 330kV Feeder Number 26: Vales Point – Sydney West 330kV Feeder Number 29: Vales Point – Sydney West 330kV Feeder Number 932: Sydney West – Mount Druitt 132kV Feeder Number 939: Sydney West – Mount Druitt 132kV

Source: Endeavour Energy (EE) & TransGrid

Figure 2.4: EE.1.1 – 1.3



Source: Google Earth Professional

TransGrid's transmission lines that traverse the project area. The width of the associated easements is approximate 200m, along the Eastern boundary. Refer to Appendix C for relevant restrictions and development guidelines issued by TransGrid.

Figure 2.5: TG.1.1 & TG.1.2

Source: MMD-357627-C-SK-DPE-XX-0500 (prepared by Mott MacDonald)

2.4 Gas

Jemena is the gas servicing provider for this area. A services search was done via DBYD (*Appendix A.5*), indicating that a high pressure secondary gas mains existing in the vicinity of the site. *Table 2.4* and *Figure 2.6* summarize the finding of the service investigation within the project area.

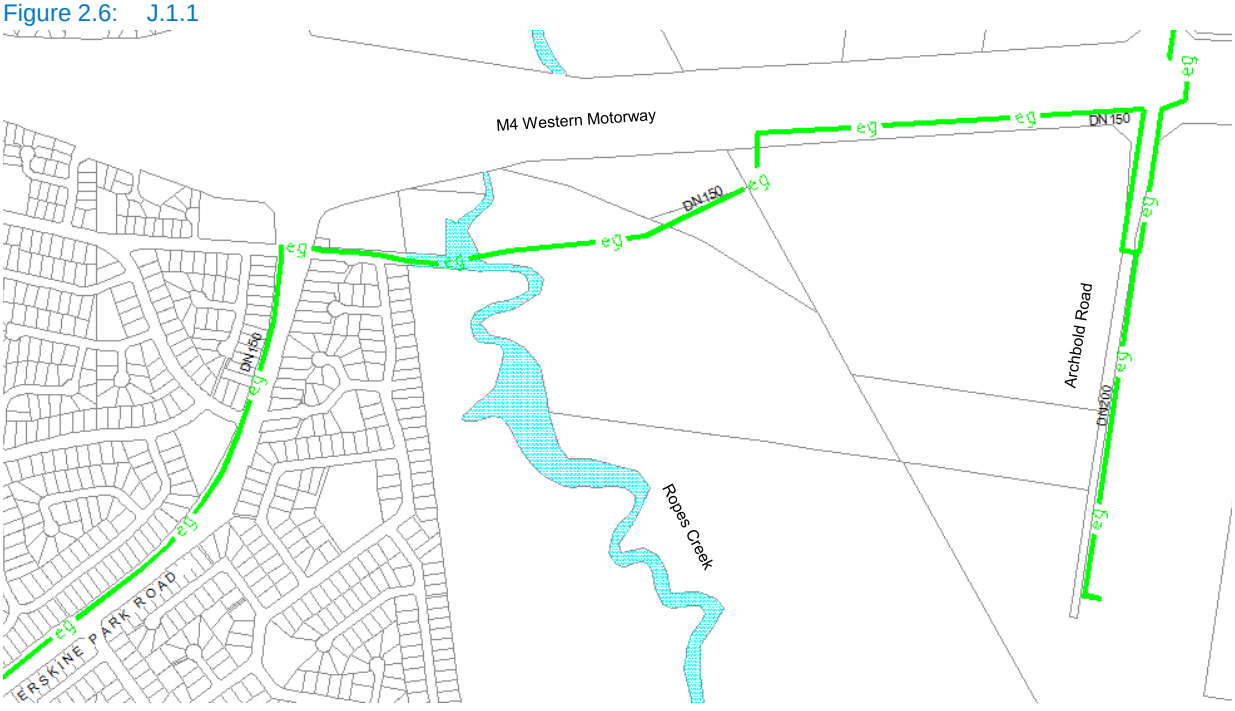
Please refer to *Appendix B.1* for a service plan indicating the detail of existing gas infrastructure.

Table 2.4: Existing Gas Infrastructure Nearby

Existing Asset Description	Asset Reference	Comments
A DN150 secondary gas main is running along Archbold Road to the north-east of the site.	J.1.1	It is highly likely to connect to the existing gas reticulation system via extending the DN150 secondary gas mains along the Archbold Road.

Source: Jemena

Figure 2.6: J.1.1



Source: MMD-357627-C-SK-DPE-XX-0600 (prepared by Mott MacDonald)

2.5 Telecommunications

Based on consultations with Telstra/NBN and the service investigation done via DBYD in the project area and its surrounding area, the following table (*Table 2.5*) summarises the existing telecommunication network affected by the proposed development at Ropes Creek.

Some of the existing cables are installed in pit and pipe containment, whereas the remaining comprised of aerial cables attached to the electricity distribution power poles. There are a number of telecommunication service providers existing nearby. *Table 2.5* and *Figure 2.7 – 2.8* summarize the finding of the service investigation within the project area.

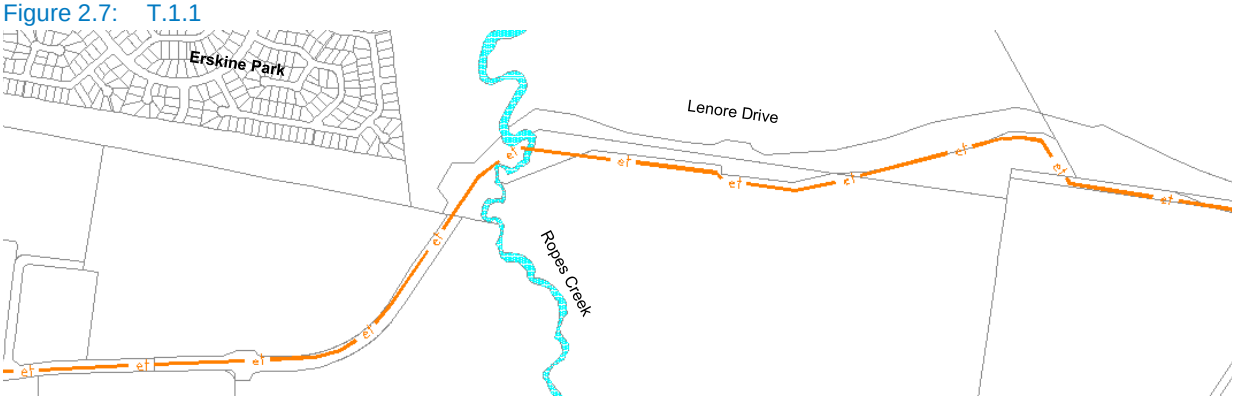
Please refer to *Appendix B.1* for a service plan indicating the detail of existing telecommunication infrastructure.

Table 2.5: Existing Telecommunication Infrastructure Nearby

Existing Asset Description	Asset Reference	Comments
P100 underground optic fibre coming from exchange tower and running along the Lenore Drive	T.1.1	It is owned by Telstra/Optus and highly likely to service the proposed development if required.
P35 copper aerial cables attached to the electricity distribution power poles before going underground along the Archbold Road	T.1.2	It is owned by Telstra/Optus and highly likely to service the proposed development if required.

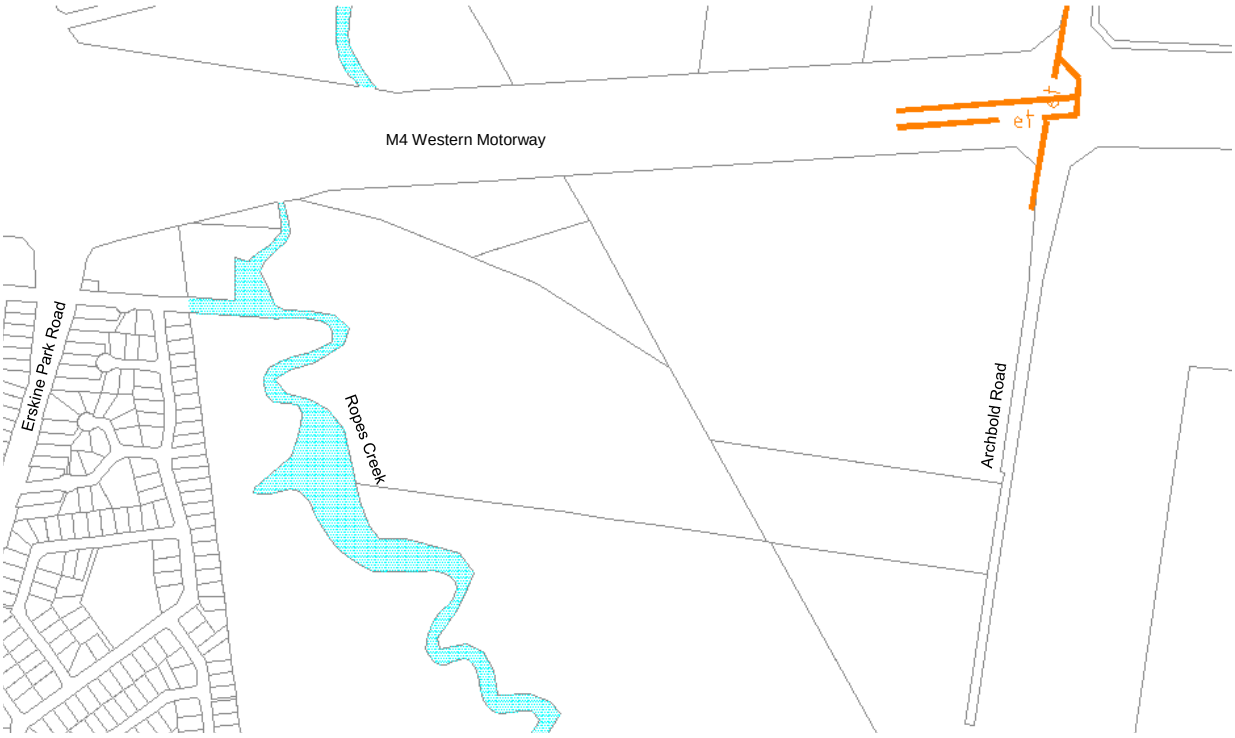
Source: DBYD

Figure 2.7: T.1.1



Source: MMD-357627-C-SK-DPE-XX-0700 (prepared by Mott MacDonald)

Figure 2.8: T.1.2



Source: MMD-357627-C-SK-DPE-XX-0700 (prepared by Mott MacDonald)

The NBN does not currently have any assets or roll-out plans within the project area.

3.0 Indicative Utility Servicing Strategy

The proposed development at Ropes Creek Precinct is general industrial complex with an estimated developable area of 90 hectare. It is understood that the building footprints indicated in the ILP (*Figure 1.2*) are only as a result of a high level planning and is subject to future refinement at the detail design stage. Demand assumptions have been made based on the developable area (rather than individual facilities) to allow for planning flexibility. Please refer to *Table 3.1* for assumptions used for capacity estimations for the proposed development.

Table 3.1: Servicing Strategy Assumptions

Dwelling Type	Total Development Lot Area (ha)	$\frac{\text{Area of Facility}}{\text{Area of Total Development Lot}}$	Total Facility Area (ha)
General industrial Complex	90	60%	54

Source: Mott MacDonald

3.1 Potable Water – SWC

The subject site is located within the Minchinbury Elevated supply zone and the existing Minchinbury Reservoir has the capacity to service the proposed development site at Ropes Creek.

The indicative potable water servicing strategy has been developed according to SWC's current potable water scheme and will be subject to future refinement at the detail design stage. A feasibility letter issued by SWC has been attached in *Appendix D.1* for detailed information.

3.1.1 Capacity Estimation

In order to accommodate general industrial complex in the project area, demands has been estimated in *Table 3.2* which is mainly based on Sydney Water's 'Average Daily Water Usage of Different Property Type'. It is suggested to endorse 2.82 L/Metric Unit/Day for general warehousing.

Table 3.2: Approximate Potable Water Demand Table

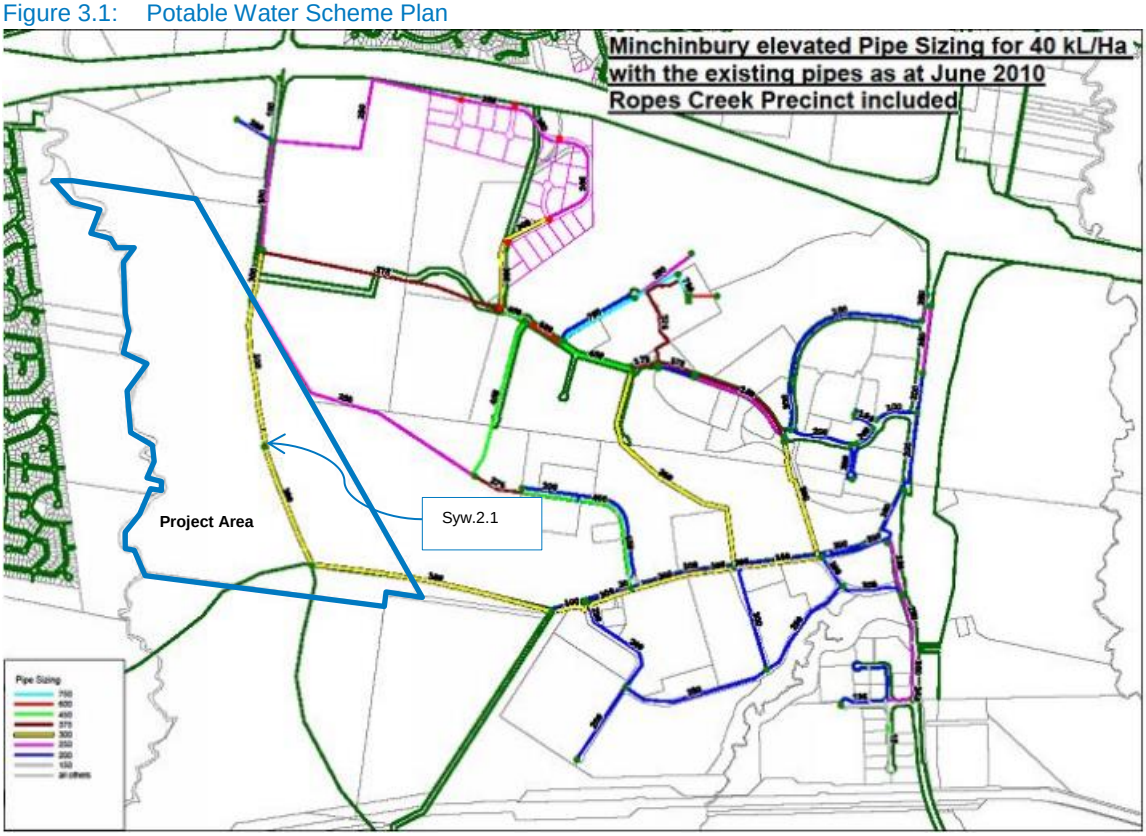
Dwelling Type	Area (ha)	Facility Area (ha)	Metric Unit	Water Demand per Metric Unit per day	Total Water Demand per Day (kL)
General industrial complex	90	54	m^2	0.003	1620

Source: Mott MacDonald/ SWC

3.1.2 Servicing Strategy Assessment

Demands generated by the general industrial complex will be similar to the developments in the vicinity area. A network of indicative watermains has been proposed to cater for Ropes Creek Precinct according to the potable water scheme plan issued by SWC (*Figure 3.1*).

Figure 3.1: Potable Water Scheme Plan



Source: Feasibility Letter issued by Sydney Water Corporation on October 6th 2015

In general, the potable water will be supplied from the Minchinbury Elevated Reservoir situated to the East of the proposed development. An indicative DN300 watermain is proposed to service the development at Ropes Creek Precinct by connecting into the existing connection point and DN300 watermains along the Northern side of Lenore Drive and joining the DN375 watermain along Honeycomb Drive.

Table 3.3 summarizes the indicative potable watermains affecting the proposed development.

Table 3.3: Indicative Potable Water Asset within Ropes Creek Precinct

Indicative Asset Description	Asset Reference	Comments
A DN300 trunk water main is to be running along the future internal road alignment within the project area	Syw.2.1	The indicative water main will be connected into the existing water supply network. As per discussed in previous section, the project area is located within the Minchinbury Reservoir Service area. It is confirmed by SWC that, the reservoir has sufficient capacity to service the site.

Source: Sydney Water Corporation

With being provided existing connection points, no major constraint has been identified in the indicative servicing strategy at this stage. Please refer to *Appendix B.2* for an indicative potable water servicing plan. Minor reticulation will be provided along the internal roads.

3.2 Waste Water – SWC

The future service provider will also be Sydney Water Corporation and a feasibly study has been completed with SWC in a similar manner to that for the potable water stated in section 3.1.

3.2.1 Capacity Estimation

In order to accommodate general industrial complex in the project area, demands has been estimated in *Table 3.4* which is mainly based on the rate provided by SWC. It is assumed that the volume of waste water generated by general industrial complex is 85% of the daily total water demand.

Table 3.4: Approximate Waste Water Demand Table

Dwelling Type	Total Water Demand per Day (kL)	Total Sewage Discharge per Day (kL)
General industrial complex	1620	1377

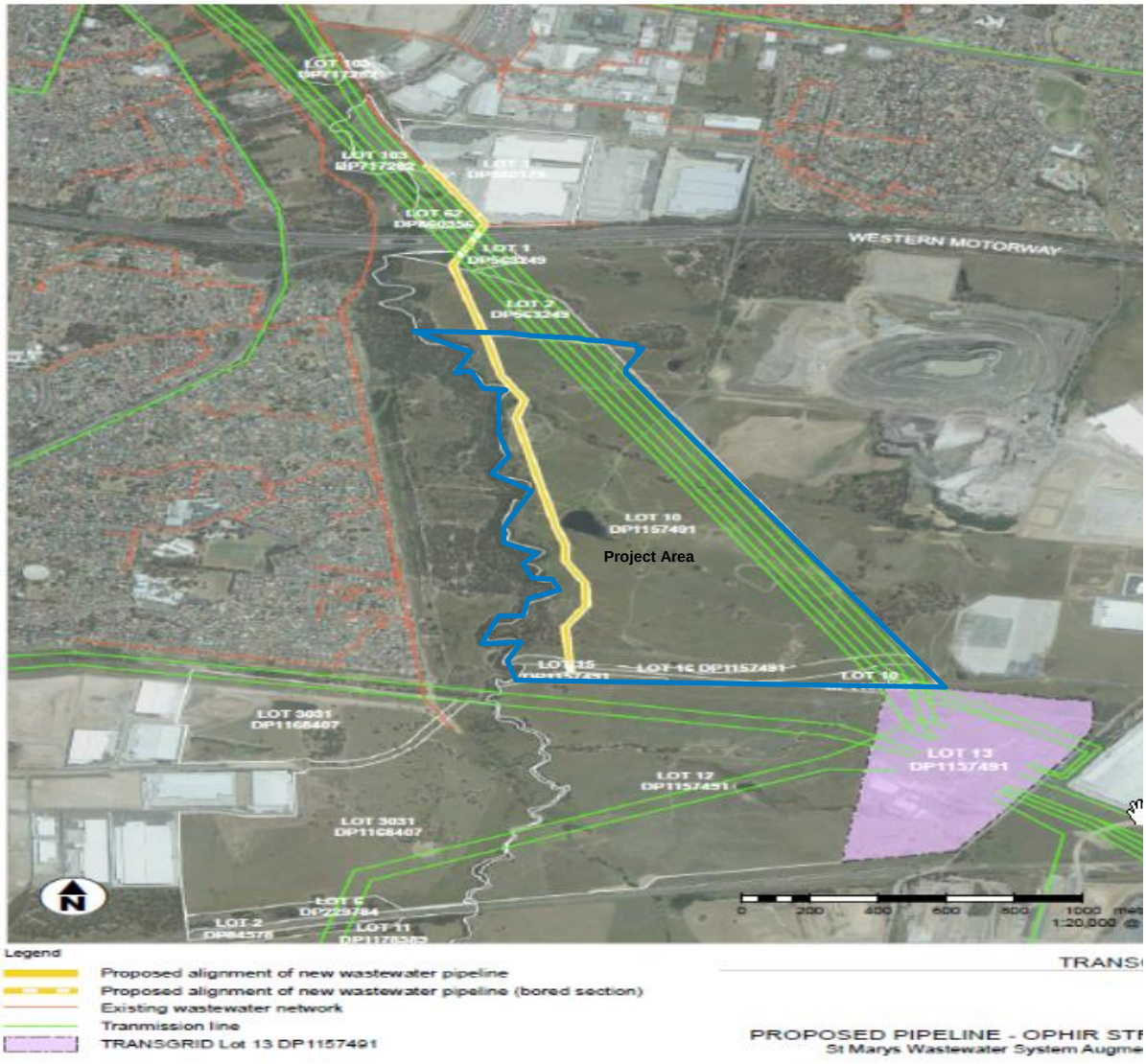
Source: Mott MacDonald

3.2.2 Servicing Strategy Assessment

The Ophir Street Carrier extension has been recently built on-site and designed to accommodate the waste water generated by the proposed development within the Ropes Creek Precinct. It is recommended by SWC that the proposed development discharge sewage directly into the Ophir Street Carrier extension, which will be treated in St Mary's STP. Developers would need to provide minor lead-in sewer mains at their own expense to connect into the Ophir Street Carrier. The sewage pipeline alignment is indicated in *Figure 3.2*.

Please refer to *Appendix B.3* for an indicative waste water servicing plan.

Figure 3.2: Ophir Street Carrier Extension



Source: Feasibility Letter issued by Sydney Water Corporation on October 6th, 2015

3.3 Electrical – Endeavour Energy & TransGrid

As part of the servicing strategy for Precinct A in BWSEA, substantial development of electrical infrastructure and its associated services have already been completed by Endeavour Energy (EE) and TransGrid. Utility authorities have confirmed the servicing strategies discussed in the following sections.

3.3.1 Capacity Estimation

Low voltage electrical reticulation will be provided by EE within the project area. As a result of technical review, EE has indicated that there would be sufficient capacity to facilitate the proposed development from North Eastern Creek Zone Substation as well as Easter Creek Zone Substation. *Table 3.5* has indicated the estimated electrical loading for the proposed general industrial complex at Ropes Creek Precinct.

Table 3.5: Estimated Electrical Loading

Average Loading (kVA/m^2)	Developable Land (ha)	Facility Area (ha)	Total Loading (kVA)
0.05	90	54	27,000

Source: Mott MacDonald

3.3.2 Servicing Strategy Assessment

In order to accommodate demands generated by the industrial complex, electricity will be supplied from TransGrid's Western Sydney Substation then to EE's zone substations and transformed into lower voltage for reticulation.

Depending on the final road layouts of this precinct, it is anticipated that Eastern Creek Zone Substation will supply the southern part of the precinct while North Eastern Creek Zone Substation will supply the Northern part (*Figure 3.3*).

In consultation with EE, the existing electrical reticulation network may have limited capacity to service initial development. Once the initial supply is exhausted, the entire development must be supplied by new feeders respectively. New feeders may follow the existing overhead feeders' (11kV) alignment and extend further to provide electrical reticulation along the final road alignment. Indicative electrical infrastructures are detailed in *Table 3.6* and *Figure 3.4 & 3.5*.

Please refer to the advice letter issued by EE in *Appendix D.2* for detailed information.

Figure 3.3: Electrical Servicing Strategy

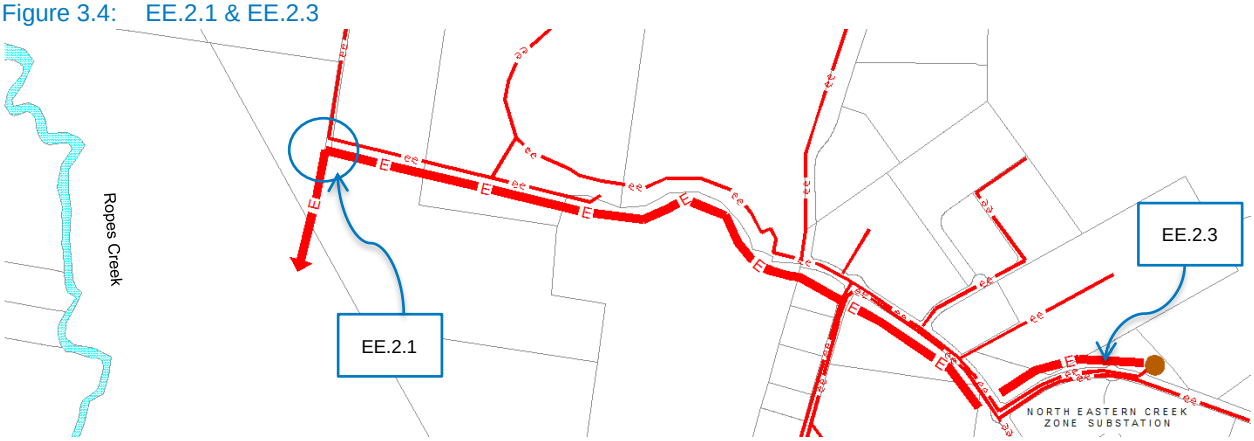
Source: Advice Letter issued by Endeavour Energy on September 30th 2015

Table 3.6: Indicative Electrical Feeders within Ropes Creek Precinct

Indicative Asset Description	Asset Reference	Comments
Initial 11kV feeder connection	EE.2.1	To supply initial electricity from North Eastern Creek Zone Substation (approximately 250m in length)
Initial 11kV feeder connection	EE.2.2	To supply initial electricity from Eastern Creek Zone Substation (approximately 1350m in length)
New 11kV feeder	EE.2.3	To supply electricity from North Eastern Creek Zone Substation once the initial supply being exhausted (approximately 2300m in length)
New 11kV feeder	EE.2.4	To supply electricity from Eastern Creek Zone Substation once the initial supply being exhausted (approximately 1700m in length)

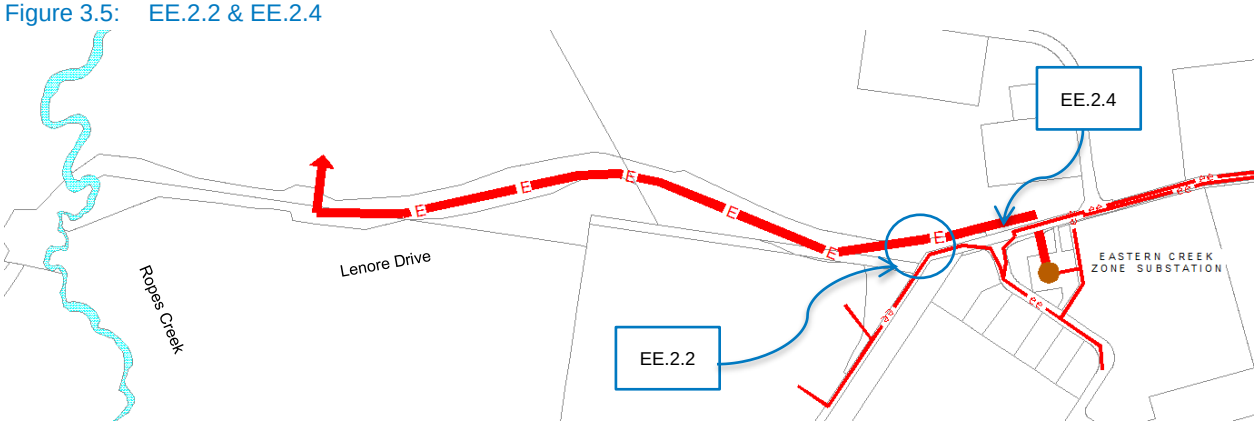
Source: Mott MacDonald

Figure 3.4: EE.2.1 & EE.2.3



Source: MMD-357627-C-SK-DPE-XX-0400 (prepared by Mott MacDonald)

Figure 3.5: EE.2.2 & EE.2.4



Source: MMD-357627-C-SK-DPE-XX-0400 (prepared by Mott MacDonald)

Part of the land has been dedicated as easement for TransGrid transmission lines. Some land uses are permitted to occur in the easement, where adequate clearance along the route of transmission lines is achieved. All works within the easement need to be approved by TransGrid. At this stage TransGrid has no intension to widen their existing easement corridor therefore having no impacts on the proposed development; however, consultations with TransGrid at the detail design stage with regards to the following siteworks are required.

- Any potential earthwork within the existing easement area;
- Ensure the height of proposed development within the existing easement area is in compliance with TransGrid's vertical clearance requirements; and
- Any future development within the existing easement area should be away from TransGrid's transmission, pilot, communication or fibre optic cables where applicable.

3.4 Gas – Jemena

There is limited existing gas network within the BSWEA. In consultation with Jemena, the gas network expansion into the project area is based on a specific request from a proponent (non-essential service) and where commercial viable.

3.4.1 Capacity Estimation

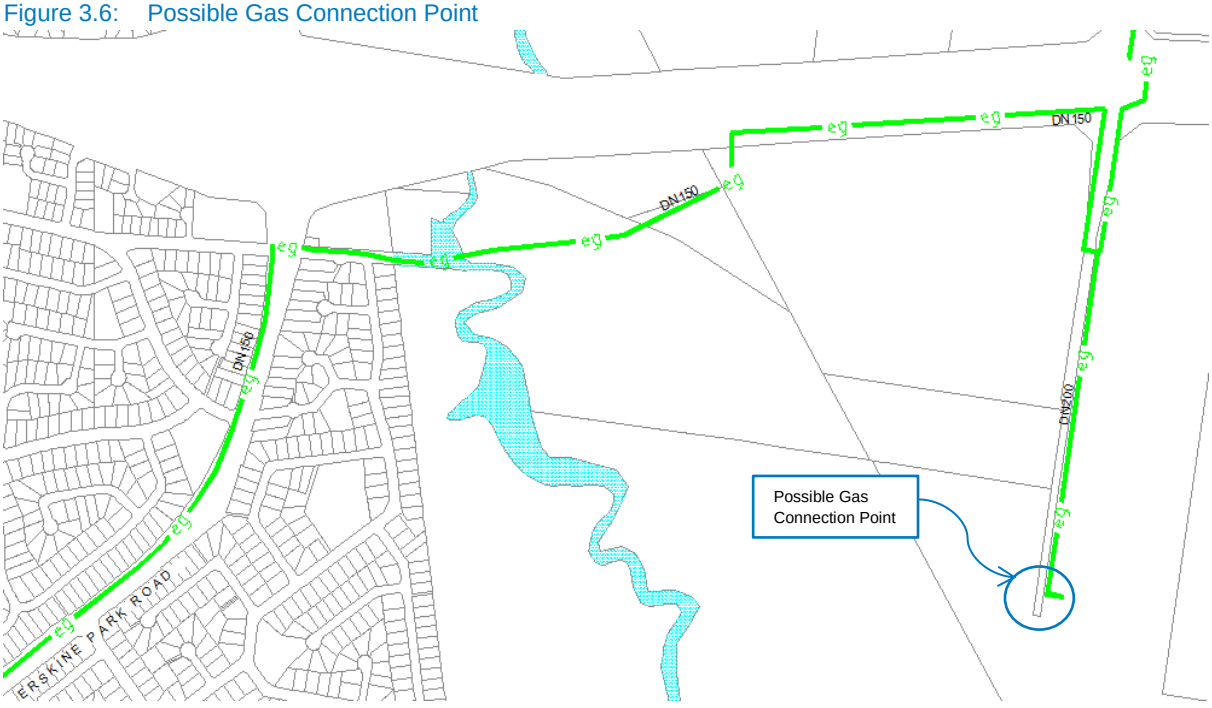
As gas is not an essential service, Jemena has no current plans to extend their service into the site area; however, Jemena has confirmed that sufficient capacity and connection points are available for the proposed development at Ropes Creek Precinct should a future tenant wish to connect.

3.4.2 Servicing Strategy Assessment

Jemena has advised that connection may be made to the existing facilities along Archbold Road by providing approximately 350m lead-in secondary gas mains. *Figure 3.6* has indicated the possible connection point as below.

The potential land use and gas loads may not offer sufficient incentives for private industry or network operators to invest in the installation of a gas network and are assessed by Jemena on a case by base basis.

Figure 3.6: Possible Gas Connection Point



Source: MMD-357627-C-SK-DPE-XX-0600 (prepared by Mott MacDonald)

3.5 Telecommunications

The NBN does not currently have any assets or roll-out plans within the project area, however, NBN will be the future service provider in lieu of Telstra to facilitate the area and also the Broader Western Sydney Employment Area (BWSEA).

Details of the NBN rollout will become available and/or produced as applications are lodged for development.

There is currently existing Telstra assets along Lenore Drive. Should the developer wish to receive telecommunications service from Telstra or another service provider, connection will be made at this location.

4.0 Alternative Servicing Strategies

Forward looking developers of industrial facilities within the Rope Creek Precinct could potentially have alternative servicing strategies available for implementation with a focus on mature, lower-cost opportunities.

4.1 Alternative Potable Water Servicing Strategy

4.1.1 Regional Servicing Strategy

Recycled Water
Considering that the proposed development within Ropes Creek Precinct is industrial/commercial, treated water from nearby water filtration plants (the Prospect, Orchard Hills and Warragamba) can be used to supplement non-drinking water demands, eg. toilet flushing, irrigation and etc. This strategy is dependent on implementation by SWC or adoption by a 3rd party operator.

4.1.2 Local Servicing Strategy

Onsite Rainwater Harvesting
With the vast catchment area (hardstand area) within the proposed industrial development, it is feasible to harvest rainwater onsite via installing in-house pump system. R can also be collected from roofs and stored in rainwater tanks, which can be used as alternative or supplementary water supply. This initiative can be used to reduce reliance on SWC's watermains under drought conditions and to further reduce water footprint.

4.2 Alternative Waste Water Servicing Strategy

4.2.1 Local Servicing Strategy

Reuse of Greywater and Blackwater
Onsite sewage treatment could be provided by individual developer for water reuse. Primary treatment systems include septic tanks, incinerating toilets, wet composting systems and dry composting toilets.

4.3 Alternative Electrical Servicing Strategy

4.3.1 Regional Servicing Strategy

Bio Gas
The development of organic waste-processing plants, such as sewage treatment plants or landfill sites within the BWSEA presents a limited opportunity to generate electricity from renewable methane sources produced as a by-product of waste processing.

Hydroelectricity
There are limited opportunities for the implementation of hydroelectric generation within the BWSEA largely due to environmental restrictions, such as topography and legal rights of access to natural water courses in the project area.

4.3.2 Local Servicing Strategy

Solar Power
The development of solar power systems at industrial and commercial site presents the most viable opportunity for renewable energy implementation within the BWSEA. Two specific forms of solar power could be considered by site developers of industrial and commercial buildings with sizeable, north-facing roof space:

- On-site electricity generation via rooftop solar photovoltaic (PV) systems; and
- On-site hot water generation via rooftop solar arrays.

Low-carbon Cogeneration
Reasonable opportunities exist to develop combined cogeneration installations (also known as combined heat and power) at large-scale industrial and commercial premises within the BWSEA.

Wind Power
Wind power involves converting wind energy into electricity by using wind turbines. A wind turbine creates reliable, cost-effective, pollution free energy that is also affordable to the local developers. Typical means to capture wind power is to construct a local wind farm, which could be built by multiple developers and provide alternative or supplementary electricity during peak seasons at a lower expense.

4.4 Alternative Telecommunication Servicing Strategy

4.4.1 Regional Servicing Strategy

Wireless
As there is already good coverage of the BWSEA area via existing wireless infrastructure, the servicing strategy for the BWSEA will involve augmentation to existing base stations and construction of additional base stations.

5.0 Appendices

Appendix A. Dial Before You Dig (DBYD) Preliminary Services Investigation

Asset Information

Legend

Sewer

Sewer Main (with flow arrow & size type text) — 225 PVC
Disused Main
Rising Main
Maintenance Hole (with upstream depth to invert) — 1.7
Sub-surface chamber
Maintenance Hole with Overflow chamber
Ventshalft EDUCT — VSE
Ventshaft INDUCT — VS
Property Connection Point (with chainage to downstream MH) — 10.5
Concrete Encased Section — Concrete Encased
Terminal Maintenance Shaft — TMS
Maintenance Shaft — MS
Rodding Point — RP
Lamphole
Vertical — VERT
Pumping Station — SP0882
Sewer Rehabilitation

Pressure Sewer

Pressure Sewer Main
Pump Unit (Alarm, Electrical Cable, Pump Unit) — A
Property Valve Boundary Assembly
Stop Valve
Reducer / Taper
Flushing Point — FP

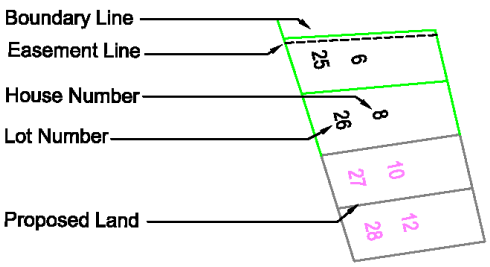
Vacuum Sewer

Pressure Sewer Main
Division Valve
Vacuum Chamber
Clean Out Point

Stormwater

Stormwater Pipe
Stormwater Channel
Stormwater Gully
Stormwater Maintenance Hole

Property Details



Sydney Water Heritage Site (please call **132 092** and ask for the **Heritage Unit**)

Water

WaterMain - Potable (with size type text) — 200 PVC
Disconnected Main - Potable
Proposed Main - Potable
Water Main - Recycled
Special Supply Conditions - Potable
Special Supply Conditions - Recycled
Restrained Joints - Potable
Restrained Joints - Recycled
Hydrant
Maintenance Hole
Stop Valve
Stop Vale with By-pass
Stop Valve with Tapers
Closed Stop Valve
Air Valve
Valve
Scour
Reducer / Taper
Vertical Bends
Reservoir
Recycled Water is shown as per Potable above. Colour as indicated

Private Mains

Potable Water Main
Recycled Water Main
Sewer Main
Symbols for Private Mains shown grey

Asset Information

Pipe Types

ABS	Acrylonitrile Butadiene Styrene	**AC**	Asbestos Cement
BRICK	Brick	**CI**	Cast Iron
CICL	Cast Iron Cement Lined	**CONC**	Concrete
COPPER	Copper	**DI**	Ductile Iron
DICL	Ductile Iron Cement (mortar) Lined	**DIPL**	Ductile Iron Polymeric Lined
EW	Earthenware	**FIBG**	Fibreglass
FL BAR	Forged Locking Bar	**GI**	Galvanised Iron
GRP	Glass Reinforced Plastics	**HDPE**	High Density Polyethylene
MS	Mild Steel	**MSCL**	Mild Steel Cement Lined
PE	Polyethylene	**PC**	Polymer Concrete
PP	Polypropylene	**PVC**	Polyvinylchloride
PVC - M	Polyvinylchloride, Modified	**PVC - O**	Polyvinylchloride, Oriented
PVC - U	Polyvinylchloride, Unplasticised	**RC**	Reinforced Concrete
RC-PL	Reinforced Concrete Plastics Lined	**S**	Steel
SCL	Steel Cement (mortar) Lined	**SCL IBL**	Steel Cement Lined Internal Bitumen Lined
SGW	Salt Glazed Ware	**SPL**	Steel Polymeric Lined
SS	Stainless Steel	**STONE**	Stone
VC	Vitrified Clay	**WI**	Wrought Iron
WS	Woodstave		

Further Information

Please consult the Dial Before You Dig enquiries page on the Sydney Water website

For general enquiries please call the Customer Contact Centre on **132 092**

In an emergency, or to notify Sydney Water of damage or threats to its structures, call 13 20 90 (24 hours, 7 days)

A0

RD

CHATSWORTH

CREEK

PHWY

INDUS ST

DBYD Address:
n/a Old Wallgrove Road
Eastern Creek NSW 2766

DBYD Job No: 9529072

DBYD Sequence No: 47226240

SYDNEY WATER CORPORATION

Scale: 1:2000

Date of Production: 12/08/2015

Plan 2 of 3

0m 30m 60m 90m 120m 150m

A0

DBYD Address:
n/a Old Wallgrove Road
Eastern Creek NSW 2766

DBYD Job No: 9529072

DBYD Sequence No: 47226240

SYDNEY WATER CORPORATION

Scale: 1:2000

Date of Production: 12/08/2015

Plan 3 of 3

0m 30m 60m 90m 120m 150m

Network Protection

High Pressure - Assets Affected

In reply to your enquiry, there are **High Pressure Gas Mains** in the vicinity of your intended work, as generally illustrated on the attached map. There may also be other mains or services at the location, as discussed in the warning below. For an explanation of the map, please see the key below.
The following excavations guidelines apply:

Excavation Guidelines:

Prior to **any** excavations in this area, you ***must*** contact the High Pressure Response Coordinator on **1300 665 380**. ***(Appointments will be coordinated with availability of a Pipeline Technician)*** to arrange a survey. For all works in the vicinity of High Pressure Gas Mains you must arrange for a Pipeline Technician to attend and supervise all excavations. Charges apply for attendance of any works outside the hours of 7am to 4pm, Monday to Friday ("**Standard Business Hours**") and for any attendance during Standard Business Hours that is longer than 2 hours.
In accordance with clause 34(5) of the Gas Supply (Safety and Network Management) Regulation 2013 (NSW), you should be informed that all excavation, (including pot-holing by hand to confirm the location of pipes) should be performed in accordance with "***Work Near Underground Assets Guideline"*** *published in 2007 by the Work Cover Authority.*
A copy of this Guideline is available at: www.workcover.nsw.gov.au

KEY

	MAX ALLOWABLE OPERATING PRESSURE	
T	TRUNK PIPELINE	7000 kPa
P	PRIMARY MAIN	3500 kPa
S	SECONDARY MAIN	1050 kPa
400	NETWORK MAIN	400 kPa
	NETWORK MAIN	300 kPa
	NETWORK MAIN	210 kPa
100	NETWORK MAIN	100 kPa
30	NETWORK MAIN	30 kPa
	NETWORK MAIN	7 kPa
	NETWORK MAIN	2 kPa
	PROPOSED MAINS	

	VALVE
S	SYSTEM PRESSURE REGULATOR
	SIPHON
123	NETWORK NODE
123S	NETWORK VALVE NODE
1298	VALVE NUMBER
6NB	6 INCH CAST IRON MAIN
150MM	150MM STEEL MAIN
110MM PE/NY	110MM POLYETHYLENE/NYLON MAIN
6 NB 50MM NY	50MM NYLON INSERTED INTO 6NB CAST IRON MAIN
1.2MBL	DISTANCE IN METRES OF MAIN FROM BOUNDARY LINE
1957	YEAR LAID
123	HOUSE NUMBER
P	PRESSURE MONITORING STATION
	MUNICIPALITY BOUNDARY
	NETWORK BOUNDARY
PR 11-2 3	STEEL MAIN PROJECT NUMBER

Warning: The enclosed plans show the position of Jemena Gas Networks (NSW) Ltd's underground gas mains and installations in public gazetted roads only. **Individual customers' services and services belonging to other third parties are not included** on these plans. These plans have been prepared solely for the use of Jemena Gas Networks (NSW) Ltd and Jemena Asset Management Pty Ltd (together "**Jemena**") and any reliance placed on these plans by you is entirely at your own risk. The plans may show the position of underground mains and installations relative to fences, buildings etc., as they existed at the time the mains etc were installed. The plans may not have been updated to take account of any subsequent change in the location or style of those features since the time at which the plans were initially prepared. Jemena makes no warranty as to the accuracy or completeness of the enclosed plans and does not assume any duty of care to you nor any responsibility for the accuracy, adequacy, suitability or completeness of the plans or for any error, omission, lack of detail, transmission failure or corruption in the information provided. Jemena does not accept any responsibility for any loss that you or anyone else may suffer in connection with the provision of these plans, however that loss may arise (including whether or not arising from the negligence of Jemena, its employees, agents, officers or contractors). The recipient of these plans must use their own care and diligence in carrying out their works and must carry out further surveys to locate services at their work site. Persons excavating or carrying out other earthworks will be held responsible for any damage caused to Jemena's underground mains and equipment. Jemena advises that you may be required to carry out potholing by hand if required by a Pipeline Technician to confirm the location of Jemena's main and installations. This must also be performed by you under the supervision of a Pipeline Technician and be carried out in accordance with the Working Near Underground Assets Guideline published in 2007 by Work Cover Authority

In case of Emergency Phone 131 909 (24 hours)

Admin
1300 880 906

Jemena Asset Management Pty Ltd ABN 53 086 013 461
for and on behalf of Jemena Gas Networks (NSW) Ltd ABN 87 003 004 322

HORSLEY PARK IA

SCALE 1:2000

50 0 50 100 150 200

THIS MAP UPDATED ON 21/10/14
THIS PLAN IS DIAGRAMATIC ONLY. DISTANCES SCALED FROM THIS PLAN MAY NOT BE ACCURATE.

DATE ALTERED:..... BY:.....

SM9D	RH7C	RH7D
EP3B	HPIA	HPIB
EP3D	HPIC	HPID

ADJOINING MAPS

NETWORK AREA

MUNICIPALITY AREA

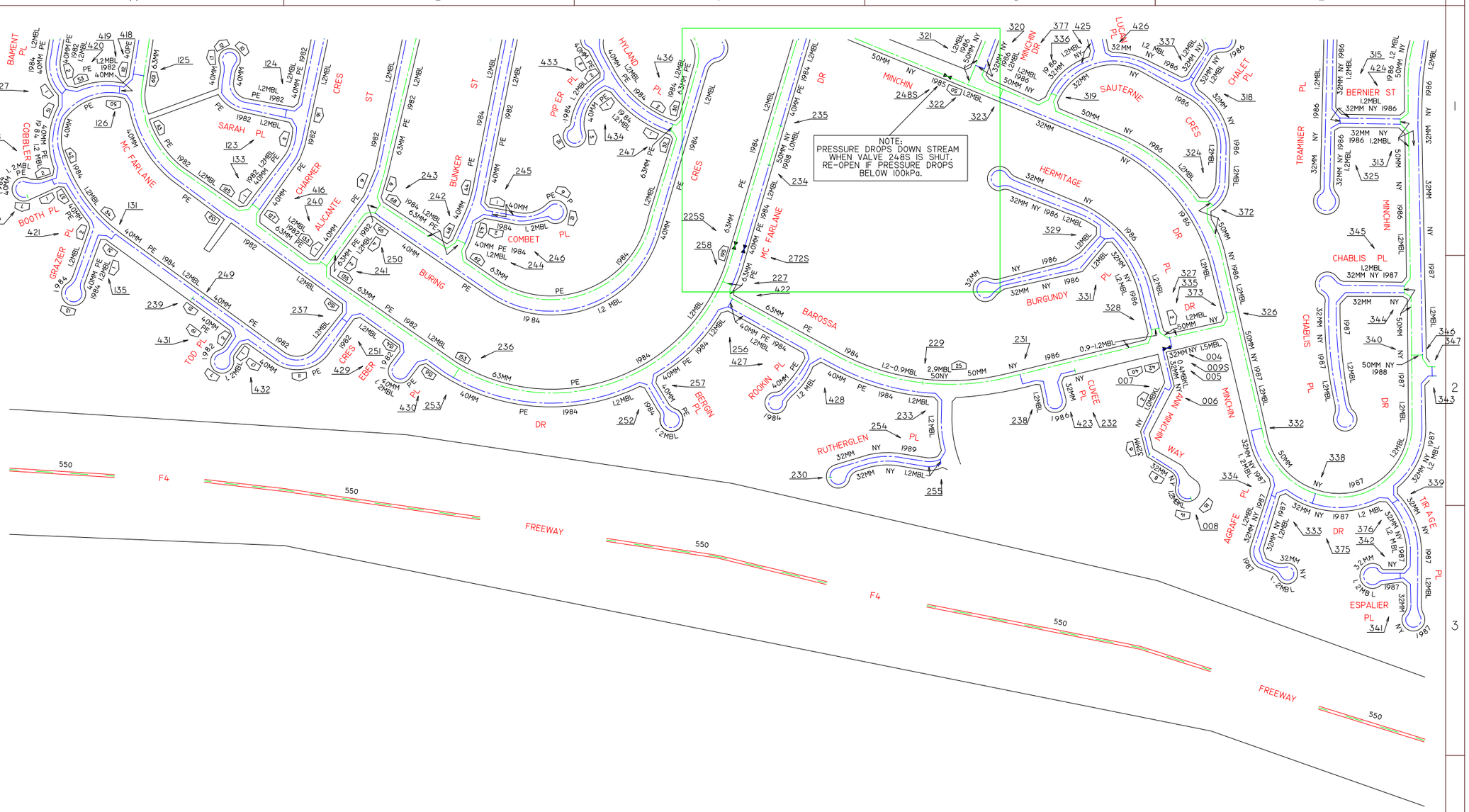
Jemena

KEY

		MAX ALLOWABLE OPERATING PRESSURE
T	TRUNK PIPELINE	7000 kPa
P	PRIMARY MAIN	3500 kPa
S	SECONDARY MAIN	1050 kPa
400	NETWORK MAIN	400 kPa
	NETWORK MAIN	300 kPa
	NETWORK MAIN	210 kPa
100	NETWORK MAIN	100 kPa
30	NETWORK MAIN	30 kPa
	NETWORK MAIN	7 kPa
	NETWORK MAIN	2 kPa
	PROPOSED MAINS	

PR 11-2 3	STEEL MAIN PROJECT NUMBER
P	PRESSURE MONITORING STATION
	VALVE
	SYSTEM PRESSURE REGULATOR
S	SIPHON
123	NETWORK NODE
1235	NETWORK VALVE NODE
298	VALVE NUMBER
6NB	6 INCH CAST IRON MAIN
150MM	150MM STEEL MAIN
110MM PE/NY	110MM POLYETHYLENE/NYLON MAIN
6NB 50MM NY	50MM NYLON INSERTED INTO 6NB MAIN CAST IRON MAIN
1.2MBL	DISTANCE IN METRES OF MAIN FROM BOUNDARY LINE
1957	YEAR LAID
	MUNICIPALITY BOUNDARY
	NETWORK BOUNDARY
123	HOUSE NUMBER

HORSLEY PARK IA



HORSLEY PARK IB

SCALE 1:2000

50 0 50 100 150 200

THIS MAP UPDATED ON 12/07/2012
THIS PLAN IS DIAGRAMATIC ONLY. DISTANCES SCALED FROM THIS PLAN MAY NOT BE ACCURATE.

DATE ALTERED:..... BY:.....

RH7C	RH7D	RH8A
HP1A	HP1B	HP2A
HP1C	HP1D	HP2C

ADJOINING MAPS

NETWORK AREA	MUNICIPALITY AREA
550	BLACKTOWN

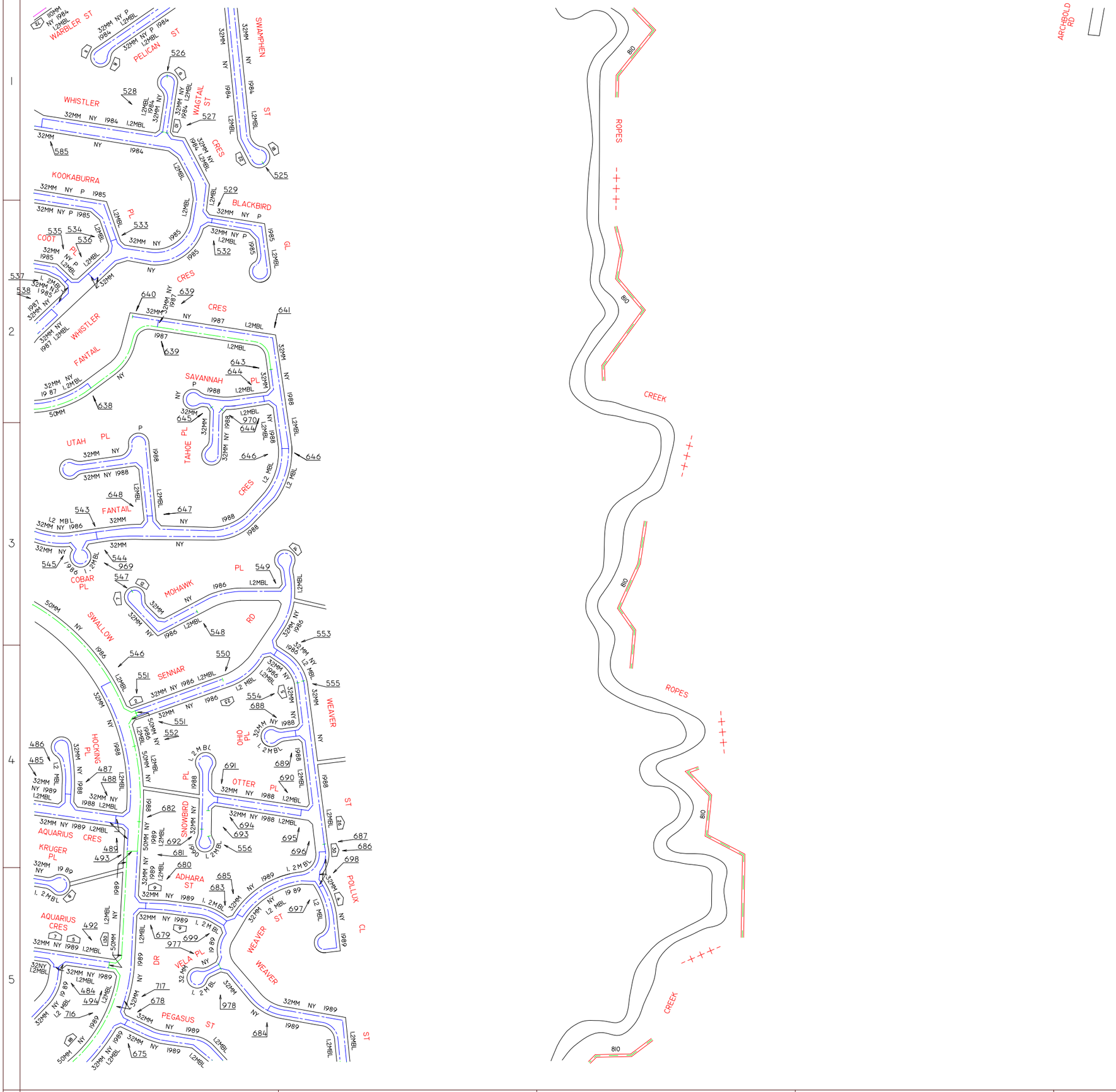
Jemena

KEY

		MAX ALLOWABLE OPERATING PRESSURE
T	TRUNK PIPELINE	7000 kPa
P	PRIMARY MAIN	3500 kPa
S	SECONDARY MAIN	1050 kPa
400	NETWORK MAIN	400 kPa
	NETWORK MAIN	300 kPa
	NETWORK MAIN	210 kPa
100	NETWORK MAIN	100 kPa
30	NETWORK MAIN	30 kPa
	NETWORK MAIN	7 kPa
	NETWORK MAIN	2 kPa
	PROPOSED MAINS	

PR II-2 3	STEEL MAIN PROJECT NUMBER
P	PRESSURE MONITORING STATION
	VALVE
	SYSTEM PRESSURE REGULATOR
S	SIPHON
123	NETWORK NODE
123S	NETWORK VALVE NODE
(129B)	VALVE NUMBER
6NB	6 INCH CAST IRON MAIN
150MM	150MM STEEL MAIN
110MM PE/NY	110MM POLYETHYLENE/NYLON MAIN
(6)NB 50MM NY	50MM NYLON INSERTED INTO 6NB MAIN CAST IRON MAIN
1.2MBL	DISTANCE IN METRES OF MAIN FROM BOUNDARY LINE
1957	YEAR LAID
	MUNICIPALITY BOUNDARY
	NETWORK BOUNDARY
123	HOUSE NUMBER

HORSLEY PARK IB



HORSLEY PARK IC

SCALE 1:2000

50 0 50 100 150 200

THIS MAP UPDATED ON 15/07/97
THIS PLAN IS DIAGRAMATIC ONLY. DISTANCES SCALED FROM THIS PLAN MAY NOT BE ACCURATE.

EP3B	HPIA	HPIB
EP3D	HPIC	HPID
EP6B	HP4A	HP4B

ADJOINING MAPS

810	PEN-RITH / BLACK-TOWN

NETWORK AREA | MUNICIPALITY AREA

Jemena

KEY

		MAX ALLOWABLE OPERATING PRESSURE
T	TRUNK PIPELINE	7000 kPa
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S	SECONDARY MAIN	1050 kPa
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	NETWORK MAIN	300 kPa
	NETWORK MAIN	210 kPa
100	NETWORK MAIN	100 kPa
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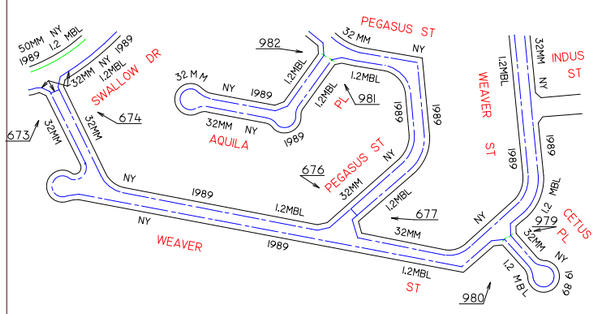
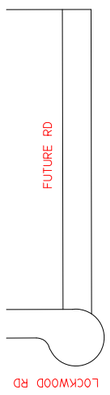
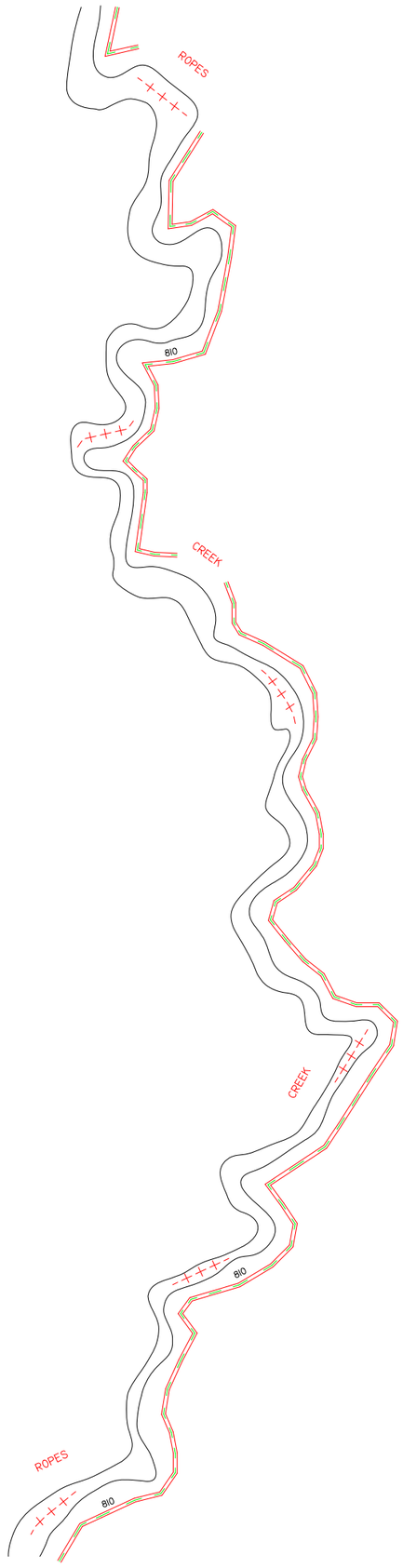
	NETWORK MAIN	7 kPa
	NETWORK MAIN	2 kPa
	PROPOSED MAINS	
PR 11-2 3	STEEL MAIN PROJECT NUMBER	
P	PRESSURE MONITORING STATION	
	VALVE	
	SYSTEM PRESSURE REGULATOR	
S	SIPHON	
123	NETWORK NODE	
123S	NETWORK VALVE NODE	
298	VALVE NUMBER	
6NB	6 INCH CAST IRON MAIN	
150MM	150MM STEEL MAIN	
110MM PE/NY	110MM POLYETHYLENE/NYLON MAIN	
6NB 50MM NY	50MM NYLON INSERTED INTO 6NB MAIN CAST IRON MAIN	
1.2MBL	DISTANCE IN METRES OF MAIN FROM BOUNDARY LINE	
1957	YEAR LAID	
	MUNICIPALITY BOUNDARY	
	NETWORK BOUNDARY	
123	HOUSE NUMBER	

HORSLEY PARK IC







HORSLEY PARK 4A

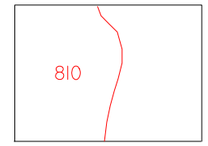
SCALE 1:2000

50 0 50 100 150 200

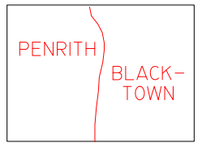
THIS MAP UPDATED ON 15/07/97
THIS PLAN IS DIAGRAMATIC ONLY. DISTANCES SCALED FROM THIS PLAN MAY NOT BE ACCURATE.

EP3D	HPIC	HPID
EP6B	HP4A	HP4B
EP6D	HP4C	HP4D

ADJOINING MAPS



NETWORK AREA



MUNICIPALITY AREA

Jemena

KEY

		MAX ALLOWABLE OPERATING PRESSURE
T	TRUNK PIPELINE	7000 kPa
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400	NETWORK MAIN	400 kPa
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	NETWORK MAIN	210 kPa
100	NETWORK MAIN	100 kPa
30	NETWORK MAIN	30 kPa
	NETWORK MAIN	7 kPa
	NETWORK MAIN	2 kPa
	PROPOSED MAINS	
PR 11-2 3	STEEL MAIN PROJECT NUMBER	
P	PRESSURE MONITORING STATION	
	VALVE	
	SYSTEM PRESSURE REGULATOR	
S	SIPHON	
123	NETWORK NODE	
123S	NETWORK VALVE NODE	
298	VALVE NUMBER	
6NB	6 INCH CAST IRON MAIN	
150MM	150MM STEEL MAIN	
110MM PE/NY	110MM POLYETHYLENE/NYLON MAIN	
6NB 50MM NY	50MM NYLON INSERTED INTO 6NB MAIN CAST IRON MAIN	
1.2MBL	DISTANCE IN METRES OF MAIN FROM BOUNDARY LINE	
1957	YEAR LAID	
	MUNICIPALITY BOUNDARY	
	NETWORK BOUNDARY	
123	HOUSE NUMBER	

HORSLEY PARK 4A

If further clarification is required, please contact:
Endeavour Energy
Phone: (02) 9853 4161 (8:00am-4:30pm Mon-Fri)
Emergency Phone Number: 131 003

DBYD Underground Search Report

Date: 12/08/2015

DBYD Sequence No: 47226236 **DBYD Job No:** 9529072

ENDEAVOUR ENERGY ASSETS AFFECTED

To:	Mr Dylan Chapman		Company:	Mott Macdonald	
Address:	Level 10 383 Kent St, Sydney, NSW 2000				
Cust. ID:	1084185	Email:	dylan.chapman@mottmac.com		
Phone:	0290989800	Mobile:	0434845768	Fax:	Not Supplied
Enquiry Location:	Old Wallgrove Road, Eastern Creek, NSW 2766				

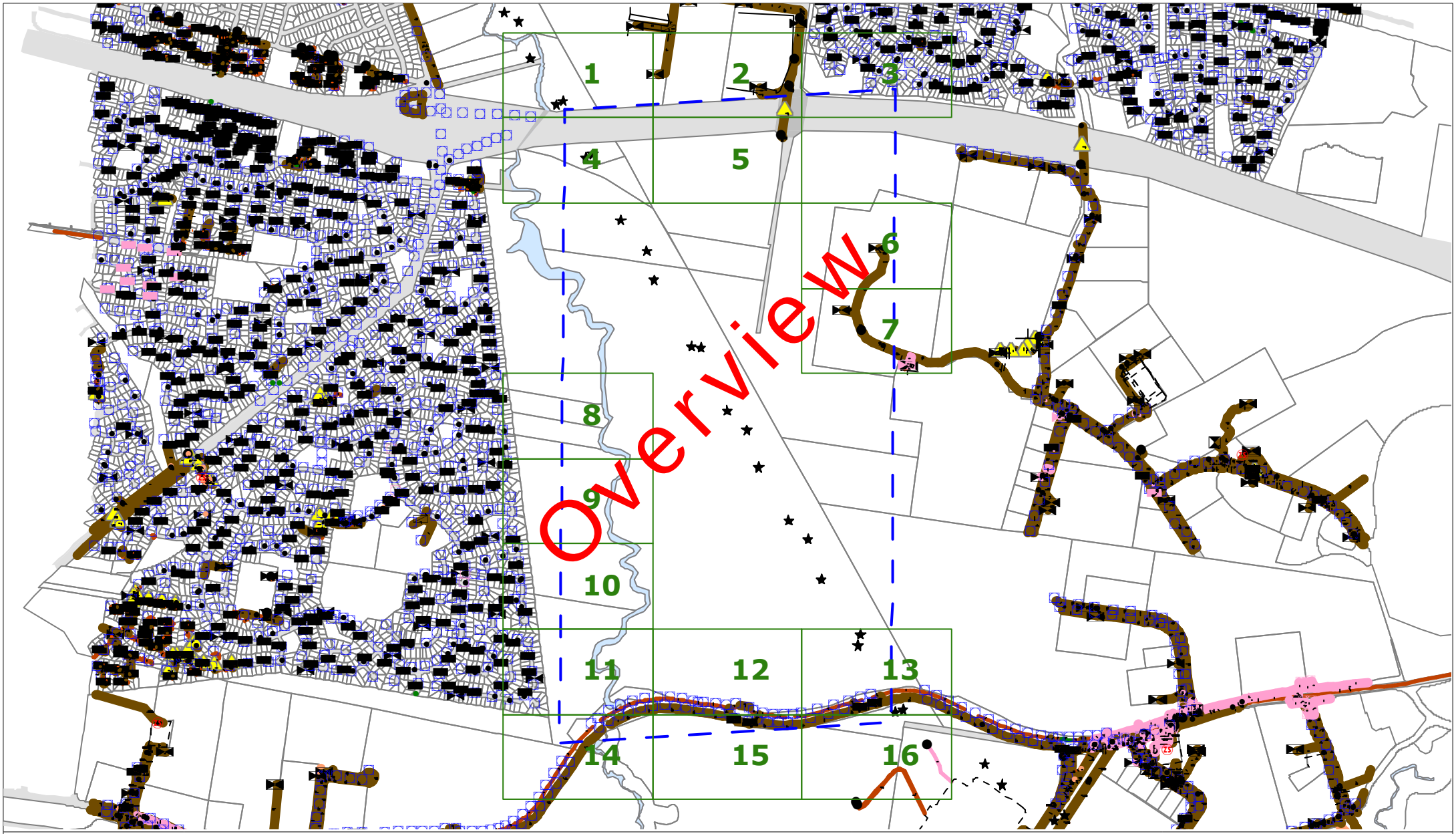
Our Search has shown that **UNDERGROUND ASSETS ARE PRESENT** on our plans within the nominated enquiry location. This search is based on the graphical position of the excavation site as denoted in the DBYD customer confirmation sheet.

WARNING

- **All electrical apparatus shall be regarded as live until proved de-energised.** Contact with live electrical apparatus will cause severe injury or death.
- In accordance with the *Electricity Supply Act 1995*, you are obliged to report any damage to Endeavour Energy Assets immediately by calling **131 003**.
- The customer must obtain a new set of plans from Endeavour Energy if work has not been started or completed within twenty **(20)** working days of the original plan issue date.
- The customer must contact Endeavour Energy if any of the plans provided have blank pages, as some underground asset information may be incomplete.
- Endeavour Energy underground earth grids may exist and their location **may not** be shown on plans. Persons excavating are expected to exercise all due care, especially in the vicinity of padmount substations, pole mounted substations, pole mounted switches, transmission poles and towers.
- Endeavour Energy plans **do not** show any underground customer service mains or information relating to service mains within private property.
- Asbestos or asbestos-containing material may be present on or near Endeavour Energy's underground assets.
- Organo-Chloride Pesticides (OCP) may be present in some sub-transmission trenches.
- All plans must be printed and made available at the worksite where excavation is to be undertaken. Plans must be reviewed and understood by the crew on site prior to commencing excavation.

SUPPLEMENTARY MATERIAL

Material	Purpose	Location
DBYD Cover Letter	Endeavour Energy DBYD response Cover Letter	Attached
DBYD Important Information & Disclaimer	Endeavour Energy disclaimer, responsibilities and information on understanding plans	Attached
DBYD Response Plans	Endeavour Energy DBYD plans	Attached
Work Cover NSW *"Work near underground assets: Guide"*	Guideline for anyone involved in construction work near underground assets	Contact Work Cover NSW for a copy
Work Cover NSW *"Excavation work: Code of practice"*	Practical guidance on managing health and safety risks associated with excavation	URL [Click Here]
Safe Work Australia *"Working in the vicinity of overhead and underground electric lines guidance material"*	Provides information on how to manage risks when working in the vicinity of overhead and underground electric lines at a workplace	URL [Click Here]
Endeavour Energy Safety Brochures & Guides	To raise awareness of dangers of working on or near Endeavour Energy's assets	URL [Click Here]



Endeavour Energy

ENDEAVOUR ENERGY WARNING

This plan shows the approximate location of underground cables relative to fixtures existing when the cables were laid, and has been prepared solely for Endeavour Energy's own use. Endeavour Energy has taken all reasonable steps to ensure that the information is accurate as possible but will accept no liability for inaccuracies in the information shown on such plans from any cause whatsoever arising. Persons excavating are expected to exercise all due care in the vicinity where cables are indicated and will be held responsible for any damage caused to Endeavour Energy's property.

ALL ELECTRICAL APPARATUS SHALL BE CONSIDERED LIVE UNTIL PROVED DE-ENERGISED.
Contact with live electrical apparatus will cause severe injury or death.

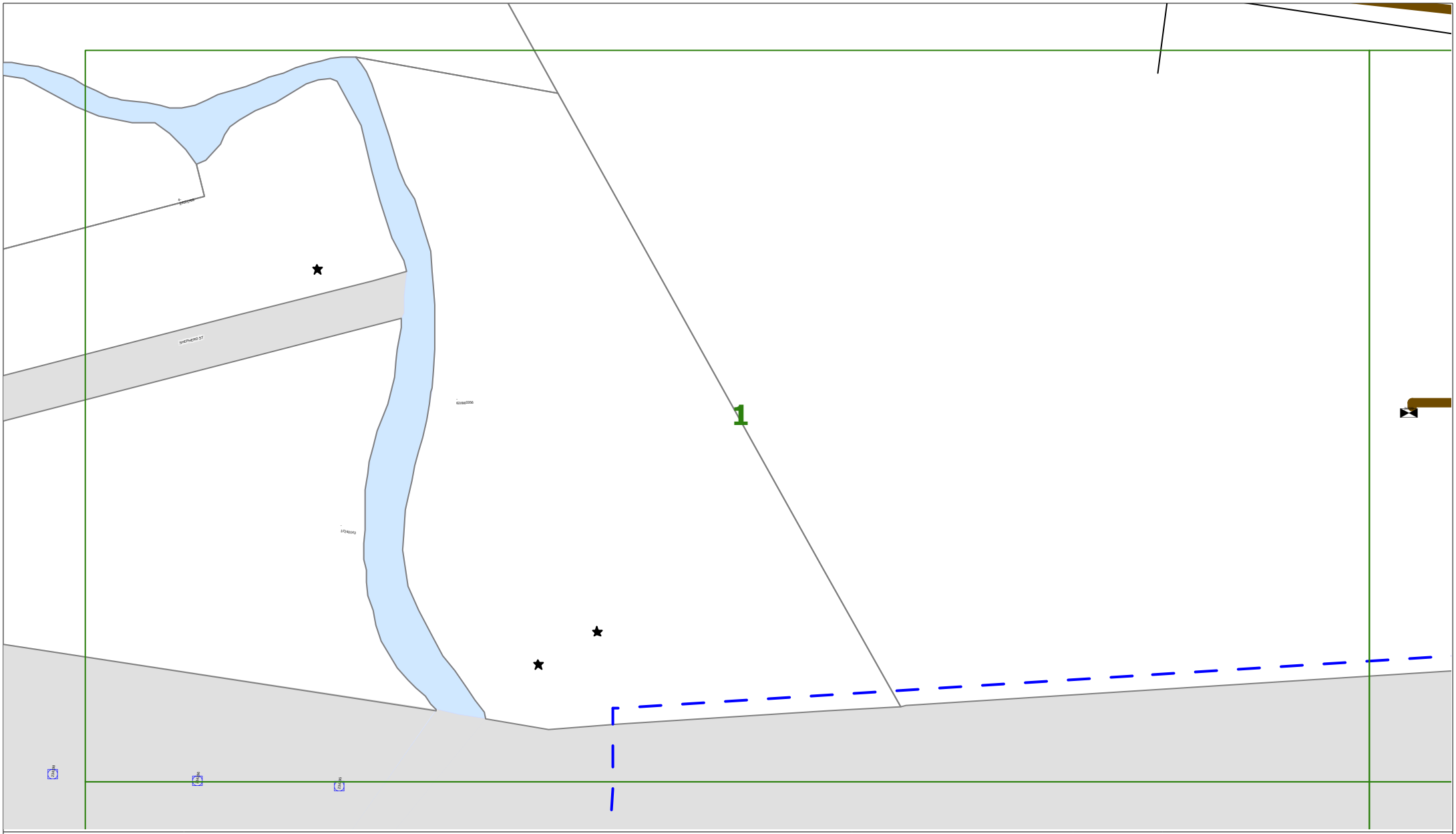
Those excavating near Endeavour Energy's cables should be aware that **ASBESTOS OR ASBESTOS - CONTAINING MATERIAL MAY BE PRESENT** in Endeavour Energy's underground assets and that Organo-Chloride Pesticides(OCP) may be present in some sub-transmission trenches.

WARNING
ASBESTOS

N

DO NOT SCALE

DBYD Sequence Number:	47226236
Issued Date:	12/08/2015



Endeavour Energy

ENDEAVOUR ENERGY WARNING

This plan shows the approximate location of underground cables relative to fixtures existing when the cables were laid, and has been prepared solely for Endeavour Energy's own use. Endeavour Energy has taken all reasonable steps to ensure that the information is accurate as possible but will accept no liability for inaccuracies in the information shown on such plans from any cause whatsoever arising. Persons excavating are expected to exercise all due care in the vicinity where cables are indicated and will be held responsible for any damage caused to Endeavour Energy's property.

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WARNING
ASBESTOS

N

DO NOT SCALE

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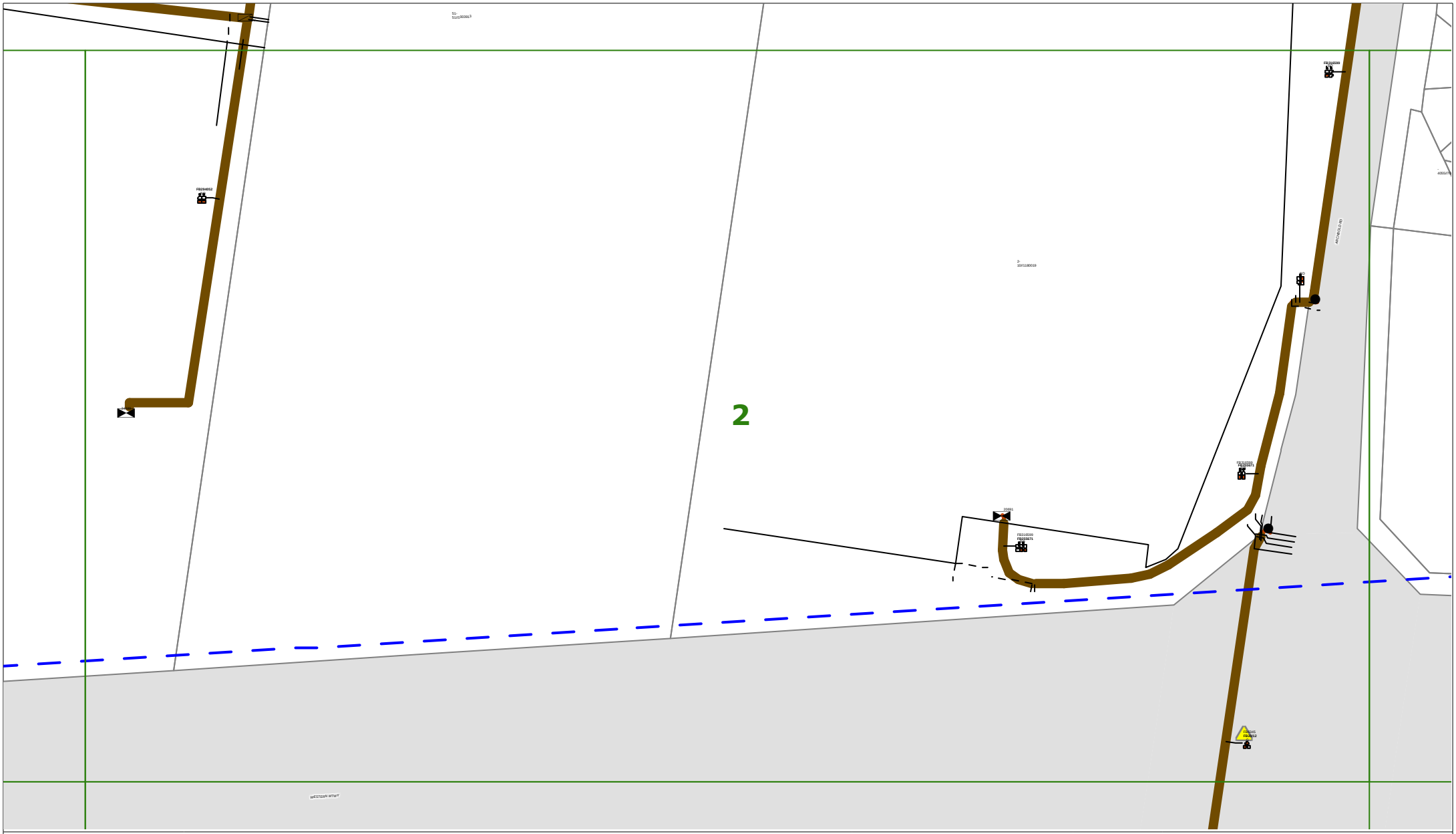

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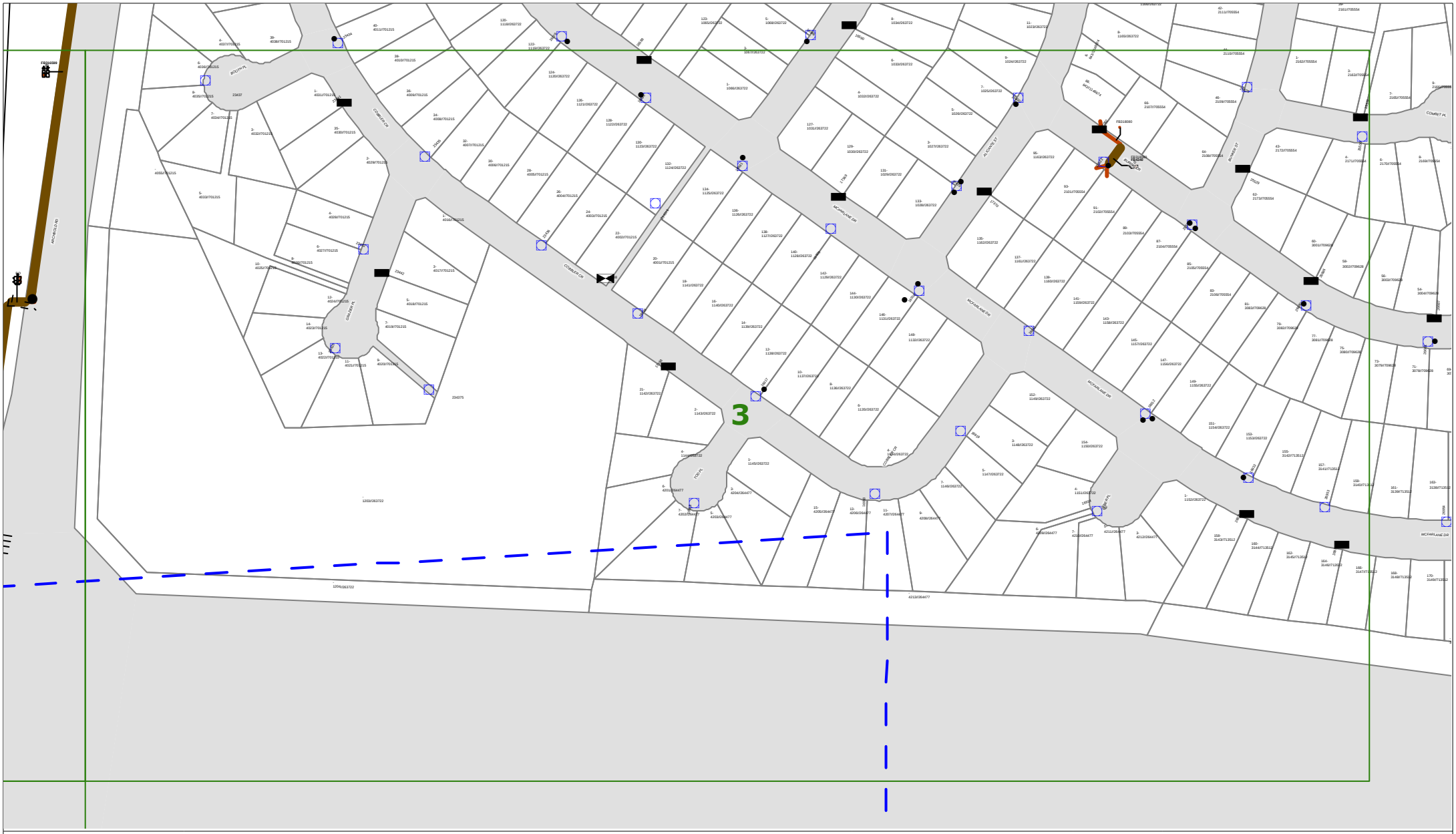

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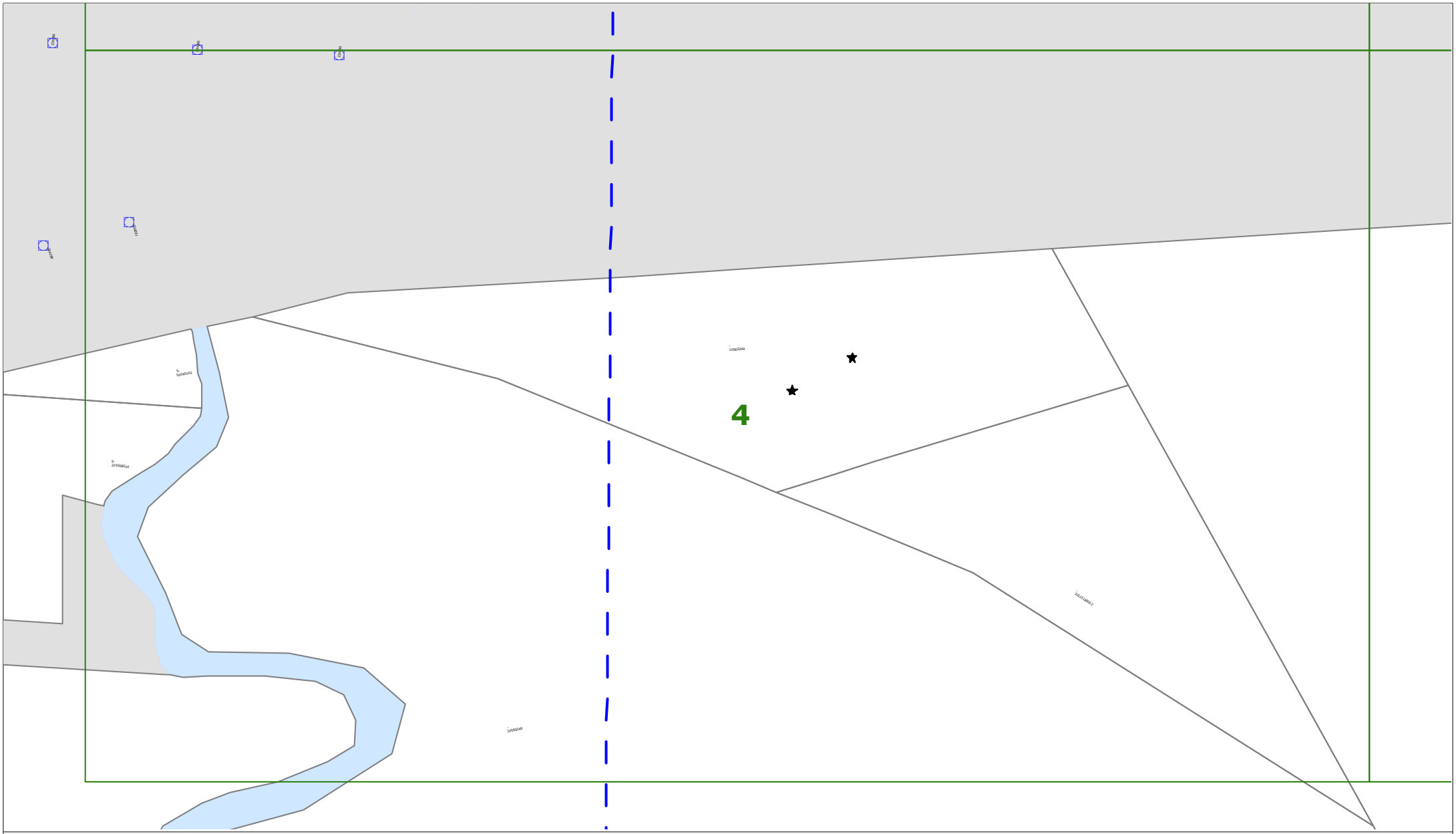

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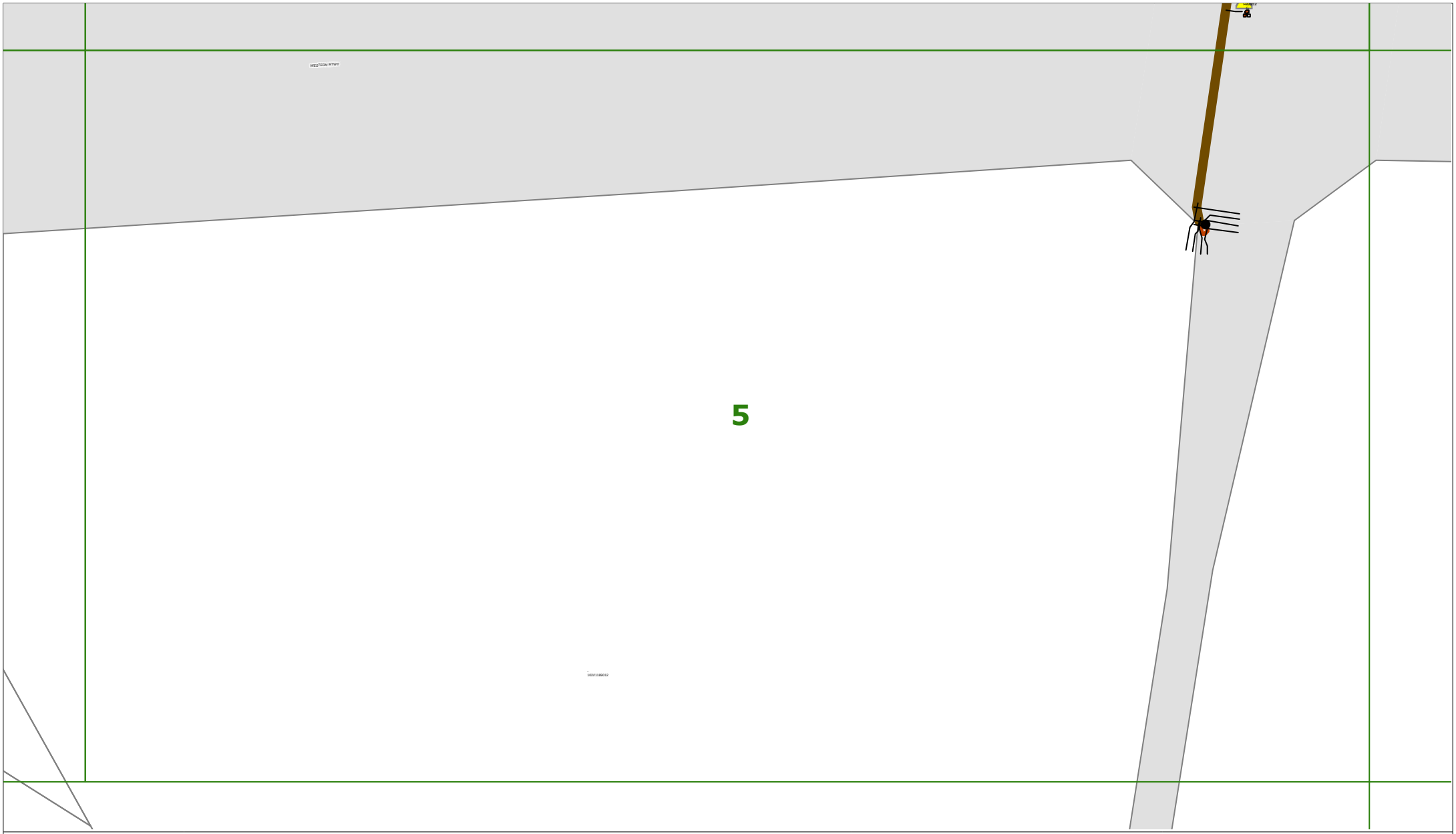

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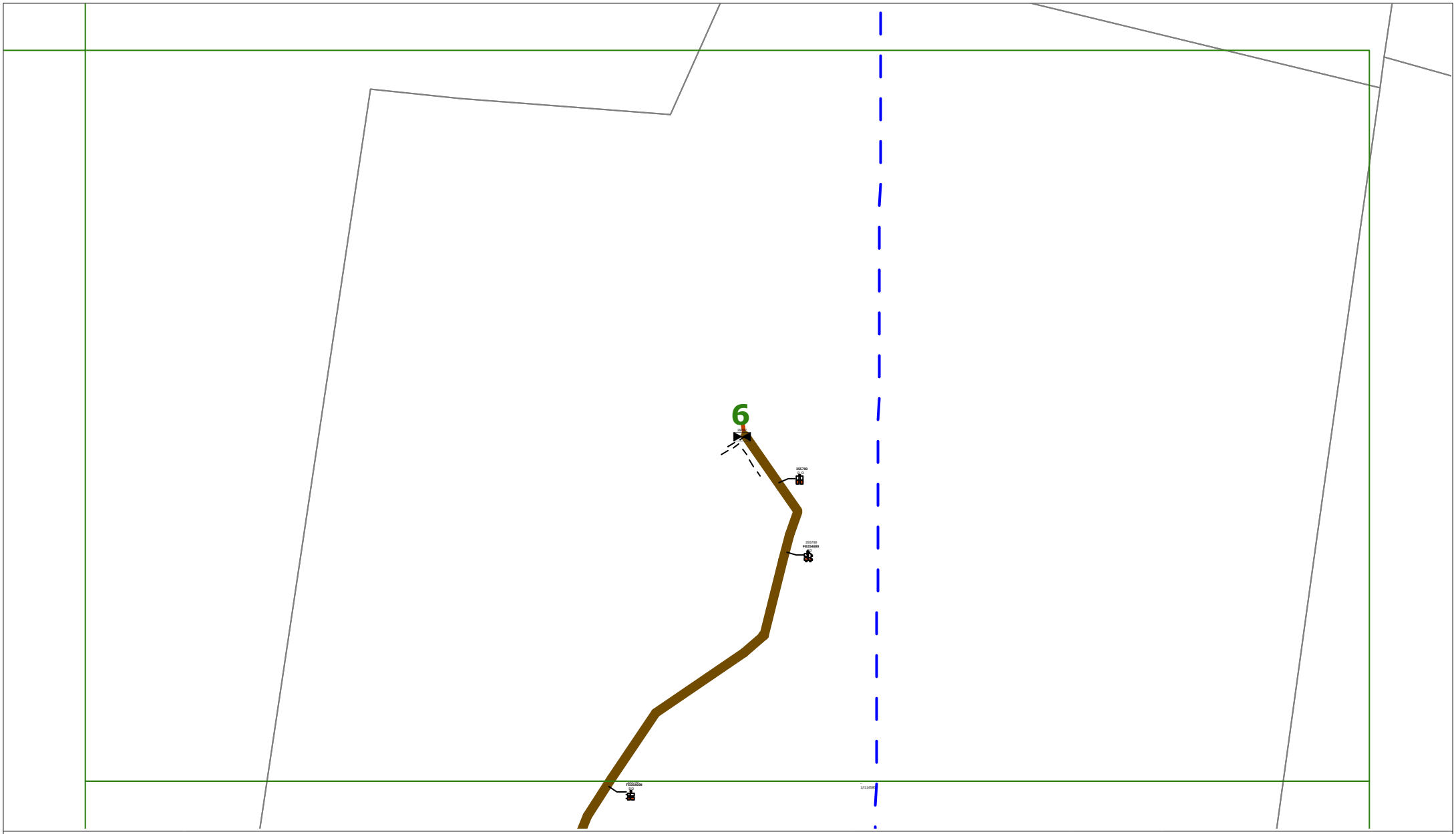

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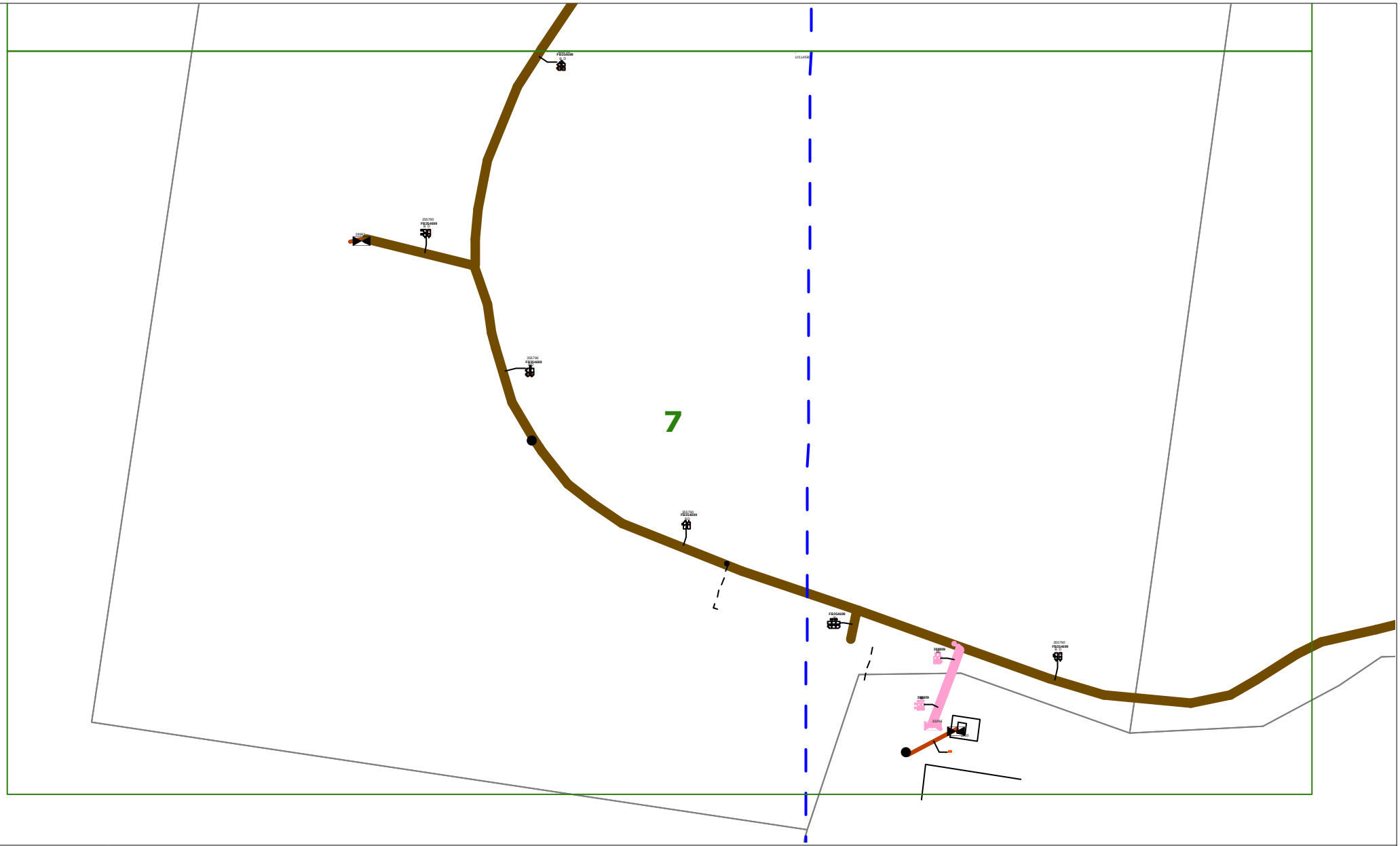

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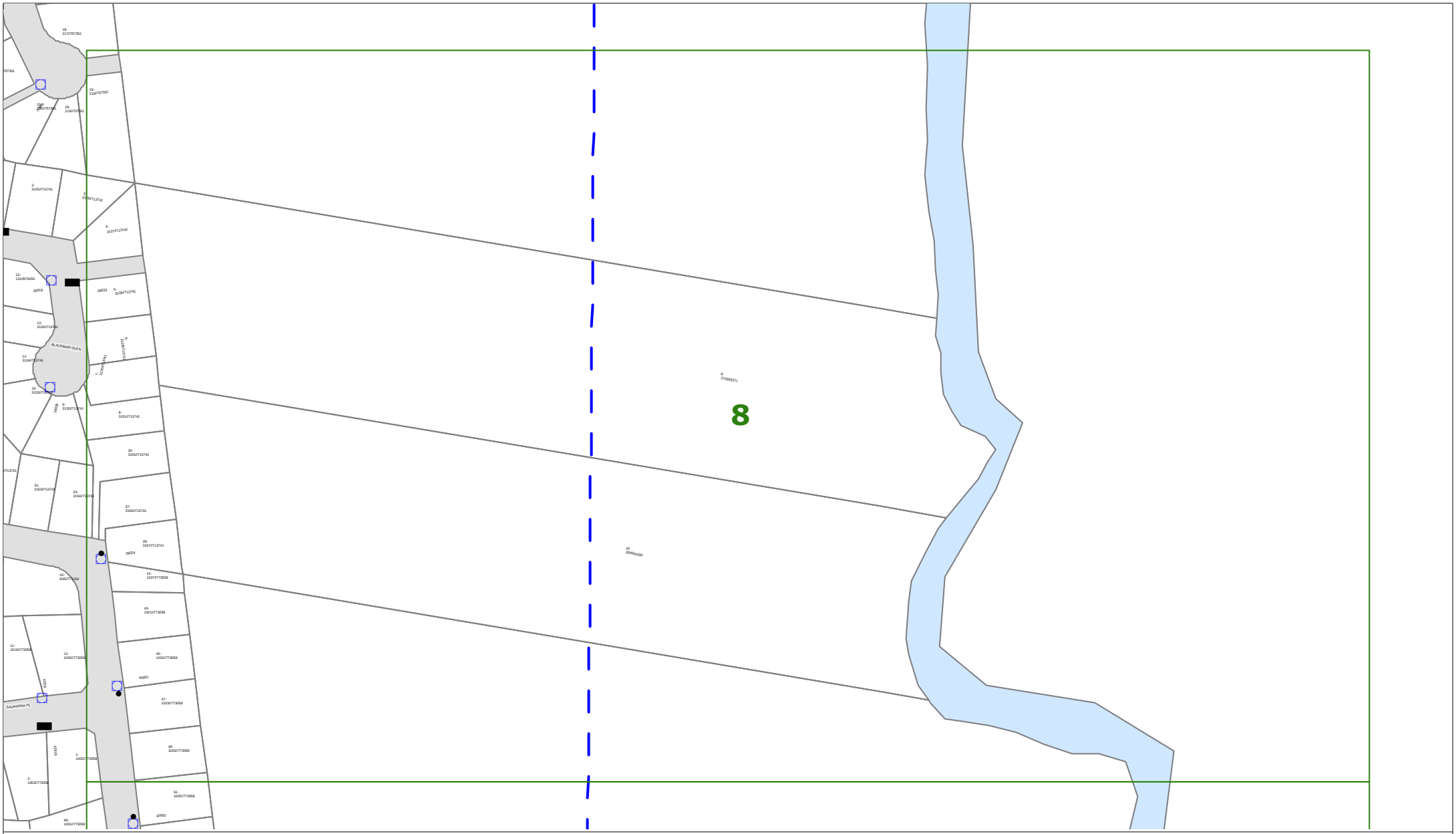

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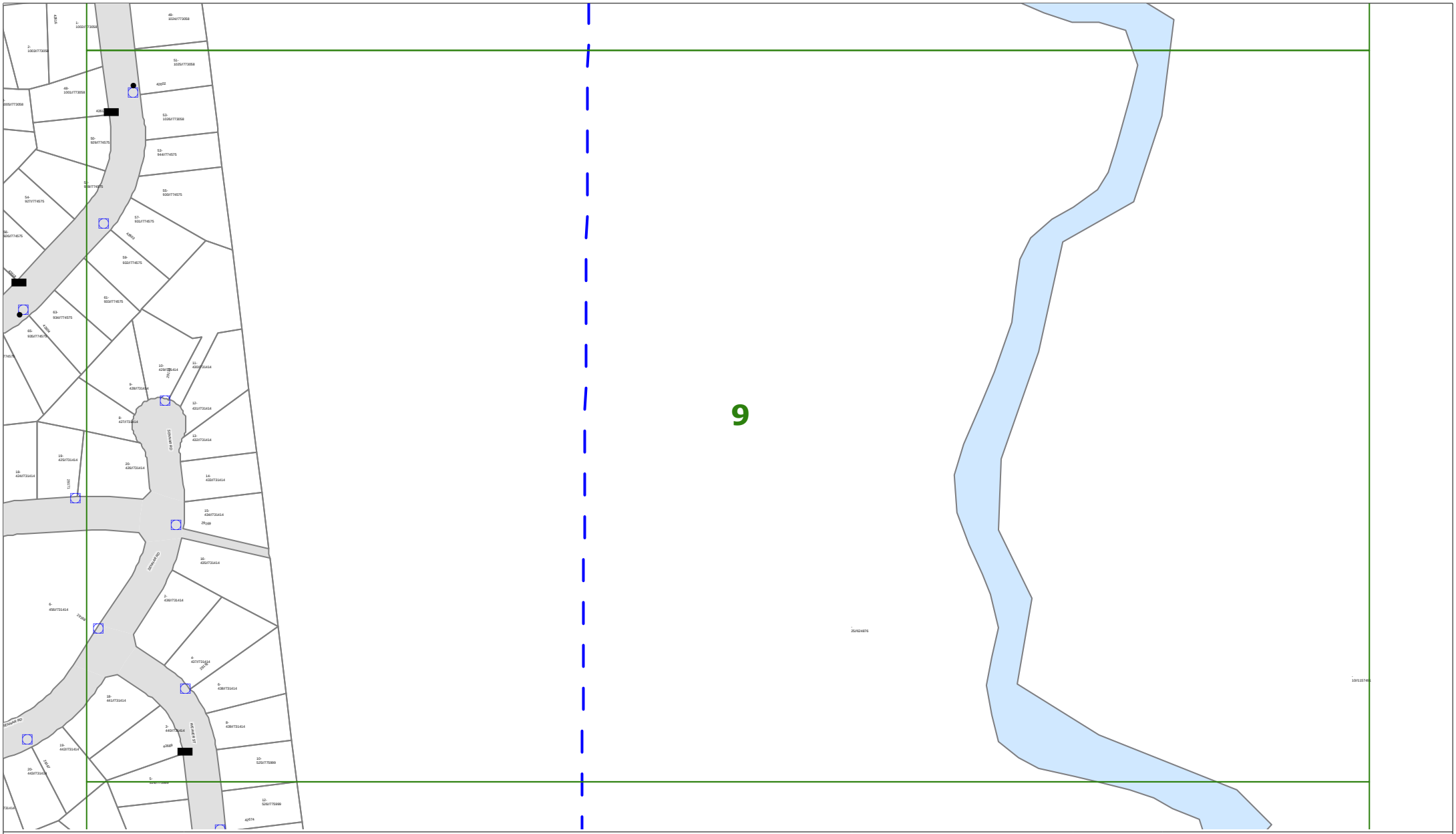

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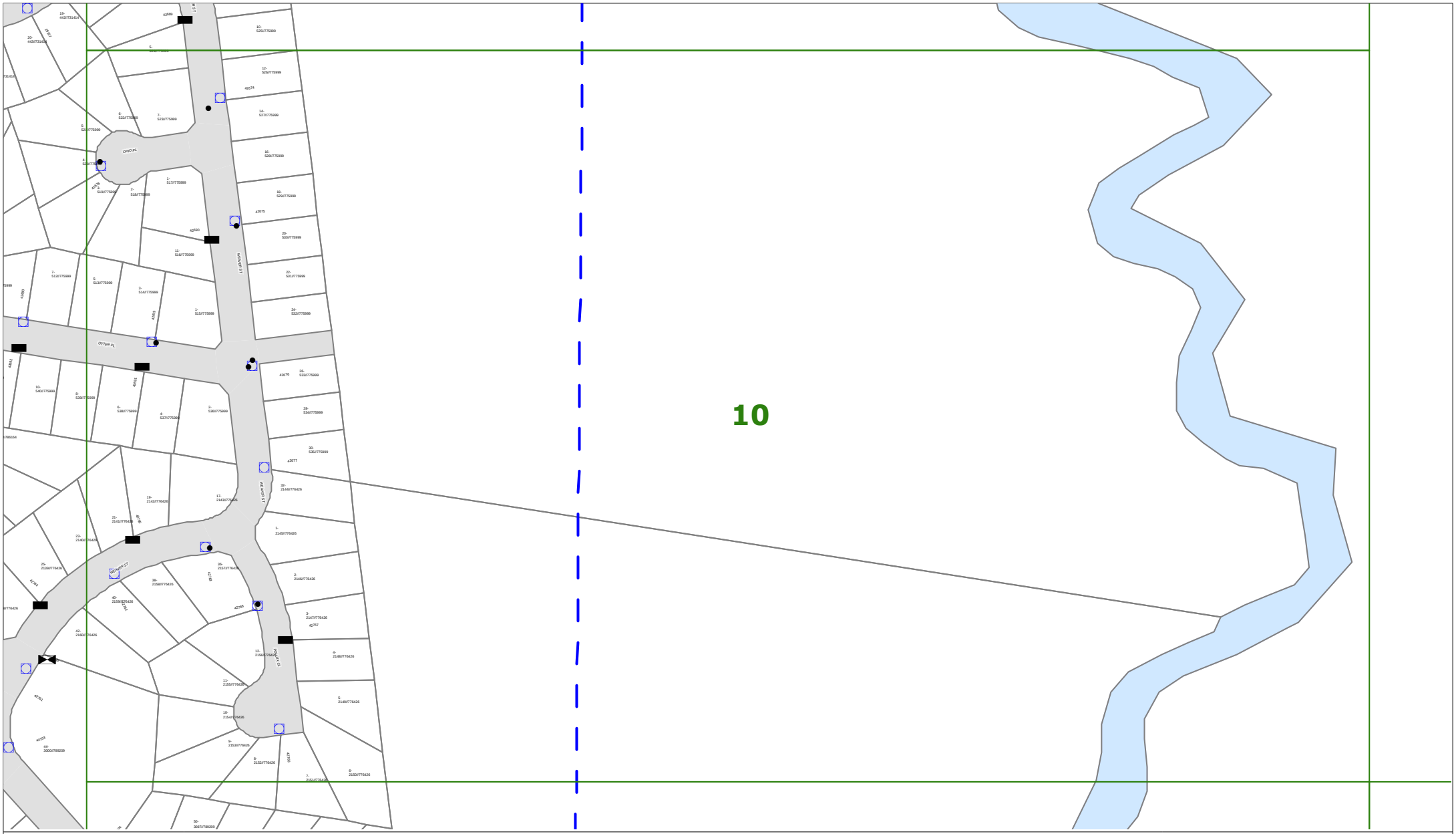

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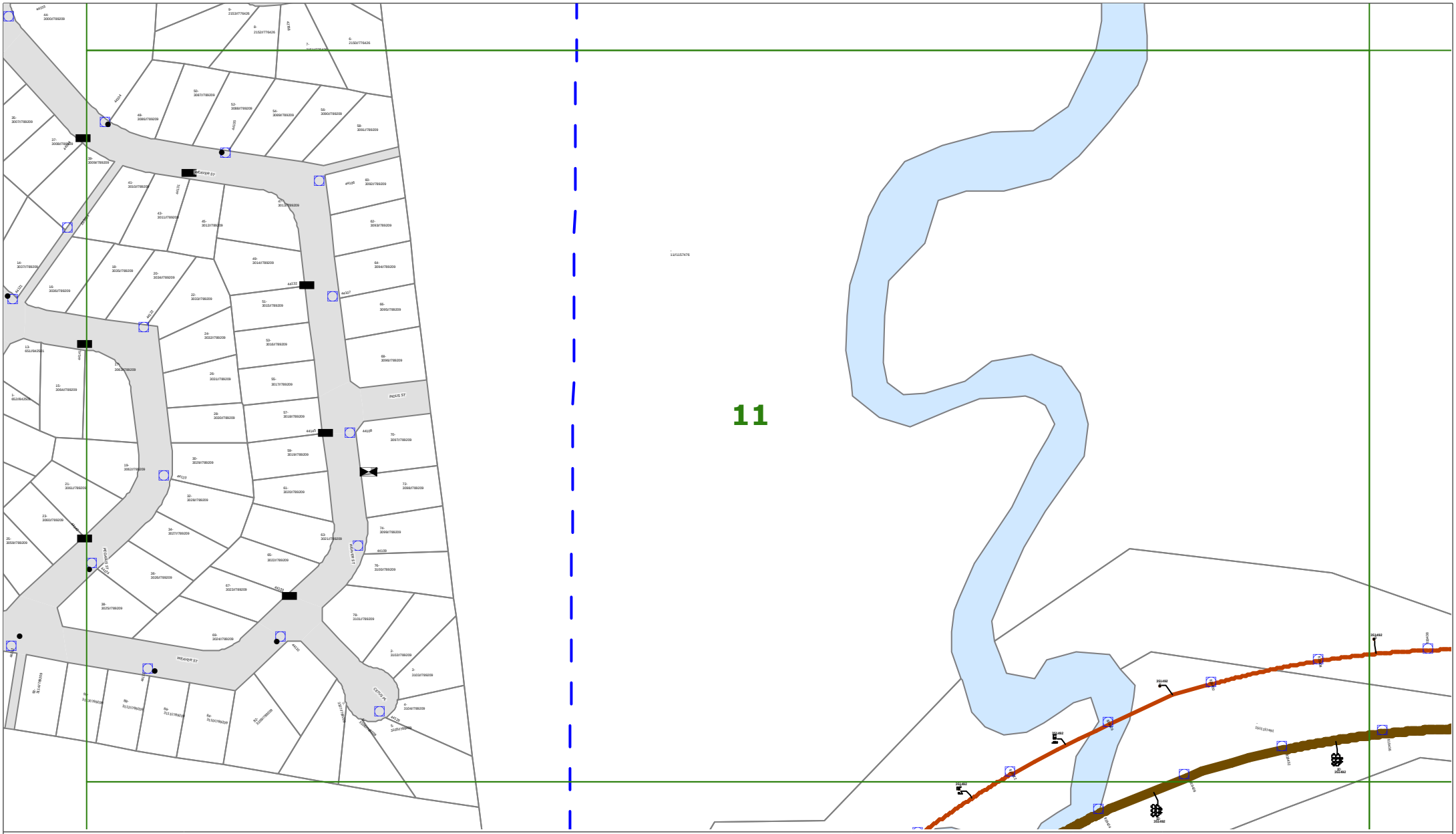

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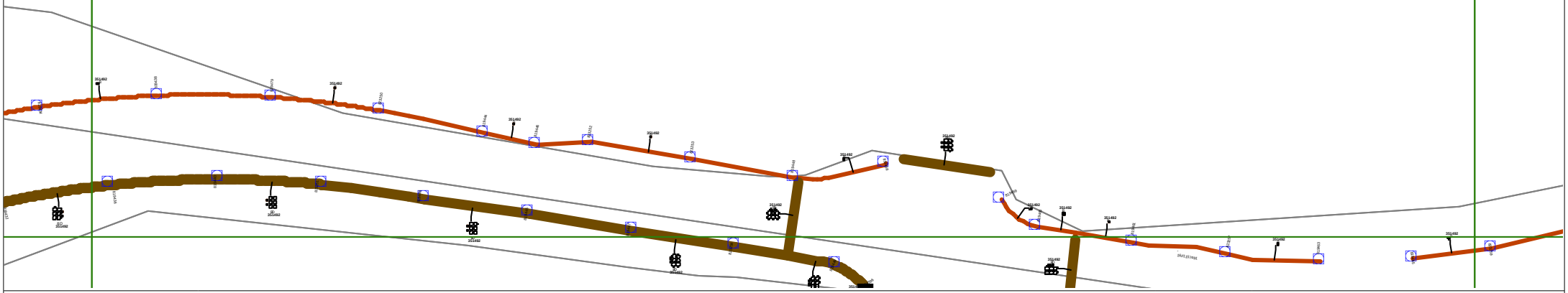

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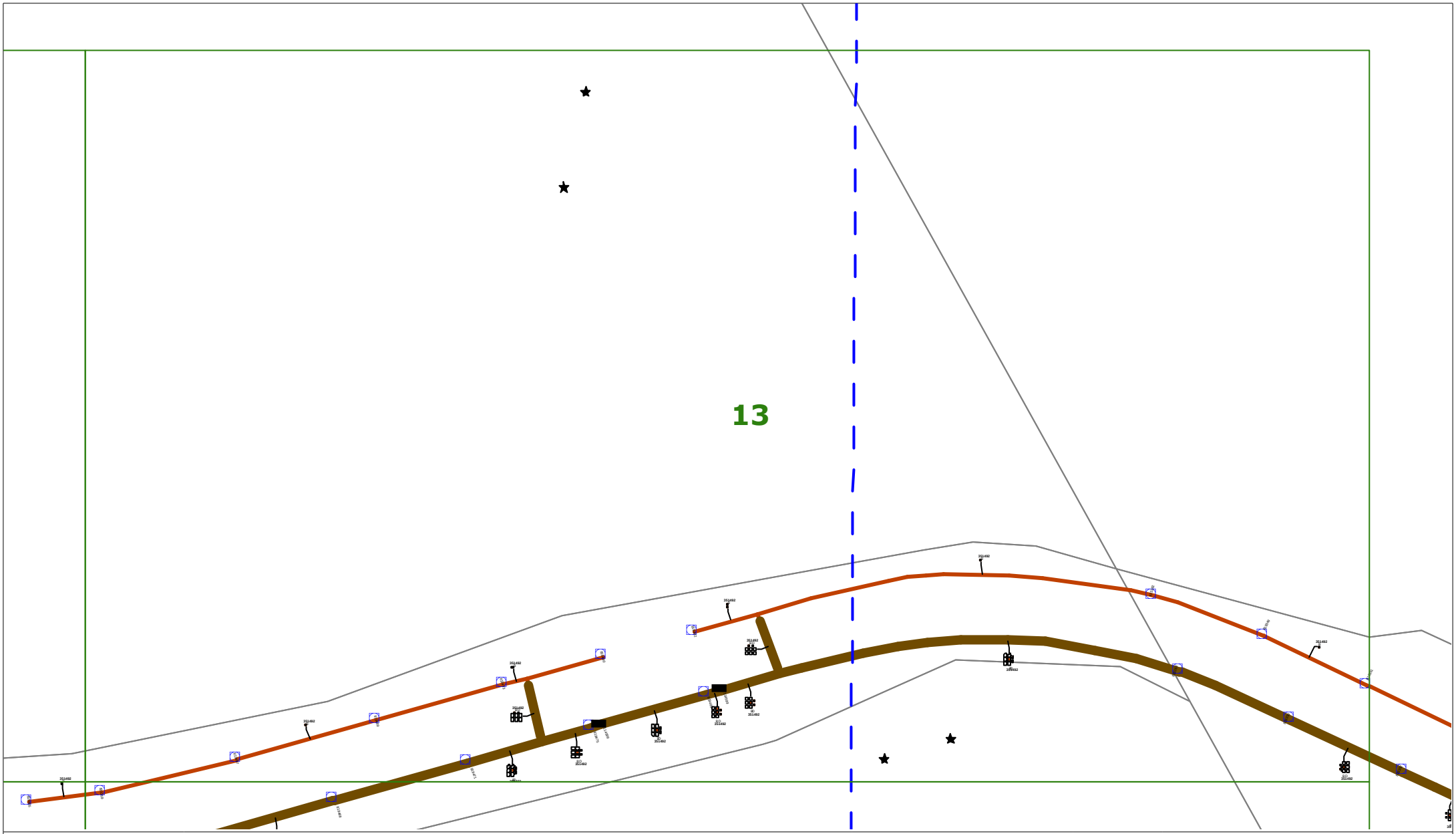

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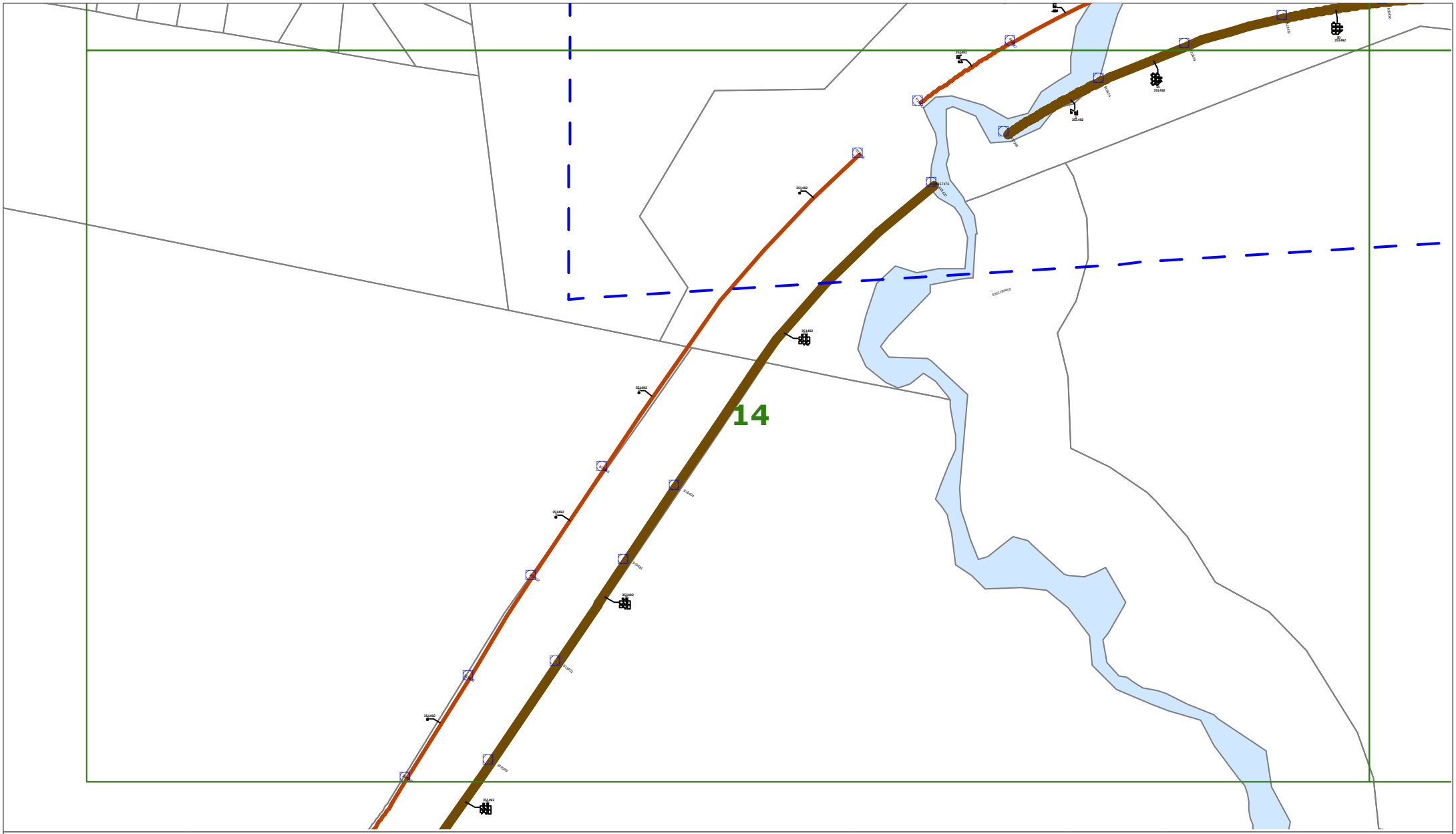

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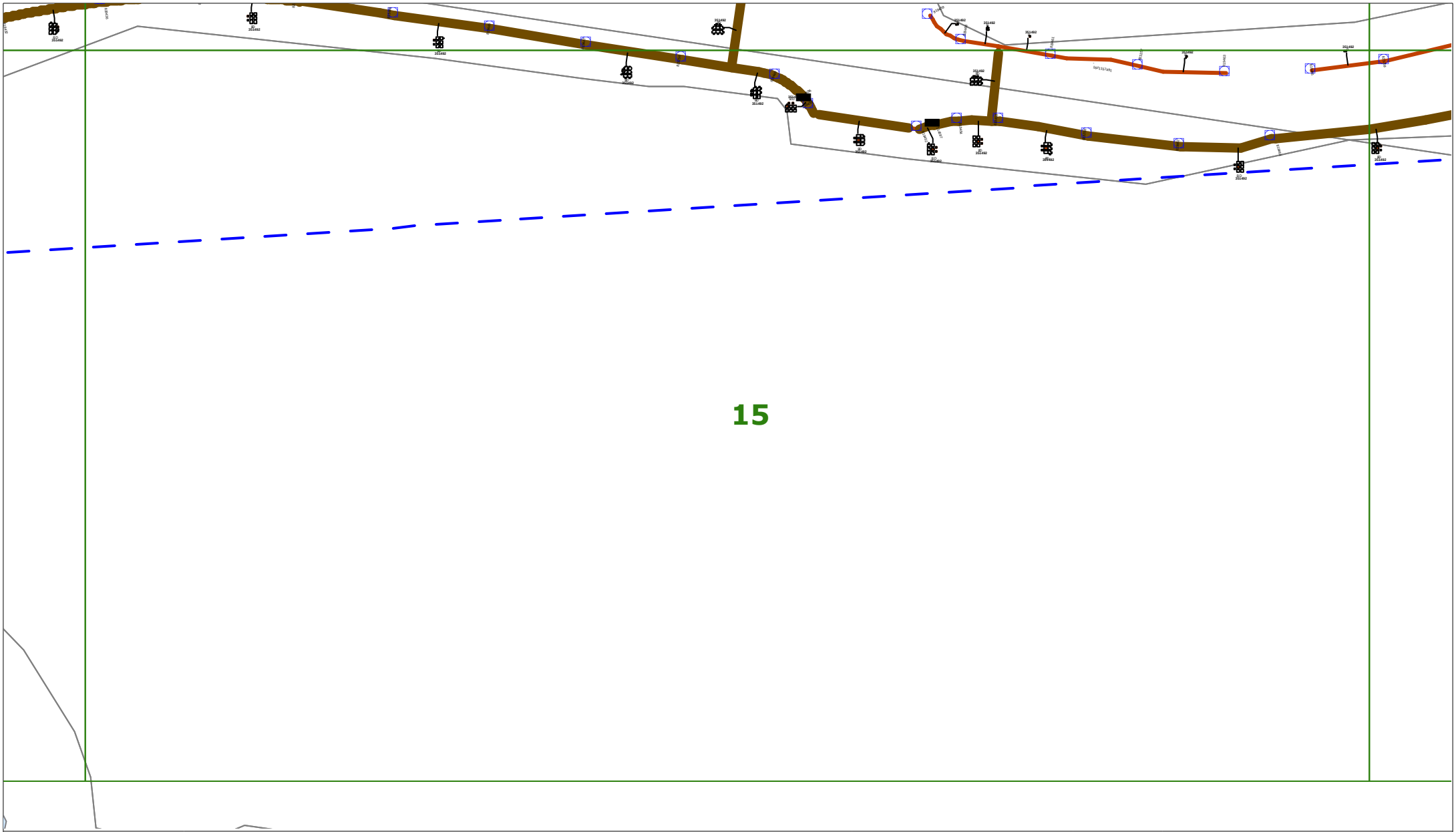

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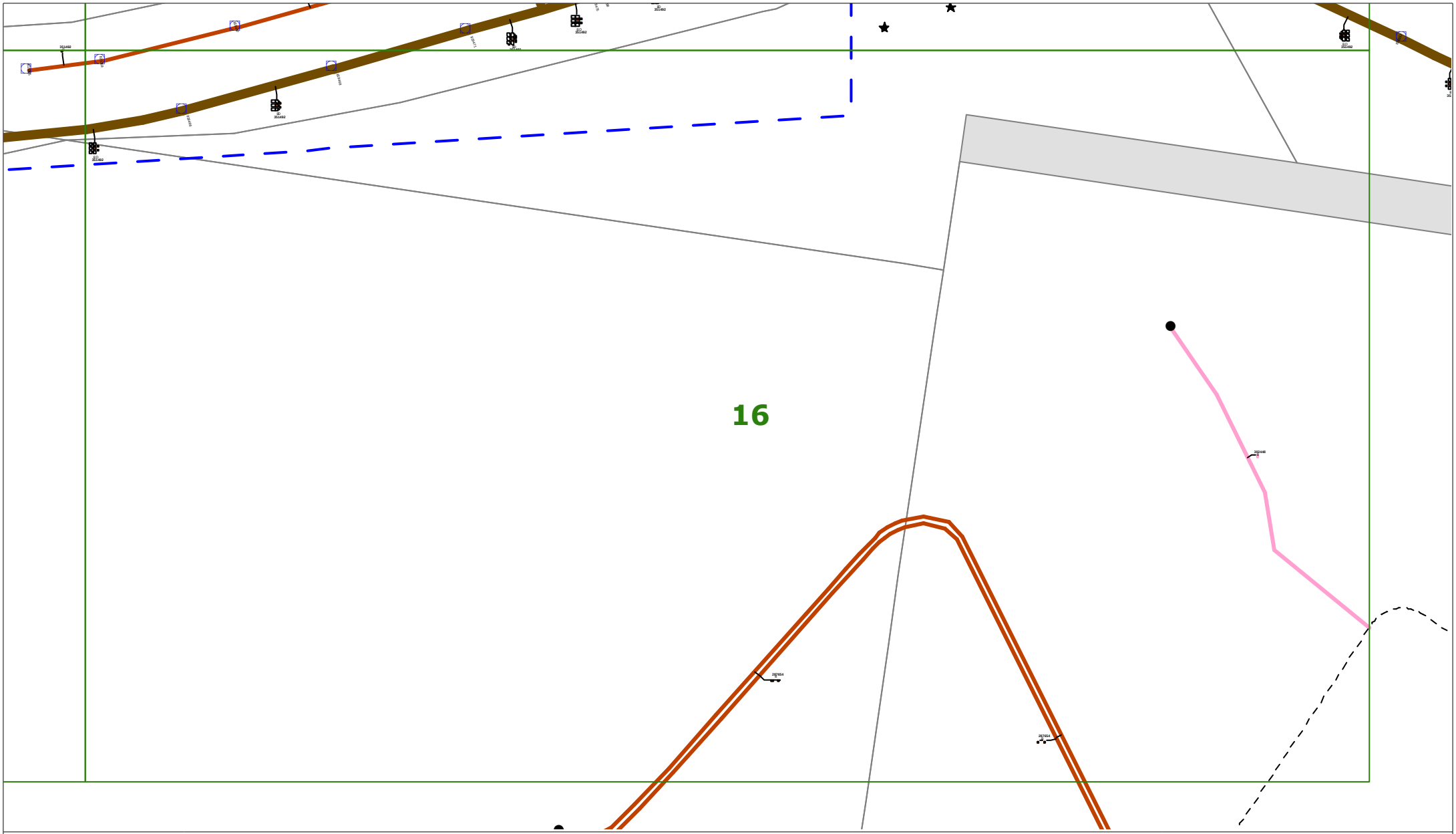

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LEGEND

IT'S HOW WE CONNECT

For more info contact a Telstra Accredited Locater or Telstra Plan Services 1800 653 935

Exchange
(major cable present)

Footway access chamber
(can vary from 1-lid to 12-lid)

Roadway access chamber

Pillar/cabinet
(above the ground / free standing)

Above ground complex equipment housing (eg RIM)
Please Note: This equipment is powered by 240V electricity.

PT **Public telephone**
Please Note: This equipment is powered by 240V electricity.

Direct buried cable

Cable jointing pit
(number indicating pit type)

Buried cable jointing pit
(number indicating pit type)

Elevated cable joint
(above ground joint on buried cable)

Cable loop (direct buried)

Telstra Plant in shared utility trench

Aerial Cable
(above ground)

Aerial Cable
(attached to joint use pole e.g. power)

SMOF **Optical fibre cable direct buried**

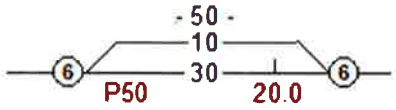
Single to multiple round conduit
Configurations 1, 2, 4, 9 respectively
P100
(Attached text denotes conduit type and size)

Multiple square conduit
Configurations 2, 4, 6 respectively
E85
(Attached text denotes conduit type and size)

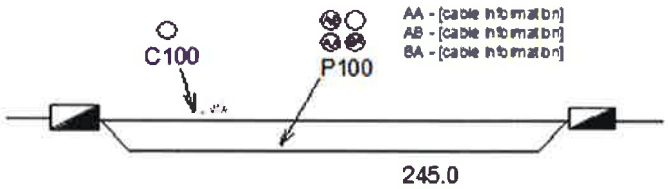
Some examples of conduit type and size:
A - Asbestos cement, P - PVC / plastic, C - Concrete, GI - Galvanised iron, E - Earthenware.
Conduit sizes *nominally* range from 20mm to 100mm.

P50	50mm PVC conduit
P100	100mm PVC conduit
A100	100mm asbestos cement conduit
E 85	85mm square earthenware conduit

Some examples of how to read Telstra plans:

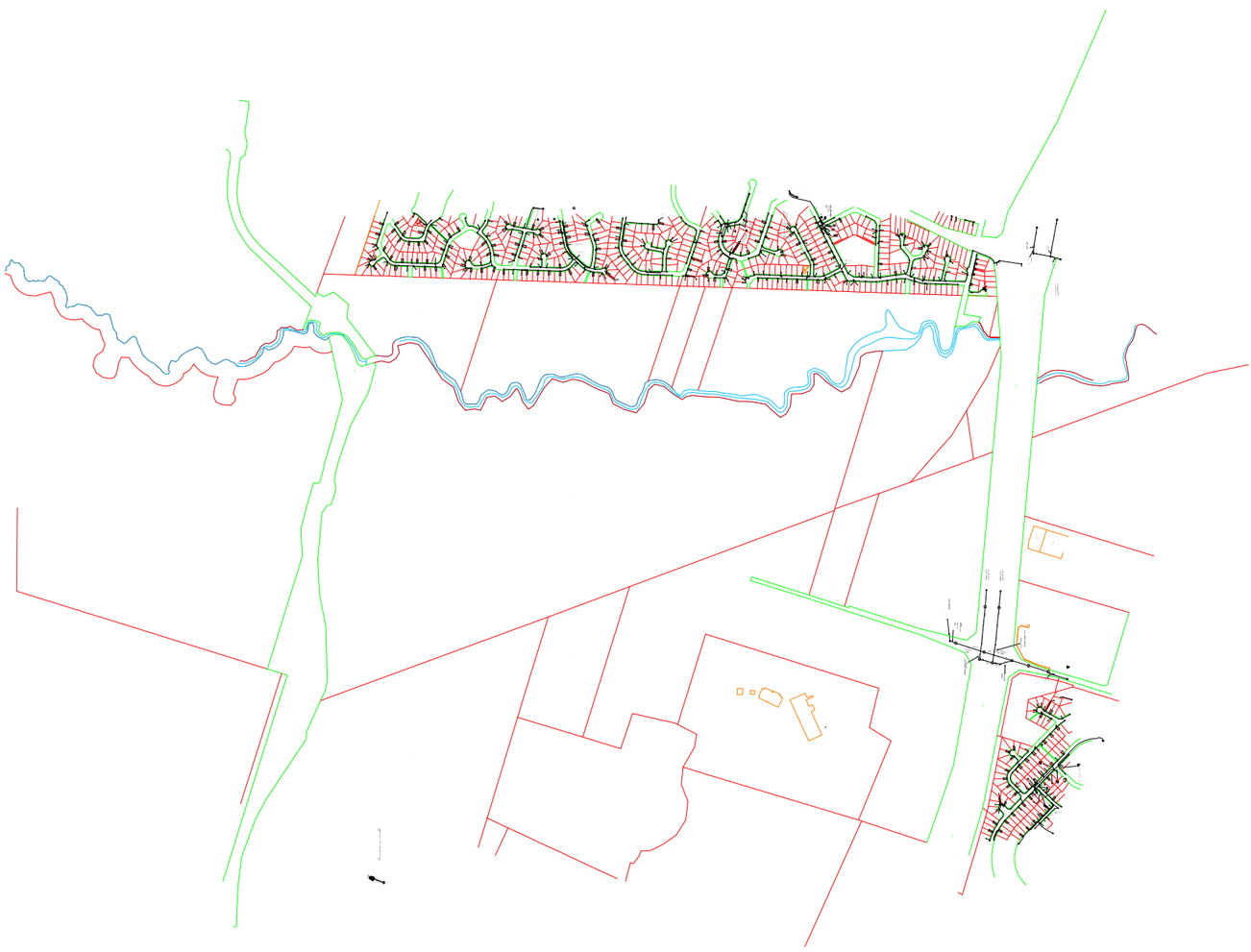


One 50mm PVC conduit (P50) containing a 50-pair and a 10-pair cable between two 6-pits, 20.0m apart, with a direct buried 30-pair cable along the same route.

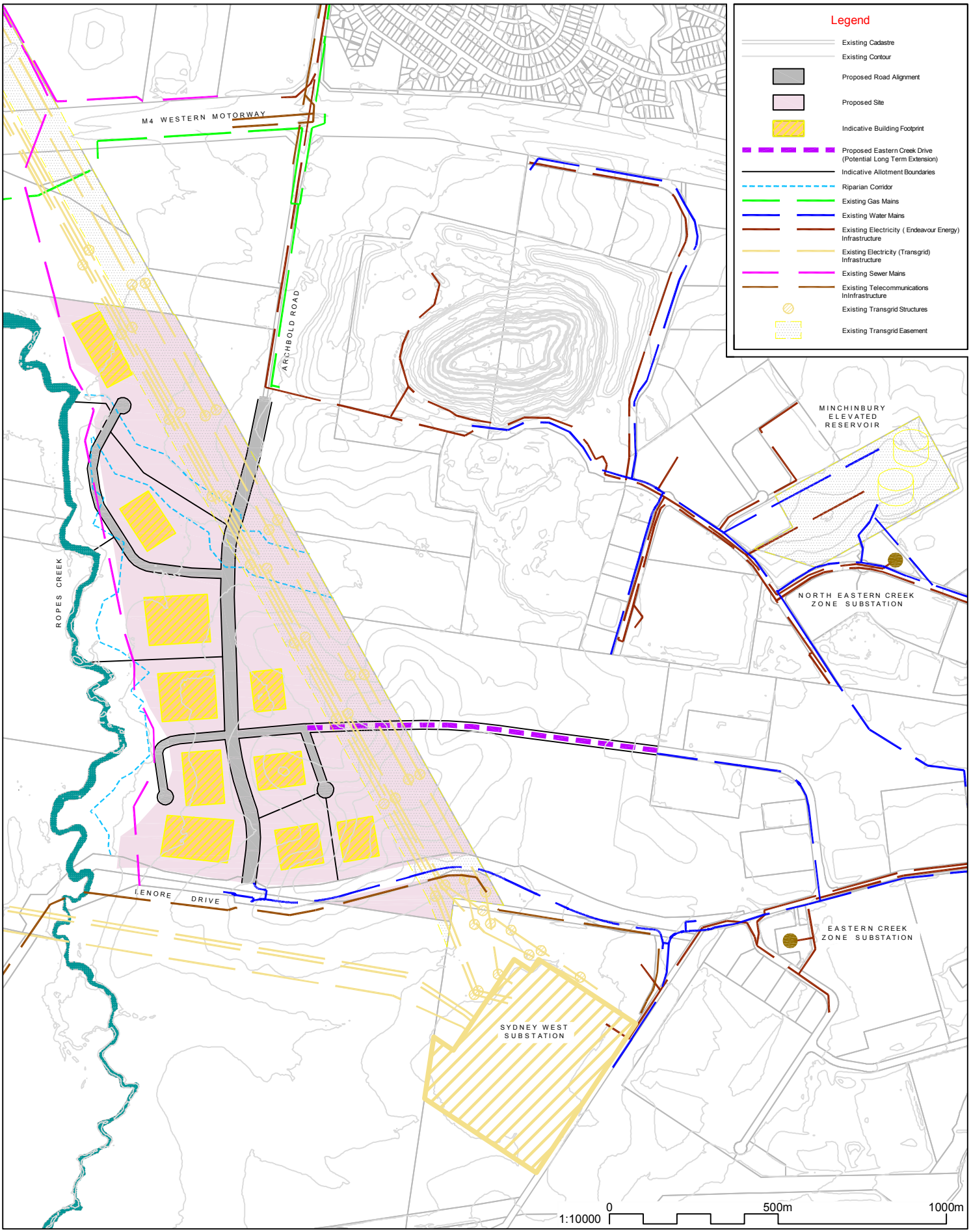


Two separate conduit runs between two footway access chambers (manholes) 245m apart. A nest of four 100mm PVC conduits (P100) containing assorted cables in three ducts (one being empty) and one empty 100mm concrete duct (C100) along the same route.

WARNING: Telstra plans and location information conform to Quality Level 'D' of the Australian Standard AS 5488 - Classification of Subsurface Utility Information. As such Telstra supplied location information is indicative only. Spatial accuracy is not applicable to Quality Level D. Refer to AS 5488 for further details. Telstra does not warrant or hold out that its plans are accurate and accepts no responsibility for any inaccuracy shown on the plans. FURTHER ON SITE INVESTIGATION IS REQUIRED TO VALIDATE THE EXACT LOCATION OF TELSTRA PLANT PRIOR TO COMMENCING CONSTRUCTION WORK. A plant location service is an essential part of the process to validate the exact location of Telstra assets and to ensure the asset is protected during construction works. The exact position of Telstra assets can only be validated by physically exposing it. Telstra will seek compensation for damages caused to its property and losses caused to Telstra and its customers.



Appendix B. Infrastructure Servicing Plans



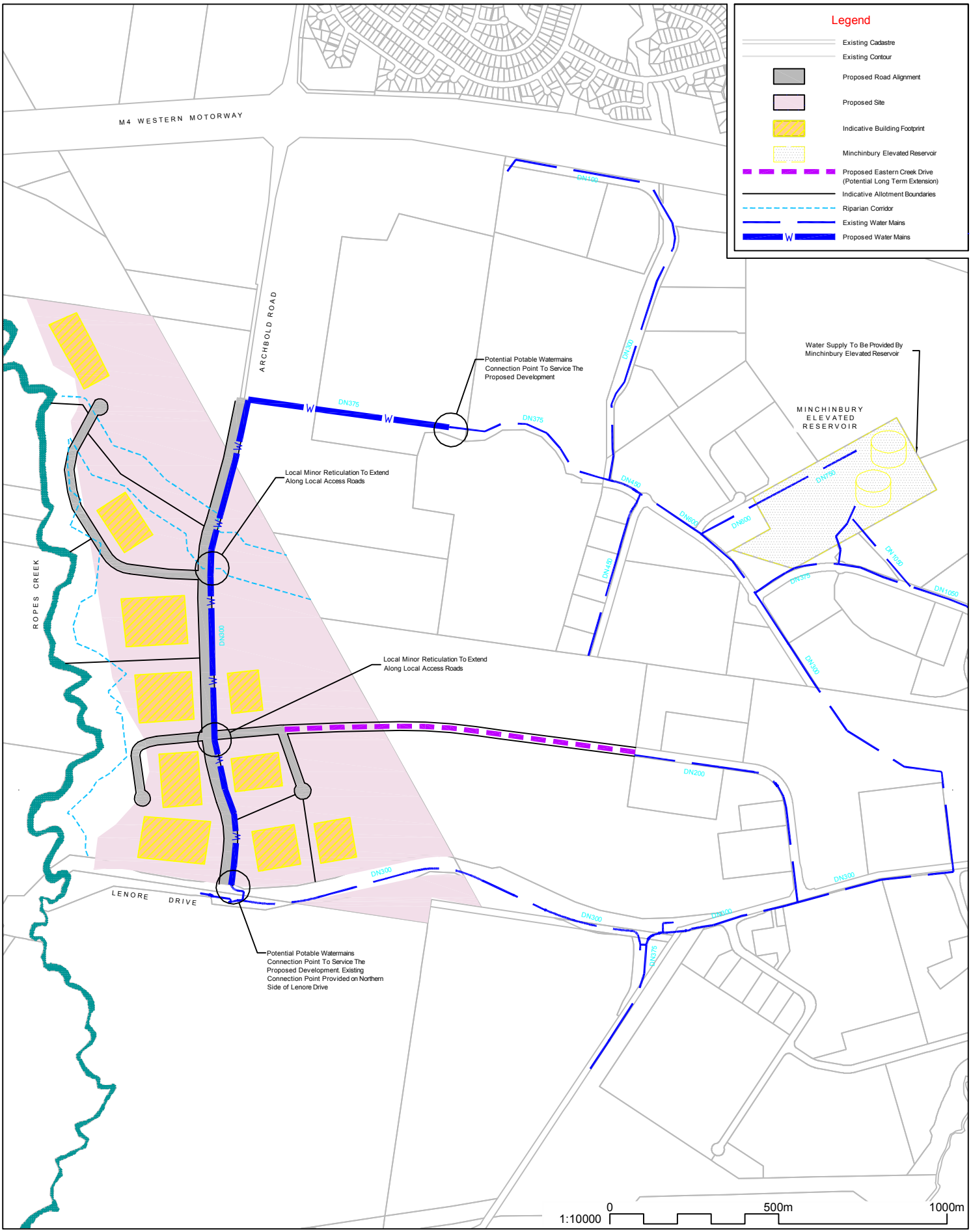
Ropes Creek Precinct
Infrastructure Services
Investigation

Existing Utility Infrastructure

MMD-357627-C-SK-DPE-XX-0100
P2 - Not For Construction
Scale 1 : 10000m

Mott MacDonald
L10, 383 Kent Street
Sydney NSW 2000
PO Box Q1678
QVB Sydney NSW 1230
Australia

Mott MacDonald



Ropes Creek Precinct
Infrastructure Services
Investigation

Sydney Water Corporation
Potable Water

MMD-357627-C-SK-DPE-XX-0200
P2 - Not For Construction
Scale 1 : 10000m

Mott MacDonald
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PO Box Q1678
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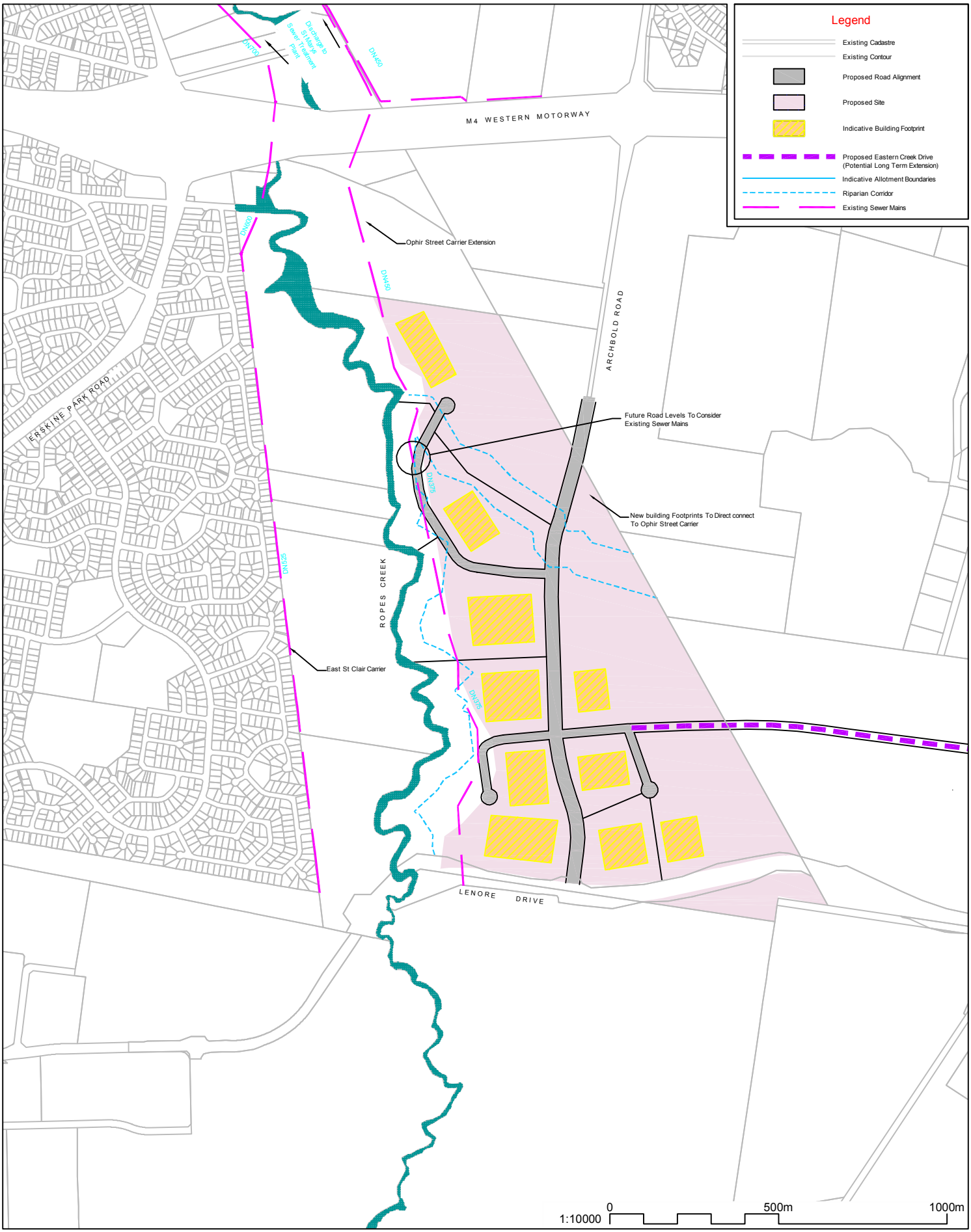
Australia

Mott MacDonald



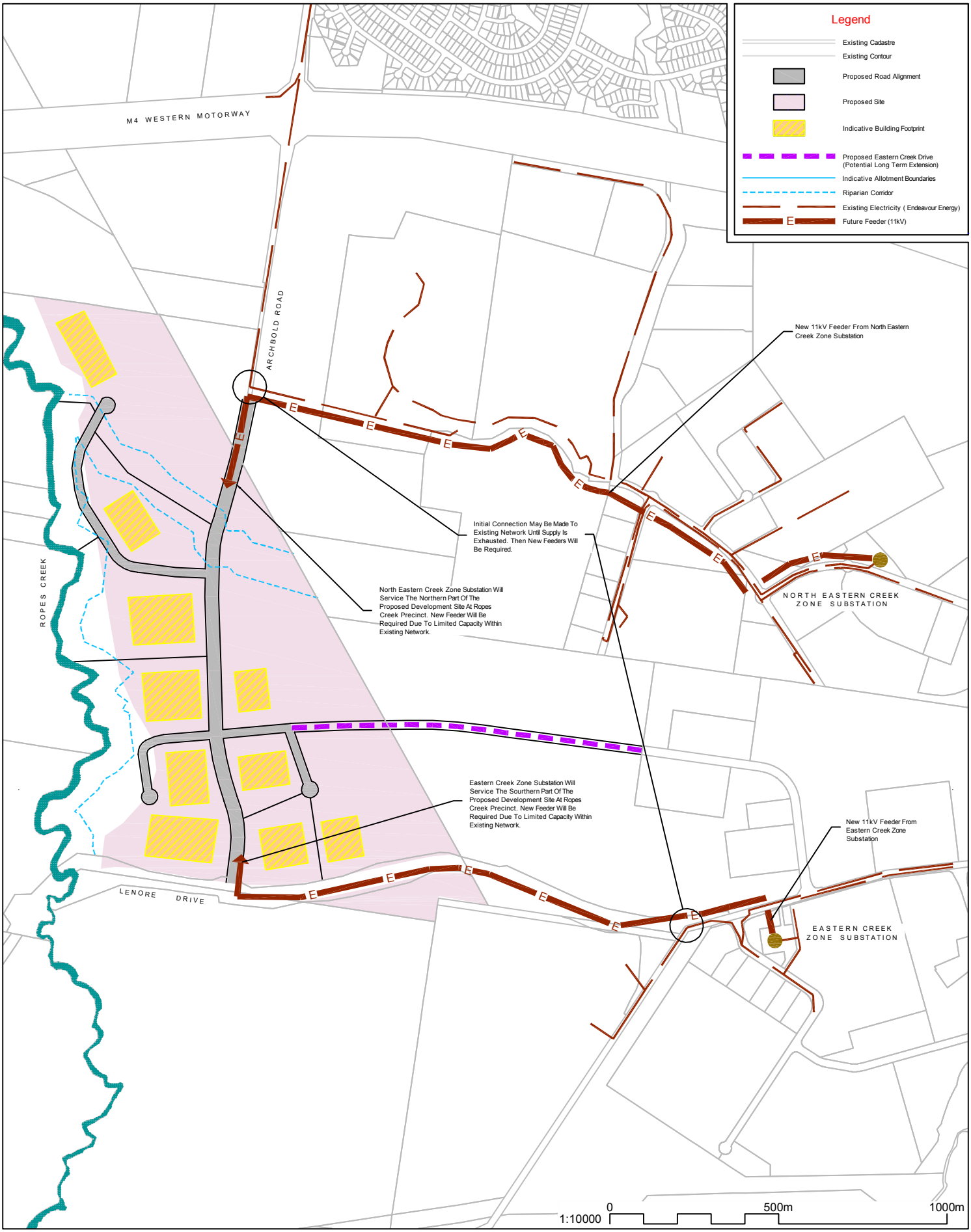
Ropes Creek Precinct
Infrastructure Services
Investigation

Sydney Water Corporation
Waste Water

MMD-357627-C-SK-DPE-XX-0300
P2 - Not For Construction
Scale 1 : 10000m

Mott MacDonald
L10, 383 Kent Street
Sydney NSW 2000
PO Box Q1678
QVB Sydney NSW 1230
Australia

Mott MacDonald



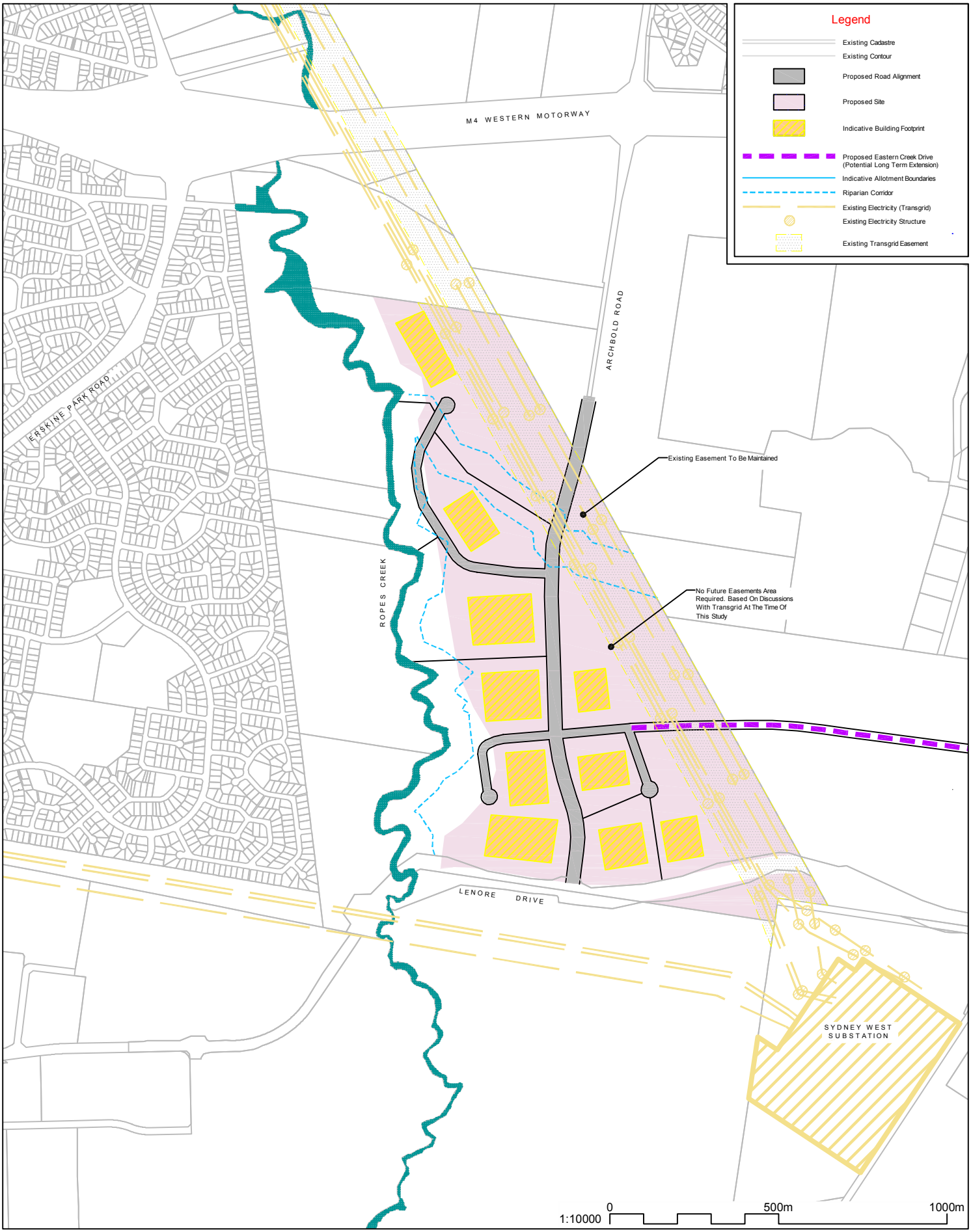
Ropes Creek Precinct
Infrastructure Services
Investigation

Endeavour Energy

MMD-357627-C-SK-DPE-XX-0400
P2 - Not For Construction
Scale 1 : 10000m

Mott MacDonald
L10, 383 Kent Street
Sydney NSW 2000
PO Box Q1678
QVB Sydney NSW 1230
Australia

Mott MacDonald



Ropes Creek Precinct
Infrastructure Services
Investigation

Transgrid

MMD-357627-C-SK-DPE-XX-0500
P2 - Not For Construction
Scale 1 : 10000m

Mott MacDonald
L10, 383 Kent Street
Sydney NSW 2000
PO Box Q1678
QVB Sydney NSW 1230
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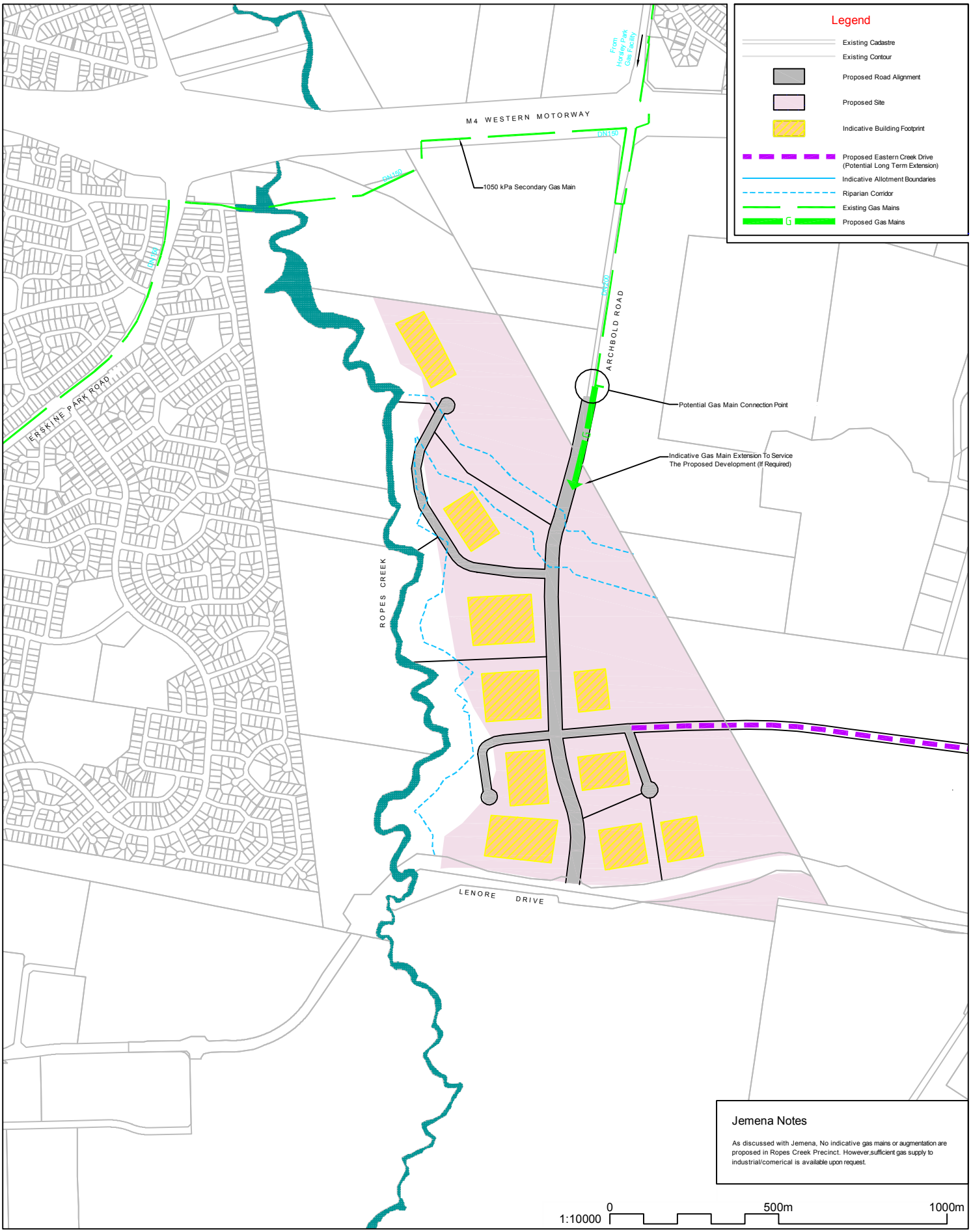
Mott MacDonald



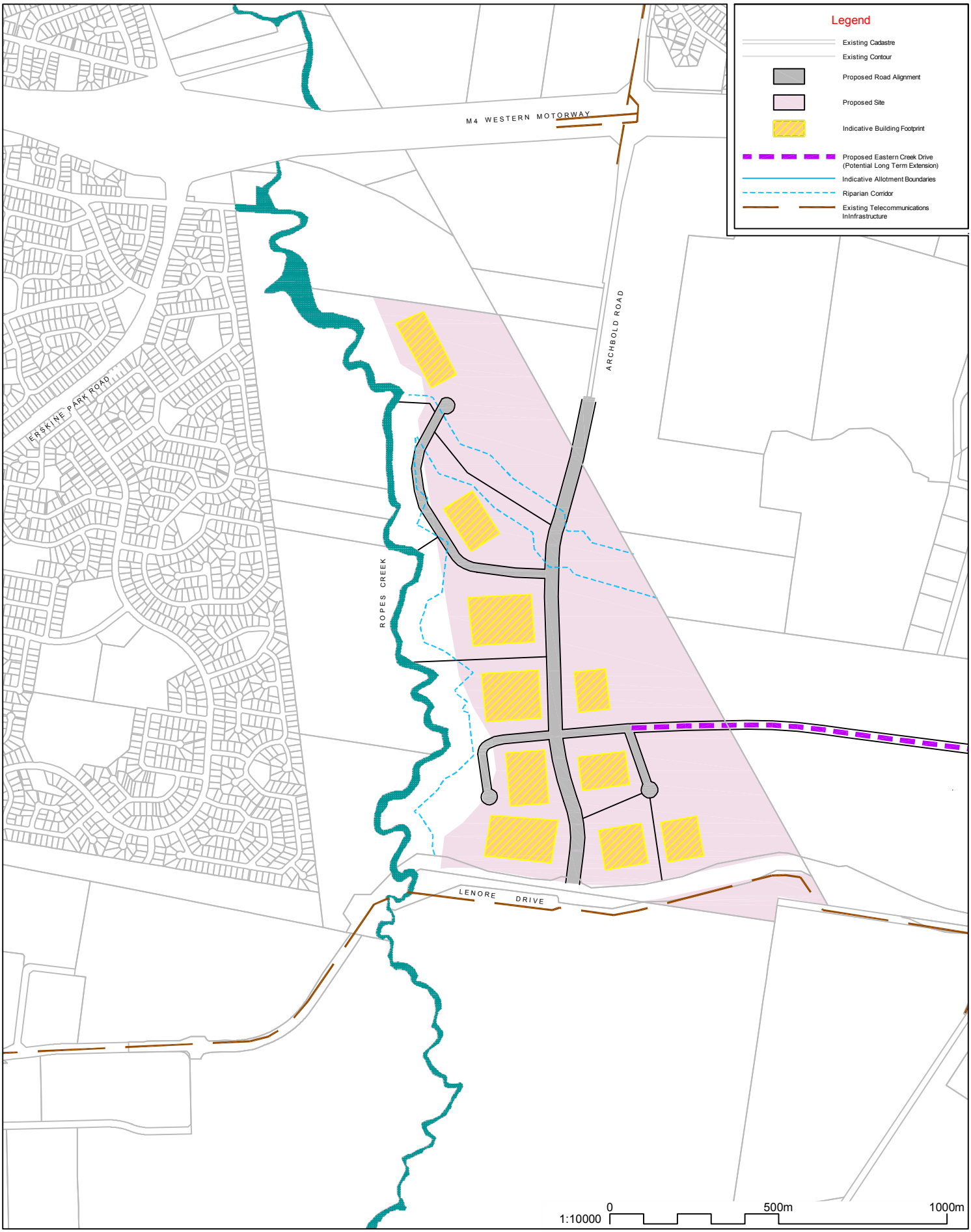
Ropes Creek Precinct
Infrastructure Services
Investigation

Jemena

MMD-357627-C-SK-DPE-XX-0600
P2 - Not For Construction
Scale 1 : 10000m

Mott MacDonald
L10, 383 Kent Street
Sydney NSW 2000
PO Box Q1678
QVB Sydney NSW 1230
Australia

Mott MacDonald



Ropes Creek Precinct
Infrastructure Services
Investigation

Telecommunication
National Broadband Network

MMD-357627-C-SK-DPE-XX-0700
P2 - Not For Construction
Scale 1 : 10000m

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Mott MacDonald

Appendix C. TransGrid Easement Guidelines for Third Party Development

TRANSGRID EASEMENT GUIDELINES FOR THIRD PARTY DEVELOPMENT

Background

Transmission Line (TL) and cable easements are acquired by TransGrid to provide adequate clearance along the route of a transmission line for construction and maintenance work and also to ensure that no work or other activity is undertaken under or near the TL or cable which could create an unsafe situation either for persons or for the security of the TL or cable. The easement area contributes to the *prudent avoidance* of exposure by persons to EMF (Electric and Magnetic Fields).

The TL or cable easement area and its ongoing maintenance are control measures that cannot be compromised. The easement is established to prevent and mitigate against the following electrical safety risks:

- Infringement of electrical safety clearances e.g. due to an activity or vegetation growth.
- Electrical Induction e.g. due to parallel conducting materials.
- Step and touch potentials under fault conditions e.g. due to lightning or bushfire.
- Failure of structures or line equipment e.g. due to third party vehicle or plant impact.
- Transfer off easement of dangerous voltages, e.g. by services installed within the easement area.
- Blowout of a conductor under high wind (or blow in of vegetation) e.g. into an adjacent structure.

Safety to people and property is of paramount concern. TransGrid is also bound to maintain its infrastructure efficiently and cost effectively. TL and cable easements along with accesses thereto have been designed to facilitate effective operational maintenance.

Development Approval Process

Where the Environmental Planning and Assessment Act 1979 makes Local Councils the consent authority for development applications, proponents to a proposed development on land are to prepare a development application and submit same to the Local Council for development consent.

The *State Environmental Planning Policy (Infrastructure) 2007* (SEPP), which commenced on 1 January 2008, requires local councils to consult with Electricity Network Operators before granting development consent for proposals that might adversely affect:

- existing electricity infrastructure;
- easements for electricity purposes, even if no infrastructure has yet been constructed in the easement.

Local Councils must give written notice to the network operator of any proposals for development:

- within or immediately adjacent to an easement for electricity purposes;
- immediately adjacent to a substation;
- within 5 metres of an exposed overhead power line;
- involving excavation within 2 metres of an underground power line or a pole or within 10 metres of a tower;
- involving a swimming pool within 30m of a transmission tower or within 5m of an overhead line.

Any comments made by the Electricity Network Operator within 21 days of receiving Local Council's written notification must be taken into consideration by the Local Council before it determines the development application.

The *proponent* is required to consult with TransGrid in accordance with the *State Environmental Planning Policy (Infrastructure) 2007* (SEPP); the *NSW Occupational Health and Safety Act 2000,* and; the *NSW WorkCover Code of Practice for Working Near Overhead Power Lines 2006*.

TransGrid Approval

The approving statutory authority will require written approval from TransGrid for all proposed activities within an easement area in accordance with section 45 of the *State Environmental Planning Policy (Infrastructure) 2007 (SEPP)*.

To assess and respond to an approving statutory authority, TransGrid will require the following information from the development proponent. TransGrid will object to any development where the development proponent has not provided the following information to TransGrid prior to Local Council's notification:

- Detailed specifications and plans drawn to scale and fully dimensioned, showing property boundaries and other relevant information.
- An *Impact Assessment* of the development on TransGrid infrastructure and associated interests (including easements). Further, details as to how any impacts thereto are proposed to be managed, mitigated or resolved (see below – *Impact Assessment*).

Upon receipt of the abovementioned documentation, the proponent's proposed development will be assessed in relation to its impact on TransGrid infrastructure, easements and means of access thereto. The proponent should note that for complicated proposals the consultation process will be iterative and the proponent should allow sufficient time for this process (see *Timeframes* below).

General *Development Proposal* Guidelines

1. Prohibited Activities and Encroachments

A number of activities and encroachments are not permitted within the easement area. These are detailed in the "TransGrid Easement Guide" (see Appendix 1 - *Prohibited Activities*).

Any *Development Proposal* should be designed in such a way that:

- It does not involve these activities, nor introduce these encroachments; and
- Does not to encourage other parties to undertake such activities or introduce such encroachments in the future.

2. Development

The *Development Proposal* should be planned with the adoption of The Right Honourable Harry Gibbs Report (*Inquiry into Community Needs and High Voltage Transmission Line Development*) recommendations, that being a policy of "*prudent avoidance*".

This report placed recommendations on the design of new transmission lines having regard to their proximity to houses, schools, work sites and the like and is equally valid when considering new developments proposed in proximity to existing powerlines and associated easements.

Electric and Magnetic Field (EMF) strength rises from the easement edge to beneath the conductors and the most practical way to achieve the *prudent avoidance* policy is to keep the development entirely outside the easement area.

If it is desired to place any part of a development within an easement the proponent shall, in conjunction with the *Development Proposal*, undertake an *Impact Assessment* to be provided to TransGrid that covers the changes in risk and mitigation measures proposed.

Relocating Infrastructure and Interruption to Transmission

The developer will be liable for any costs involved in having to relocate TransGrid infrastructure as part of any proposed development. Further, the developer will also be liable for any costs and penalties incurred as a consequence of interruptions to TransGrid's transmission operations arising from the development, whether planned or inadvertent.

Impact Assessment

An *Impact Assessment* shall be completed and is to accompany the development proposal when it is submitted to TransGrid for consideration.

The *Impact Assessment* shall cover:

1. Detailed description of the development
2. Health and safety risk assessment and control measures
3. Operational risk to the TL or cable due to the development
4. Maintenance risk to the TL or cable due to the development
5. Design and construction risk to the TL or cable and associated with the proposed development
6. Physical impact risk to the TL (vehicle collision, vegetation or other impact)
7. Risk to TransGrid's rights and entitlements
8. Impact of the proposed development re TransGrid's access to the easement and along the easement.

Checklist

The following checklist may assist in the completion of the *Impact Assessment.* A template is provided in *Appendix 3*.

Refer also to *Appendix 1* and *Appendix 2* for guidance on prohibited activities and TransGrid's requirements for developments and subdivisions.

1. **Detailed Description of the Development**

- Street Address;
- Land and Title references;
- Physical proximity of the proposed development to TransGrid's easement boundary (distance dimensions to be provided on a scaled plan); and
- Horizontal and vertical clearances of the proposed development to TransGrid's Infrastructure and associated easements

2. **Health and Safety Risk Assessment**

- **Safety Risk to General Public**

i. Have ground levels been changed that would compromise design clearances?
ii. Has the easement been altered in any way that would encourage prohibited activities to occur within the easement?
iii. Has the easement or the nature of the land in the vicinity of the easement, been altered in any way that would encourage prohibited encroachments to occur within the easement?
iv. Is it possible for proposed structures to transfer voltages off easement, or bring remote earths into the easement?
v. Has development been proposed that increase step and touch potential hazards, or that would encourage people to congregate within the step/touch potential zone of a structure?

- **Safety Risk to Non-electrical Workers and Emergency Service Personnel**

i. Has infrastructure been proposed that can be climbed compromising design clearances?
ii. Has infrastructure been proposed that can be accessed by maintenance persons using Elevated Work Platforms (EWPs) compromising design clearances?
iii. Has infrastructure been proposed that can bring remote earths onto the easement?

iv. Has infrastructure been proposed that is a fire hazard, or that would encourage the storage or use of flammable material on the easement?
v. Has infrastructure been proposed that would require emergency workers (such as fire fighters) to come near, or their equipment to come on or near high voltage conductors?

- **Safety Risk to TransGrid Employees & Contractors**

i. Has access around any TransGrid structure been altered preventing EWPs, crane or other plant access or introduced other risks to maintenance staff?
ii. Has the proposed development complied with TransGrid's horizontal clearances?
iii. Has access to the easement been altered that would introduce risks to personnel, including although not limited to asset inspectors or patrol staff?

- **Health Risk to the General Public**

i. Have public spaces been proposed *within the easement* that would encourage persons to congregate for lengthy periods of time?
ii. Have facilities been provided outside of the easement but immediately adjacent thereto that would encourage persons to congregate within the easement?

3. Operational Risk

- Have any ground level developments been proposed (including roads, driveways, parking lots and turning bays etc) that would expose TransGrid transmission structures and lines to impact risk?
- Has change in water flows or drainage been proposed that could impact on the foundations of any TransGrid structure (or guy)?
- Are excavations or surface activities proposed that would impact a TransGrid structure's foundations, stability or earthing systems?

4. Maintenance Risk

- Have roads, driveways or landscaping been proposed that would prevent or hinder TransGrid maintenance, or increase maintenance costs, for the above or below ground components of the transmission line structure?
- Has access to the easement or within the easement, been obstructed, restricted or altered?
- Have access roads, bridges, crossings and the like been designed to cater for the weight and size of TransGrid maintenance plant (EWPs and Cranes)?
- Does the development encourage the placement of obstructions that would prevent access for routine or emergency works?

5. Development Design and Construction Risk

- Has the development been designed so that during the construction phase TransGrid is not restricted from undertaking normal maintenance and inspection activities?

- Has the development been designed so that during the construction phase prohibited activities or encroachments are not required in the easement area?
- Has the design health and safety risk assessment taken into account the requirements of the NSW WorkCover Code of Practice for *Working Near Overhead Powerlines* 2006?

6. TransGrid's Rights

- Have TransGrid's existing rights been preserved?
- Has TransGrid been exposed to new maintenance costs (e.g. landscaping or other development changes impacting easement access, use and maintenance)?
- Does a new deed of easement need to be negotiated?

Post Construction Compliance Statement

The development proposal shall include as-built plans of the final construction that must be provided to TransGrid. The as-built drawings must be accurate, scaled and display distances/measurements, demonstrating compliance to the agreed plans and implementation of agreed control measures.

Timeframes

TransGrid will respond to a Local Council notification of a proposed development within 21 days as required in the SEPP, however that response may not be an approval (or a disapproval). If the development proposal does not meet the requirements of these Guidelines, or in the event further detailed engineering analysis is required, TransGrid will require the development proposal to be revised and resubmitted.

Developers are advised to consider TransGrid's requirements early in the process (and not as an afterthought that could result in project delays).

Further Assistance

For any further development enquiry assistance please contact the Development Enquiry Services Coordinator on Telephone (02) 9620 0777.

TRANSGRID EASEMENT GUIDELINES FOR THIRD PARTY DEVELOPMENT

APPENDIX 1

Prohibited Encroachments and Activities

TransGrid will use its powers under the Electricity Supply Act, involve WorkCover or take other legal action as required to prevent or halt prohibited activities.

1. Transmission Lines

Activities and encroachments that are **prohibited** within a Transmission Line (TL) Easement include, but are not limited to *(Note 2)*, the following:

- The construction of houses, buildings, substantial structures, or parts thereof.
- The installation of fixed plant or equipment.
- The storage of flammable materials, corrosive or explosive material.
- The placing of garbage, refuse or fallen timber.
- The planting or cultivation of trees or shrubs capable of growing to a height exceeding 4 metres.
- The placing of obstructions other than timber boundary fences within 20 metres of any part of a transmission line structure or supporting guy.
- Camping or the permanent parking of caravans or other camping vehicles.
- The parking or storage of flammable liquid carriers or containers.
- The installation of site construction offices, workshops or storage compounds.
- Flying of kites or wire controlled model aircraft within the easement area.
- Flying of any manned aircraft or balloon within 60m of any structure, guy or conductor.
- Flying of remote controlled or autonomous aerial devices (such as UAVs) within 60m of any structure, guy or conductor.
- Placing any obstructions on access tracks or placed in the easement area that restricts access.
- Any vegetation maintenance (such as felling tall trees) where the vegetation could come within the *Ordinary Persons Zone* – refer to the NSW WorkCover '*Working Near Overhead Powerlines - Code of Practice 2006'.*
- Any substantial excavation within 10 metres of a pole or supporting guy or guy foundation or within 20 metres of a tower
- The climbing of any structure (*any development that encourages or facilitates climbing will not be permitted).*
- Any change in ground levels that reduce clearances below that required in AS7000.
- The attachment of any fence, any signage, posters, or anything else, to a structure, or guy.

  Note: Interference to electricity infrastructure is an offence under the Electricity Supply Act.

- The movement of any vehicle or plant between the tower legs, within 5m of a structure, guy or between a guy and the pole.
  Note: Any damage to electricity infrastructure is an offence under the Electricity Supply Act.
- The storage of anything whatsoever within the tower base or within 10m of any tower leg.

- Any structure whatsoever that during its construction or future maintenance will require an *Accredited* person to access. *Note: The final structure may meet AS7000 clearances, but may be accessible* (e.g. by EWP) by Ordinary Persons within the Ordinary Persons Zone.
- Any work that generates significant amounts of dust or smoke that can compromise the TL high voltage insulation.
- The erection of any structure in a location which could create an unsafe situation work area for TransGrid staff.
- Any activity by persons not *Accredited* or not in accordance with the requirements of the WorkCover *'Working Near Overhead Powerlines - Code of Practice 2006'* that is within *(Note 1)*:
    - 3m of an exposed 132kV overhead power line
    - 6m of an exposed 220kV or 330kV overhead power line
    - 8m of an exposed 500kV overhead power line

  Note: Distances quoted are to the design conductor position (i.e. maximum sag and blowout)

The following activities may be approved with conditions. TransGrid's prior written consent is required. The proponent will have to demonstrate (using the *Impact Assessment* process) that the risks associated with the activity have been satisfactorily mitigated. Guidance on how to achieve this is provided in Appendix 2.

- Burning off or the lighting of fires. Lighting of fires directly under energised conductors will not normally be approved.
- Operation of mobile plant or equipment having a height when fully extended exceeding 4.3 metres.

  Note: Approval would be based on the need to maintain adequate clearance between the equipment and the line, having regard to the particular situation. Note that plant may require trailing earths and supervision by TransGrid staff.

- *Temporary* parking of caravans and other large vehicles in the outer 3m of the easement area, subject to a 4.3 metre height restriction and metallic parts being *earthed*.
- The erection of flagpoles, weather vanes, single post signs, outdoor lighting, subject to a 4.3 metre height restriction and metallic parts being *earthed*.
- The erection of non-electric agricultural fencing, yards and the like.

  Note: Fencing that exceeds 2.5 metres in height or that impedes would not be approved. Metallic fencing may require earthing and will generally not be approved if located within 20 metres of any part of a transmission line structure or supporting guy or within 4 metres of the vertical projection of the overhead conductors.

- The erection of electric fencing provided that the height of the fencing does not exceed 2.5 metres and provided that the fence does not pass beneath the overhead conductors.

  Note: Approval may be given for a portable electric fence to pass underneath the conductors provided that it is supplied from a portable battery-powered energiser that is located remotely

from frequented areas. Where it is necessary for a permanent electric fence to pass beneath the overhead conductors, or where an extensive permanent electric fencing system is installed in proximity to a transmission line certain additional safety requirements may be required.

- The installation or use of irrigation equipment inside the easement.

  NOTE: An irrigation system will not be approved if it is capable of coming within 4 metres of the overhead conductors; exceeds 4.3 metres in height; consists of individual sections of rigid or semi-rigid pipe exceeding 4.3 metres; and/or is capable of projecting a solid jet of water to within 4 metres of any overhead conductors.

- The installation of *low voltage* electricity, telephone, communication, water, sewerage, gas, whether overhead, underground or on the surface.

  Note: Services that do not maintain standard clearances to the overhead conductors that are within 15 metres from the easement centre-line, 20 metres from any part of a transmission line supporting structure or are metallic and within 30 metres of any part of a structure will not be approved. TransGrid may impose additional conditions or restrictions on proposed development.

- The installation of high voltage electricity services, subject to there being no *practicable* alternative and provided the standard clearances are maintained to the supporting structures.

  Note: Where extensive parallels are involved certain additional safety requirements may be imposed by TransGrid, depending on the particular case and engineering advice.

- Swimming pools, subject to TransGrid's strict compliance criteria.

  Note: Above ground pools will not be approved. In-ground pools will not be approved if there is a practicable alternative site clear of the easement area. If there is no practical alternative site, in-ground pools including coping will not be approved if it encroaches more than 4.5 metres, or is less than 30 metres away from a transmission line structure.

- Detached garages, detached carports, detached sheds, detached stables, detached glass houses, caravans, site containers, portable tool sheds, pergolas and unroofed verandahs attached to residences. (Easement encroachments of more than 3m will not be approved).
- Prefabricated metal (garden) sheds. TransGrid approved sheds must be earthed.

  Note: Sheds exceeding 2.5 metres in height, with a floor area exceeding 8 m^2, encroaching more than of up to 3 metres or within 20 metres of any part of a transmission line structure will not be approved. Connection of electric power will not be approved.

- Single tennis courts.

  Note: Tennis courts that hinder access, are for commercial use or do not provide adequate clearances shall not be approved.

- Sporting facilities and open recreational areas.

  Note: Facilities associated with the use of firearms and public sporting venues are discouraged.

- Subdivisions. See ***Appendix 2*** requirements.

- Roads, subject to horizontal and vertical clearances. Restrictions and other conditions on consent may also apply.

  Note: Roads located within 20 metres of any part of a transmission line structure will not be approved.

  Where it is proposed that a road passes within 30 metres of a transmission structure or supporting guy, TransGrid may refuse consent or impose restrictions and other conditions on consent. Where a road passes within 30 metres of a transmission structure or supporting guy, the structure's earthing system may require modification for reasons including, but not limited to, preventing fault currents from entering utility services which may be buried in the road. The option of raising conductors or relocation of structures, at the full cost of the proponent, may be considered.

- Cycleways, walking tracks and footpaths, provided *standard clearances* are maintained and the proposal does not alienate large sections of the easement area.
- Excavation – subject to restriction criteria.

  Note: Substantial excavations located within 10 metres of a general purpose pole structure or supporting guy, or within 20 metres of any part of a steel tower or major pole structure and exceeding a depth 3 metres will not be approved.

- Quarrying activities, earthworks, dam or artificial lake construction.
- Mining. Approval would be based on the merits of the proposal and any related circumstances.
- Use of explosives.
- Vehicle access or parking facilities.

  Note: Vehicle access and/or car parking facilities will not be approved if within 30 metres of a TL structure without adequate precautions provided to protect the structure from any accidental damage.

Note 1: An encroachment or activity that is located outside the prohibited distance of the infrastructure but still within the easement will not necessarily be permitted. It will generally need to be addressed in the Impact Assessment and remains subject to TransGrid prior consent.

Note 2: The above list is not exhaustive and if there is any uncertainty as to whether an activity or encroachment is acceptable within an easement, please contact TransGrid. TransGrid may impose additional conditions or restrictions on proposed development.

2. Cables

The activities listed below are prohibited within cable easements:

- The storage of flammable liquids or explosives.
- The planting or cultivation of trees or shrubs with extensive root systems.
- The construction of houses, buildings or substantial structures.
- The installation of fixed plant or equipment.
- The placing of garbage, refuse or fallen timber.
- Vertical boring directly over the cable lay (eg. the installation of fencing or safety railing).
- The raising or lowering of existing ground surface levels.
- Any excavation within *2m* of an underground cable.

The following activities may be approved with conditions. TransGrid's prior written consent is required. The proponent will have to demonstrate (using the *Impact Assessment* process) that the risks associated with the activity have been satisfactorily mitigated. Guidance on how to achieve this is provided in Appendix 2.

- Parking of vehicles.

  Note: Parking will be prohibited if the surface is not capable of supporting the vehicles likely to be parked, risking the crushing of the cable/ducts or erosion of the ground.

- The operation of mobile plant and equipment.

  Note: Such operations will be prohibited if the surface is not capable of supporting the vehicles likely to be parked, whereby risking the crushing of the cable/ducts or erosion of the ground.

- The erection of structures spanning the easement.
- Excavation.
- Concrete driveways.
- The installation of metal pipes, metal fences, underground or overhead cables.
- Road-boring in the vicinity of a high voltage cable.

TRANSGRID EASEMENT GUIDELINES FOR THIRD PARTY DEVELOPMENT

APPENDIX 2

General Requirements for Developments and Subdivisions

The following list of current general requirements is provided for your information. It should be noted that the list is not exhaustive and, where there is any doubt concerning a particular activity within the easement area advice should be sought from TransGrid.

1. Completed Works

The completed works shall provide for the following considerations:

- A safe unobstructed working platform shall be preserved around the transmission line structures for access by EWP, cranes as well as other large plant and equipment. No obstructions of any type shall be placed within 30 metres of any part of a transmission line structure.
- Roads, streets etc (including kerb to property boundaries) and intersections shall not be located within 30 metres of any TL structure.
- Roads crossing the easement require 12 metre clearance between the finished road surface and the conductor at it's maximum operating temperature.
- Roads paralleling the transmission line are not to be within the easement area.
- Proposed roadway locations shall also take into consideration any street lighting requirements to ensure that statutory clearance requirements are followed. The design clearances should include future maintenance safety issues. TL outages will not be provided for street light maintenance.
- Details of the levels of proposed roadways where they cross the easement shall be submitted to TransGrid for written approval prior to construction to ensure that adequate clearances to the TL conductors are maintained. It should be noted that formal approval will not be given to the subdivision if such clearances are not maintained.
- Access to the TL and its structures shall be available at all times for TransGrid plant and personnel. In this regard a continuous and unobstructed access way shall be retained along the easement.
- Where fences are required for security purposes access gates will be installed in an agreed location and a TransGrid lock will be fitted.
- All underground services installed more than 20 metres but within 30 metres of a TL structure shall be non-metallic. Utility services (including street lighting), whether above or below ground, shall not be installed without prior written approval of TransGrid.
- Excavation work or other alterations to existing ground levels shall not be carried out within the easement area without the prior approval of TransGrid. Approval will not normally be granted for such work within 20 metres of any supporting structure.
- Fenced boundaries for all new properties in the subdivision shall not be within 30 metres of any TL structure.
- A "Restriction-as-User" (88B Instrument) shall be placed on the titles of the lots affected by the TL easement. Any proposed activity within an easement area will require the prior written approval of TransGrid (appropriate wording will be advised when required).
- Any proposed development does not impact on TransGrid's costs of inspecting, maintaining or reconstruction the transmission lines.
- Vegetation Control
  In order to comply with its statutory responsibilities to maintain adequate clearance between the conductors and any forms of vegetation. TransGrid maintains its easements as follows:

- Tall growing species likely to infringe safe clearances are to be removed regardless of existing height at time of construction.
- Trees likely to fall onto conductors or towers are also to be removed whether on the easement or off the easement (ref. Sec 48 of the Electricity Supply Act 1995).
- Shrubs and other vegetation of lower mature height within the easement will be reduced and managed, generally by slashing with ground level retained.
- Vegetation management will aim to reduce available fuel and subsequent bushfire risks in accordance with NSW Rural Fire Service Bush Fire Environmental Assessment Code, which sets out requirements for hazard reduction strategies such as Asset Protection Zones and Strategic Fire Advantage Zones
- Removed vegetation will be mulched or chipped and removed from site or retained on site in accordance with owner/stakeholder requirements and
- Other works considered necessary in order to provide a safe working environment for maintenance staff, contractors and for the property owner/manager will be undertaken.

Proposed vegetation plantings, such as Riparian corridors, within the transmission line easements shall be compatible with the above maintenance requirements.

2. Construction

During construction, the development plans shall also provide for the following considerations:

- Vehicles, plant or equipment having a height exceeding 4.3 metres when fully extended shall not be brought onto or used within the easement area without prior TransGrid approval.
- Where temporary vehicular access or parking (during the construction period) is within 16 metres of a transmission line structure, adequate precautions shall be taken to protect the structure from accidental damage. Plans need to be submitted to TransGrid for prior approval.
- The easement area shall not be used for temporary storage of construction spoil, topsoil, gravel or any other construction materials.

3. Costs

The Developer shall bear all costs of any reconstruction or modification of the transmission line, including consultation and design required to maintain clearances due to proposed ground level changes; road crossings within the easement; or due to any damage to the TL arising from the development.

TRANSGRID EASEMENT GUIDELINES FOR THIRD PARTY DEVELOPMENT

APPENDIX 3

Impact Assessment Template

Detailed Description of the Development

Risk Type	Aspect	Drawing Reference	Assessment	Risk Level	Control Measure	Residual Risk
Health and Safety						
Operational						
Maintenance						
Design and Construction						
Rights and Entitlements						

Compliance plan

Example of the Required Working Platform for Transmission Tower Maintenance

330kV Tower and Line

Appendix D. Liaison with Utility Authorities

D.1 Sydney Water Corporation – Feasibility Letter

D.2 Endeavour Energy – Advice Letter

Case Number: 147637

6 October 2015

Aaron Nangle
c/- MOTT MACDONALD AUSTRALIA

FEASIBILITY LETTER

Developer:	**Aaron Nangle**
Your reference:	**357627**
Development:	**Lot 10 DP1157491 10 Archbold Rd, Minchinbury**
Development Description:	**Proposal to develop Lot 10 DP1157491 to accommodate general industrial complex**
Your application date:	**26 August 2015**

Dear Applicant

This Feasibility Letter (Letter) is a guide only. It provides general information about what Sydney Water's requirements could be if you applied to us for a Section 73 Certificate (Certificate) for your proposed development. **The information is accurate at today's date only.**

If you obtain development consent for that development from your consent authority (this is usually your local Council) they will require you to apply to us for a Section 73 Certificate. You will need to submit a new application (and pay another application fee) to us for that Certificate by using your current or another Water Servicing Coordinator (Coordinator).

Sydney Water will then send you either a:

- Notice of Requirements (Notice) and Developer Works Deed (Deed) or
- Certificate.

These documents will be the definitive statement of Sydney Water's requirements.

There may be changes in Sydney Water's requirements between the issue dates of this Letter and the Notice or Certificate. The changes may be:

- if you change your proposed development eg the development description or the plan/ site layout, after today, the requirements in this Letter could change when you submit your new application; and

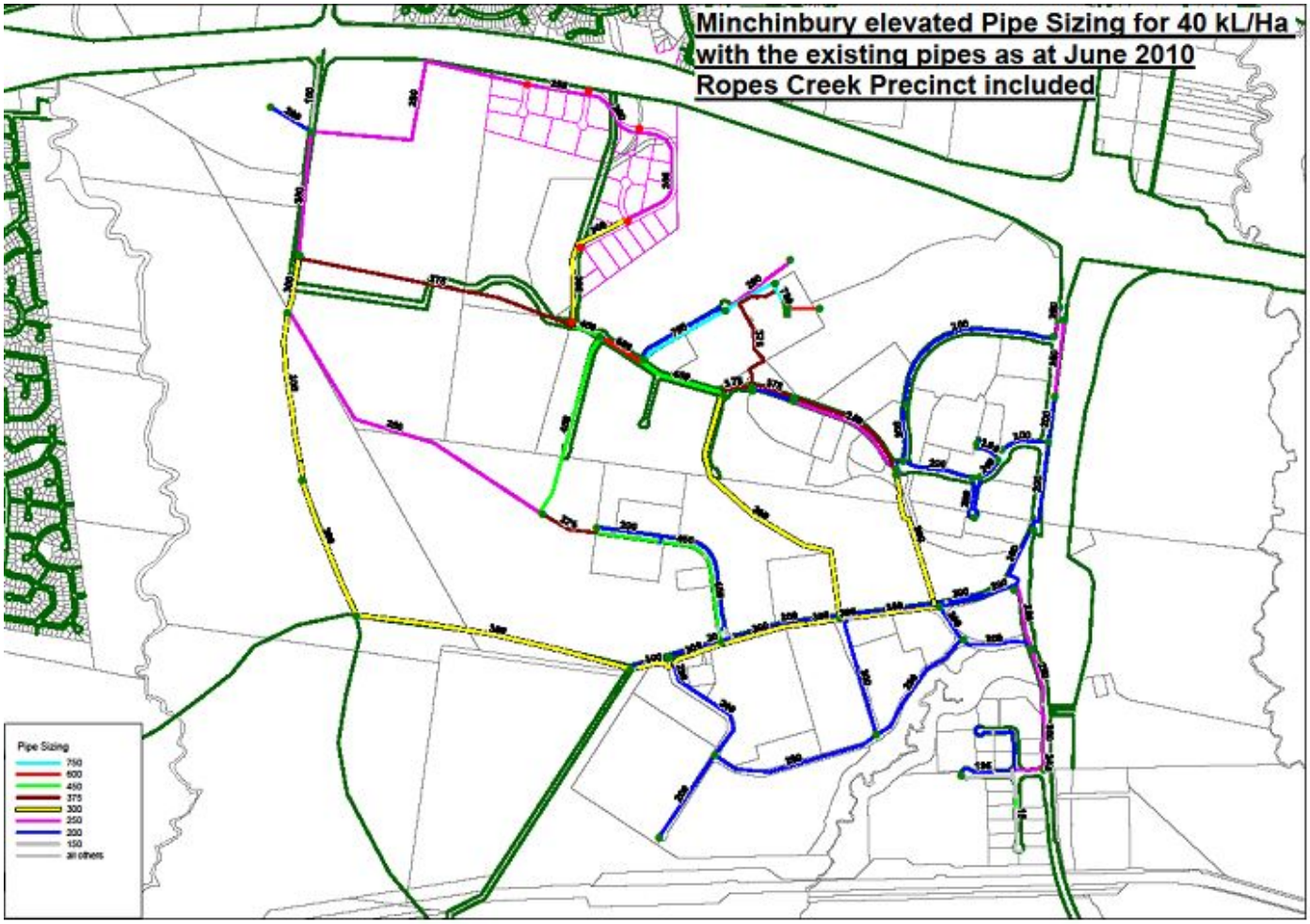
- if you decide to do your development in stages then you must submit a new application (and pay another application fee) for each stage.

You have made an application for specific information. Sydney Water's possible requirements are:

Potable Water:

- The subject site is located within the Minchinbury Elevated supply zone.
- To serve the proposed development site the developer will be required to consider the water main sizing as per the Scheme Plan below.
- All works are to be constructed in accordance with the Water Supply Code of Australia WSA 03-2011-3.1 (Sydney Water Edition - 2012).

Potable Water Scheme Plan



Wastewater

- The proposed development is to connect to the Ophir Street Carrier. A plan showing the proposed Carrier route in relation to the subject site is shown on page 3..The estimated completion of the Carrier is late December 2015.
- To connect to the Ophir Street Carrier the developer would need to provide a lead-in wastewater main to connect the subject site to the Ophir Street Carrier.
- An accredited Hydraulic Designer will be engaged by the developer to ensure that the proposed wastewater infrastructure for this development will be sized & configured according to the Sewerage Code of Australia WSA 02-2002-2.2 (Sydney Water Edition 1 – Version 3). Evidence of Code compliance should be attached with the design.

Proposed Ophir Street Carrier

- You must use Sydney Water's new **Technical Specifications for Leak Tight Sewer Systems** to plan, design and construct the sewer. This specification must be used in conjunction with (and have precedence over) the Sewerage Code of Australia, WSA02-2002 (Sydney Water Edition).

No warranties or assurances can be given about the suitability of this document or any of its provisions for any specific transaction. It does not constitute an approval from Sydney Water and to the extent that it is able, Sydney Water limits its liability to the reissue of this Letter or the return of your application fee. You should rely on your own independent professional advice.

END

30 September 2015

Endeavour Energy Ref: ENL2518 – 2015/08613/001
Customer Ref:

Mott MacDonald
383 Kent Street
SYDNEY
NSW 2000

Attention: Greg Lee

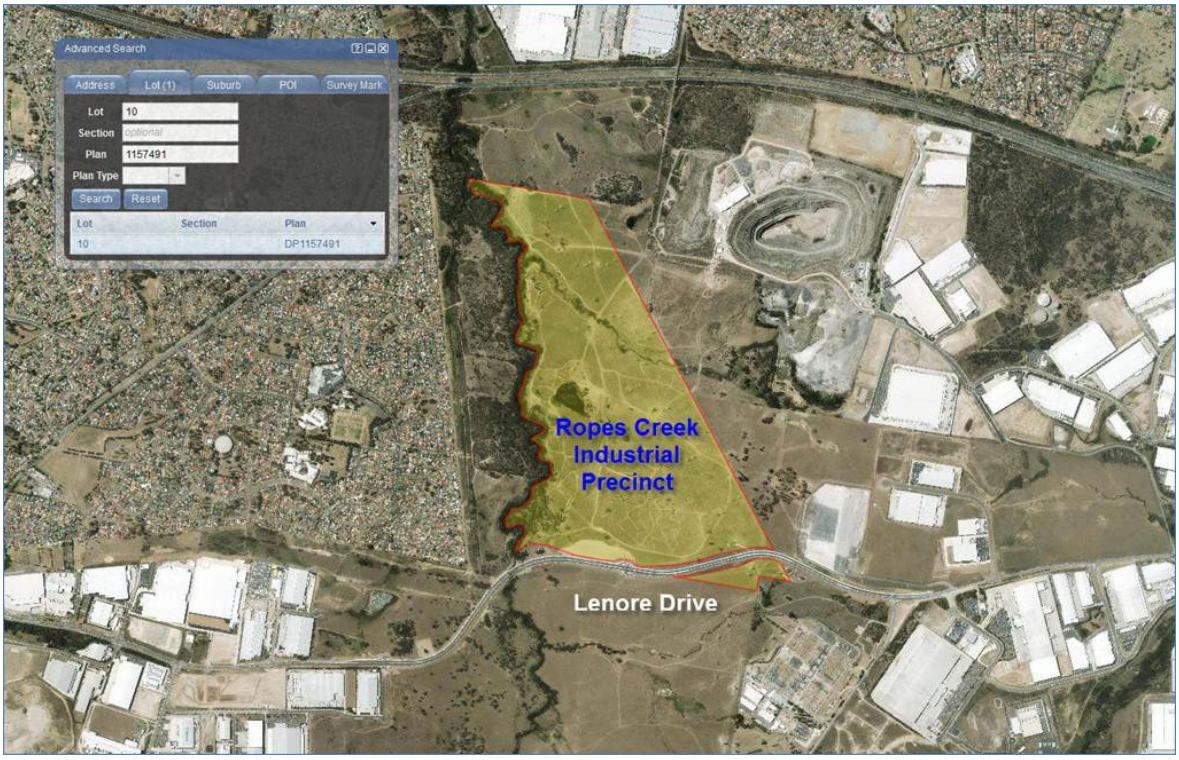
ENL2518 – Proposed Industrial Development | Lot 10 DP 1157491, Lenore Drive, EASTERN CREEK

Dear Greg,

Thank you for your enquiry regarding the proposed Industrial development at the above address. This enquiry has been registered under our reference numbers – ENL218. Please quote this number for all future correspondence.

Endeavour Energy acknowledges that NSW Department of Planning and Environment is preparing a feasibility study in relation to the provision of electricity service for Lot 10 DP 1157491 and would seek comments from Endeavour Energy regarding the supply arrangements and conditions.

The proposed development at Ropes Creek is approximately 134.8 ha in area. Considering the transmission line easements along the eastern boundary of the site and at set-back for the 100+ year flooding along the Ropes Creek, the developable land area has been approximately to be 90 ha.

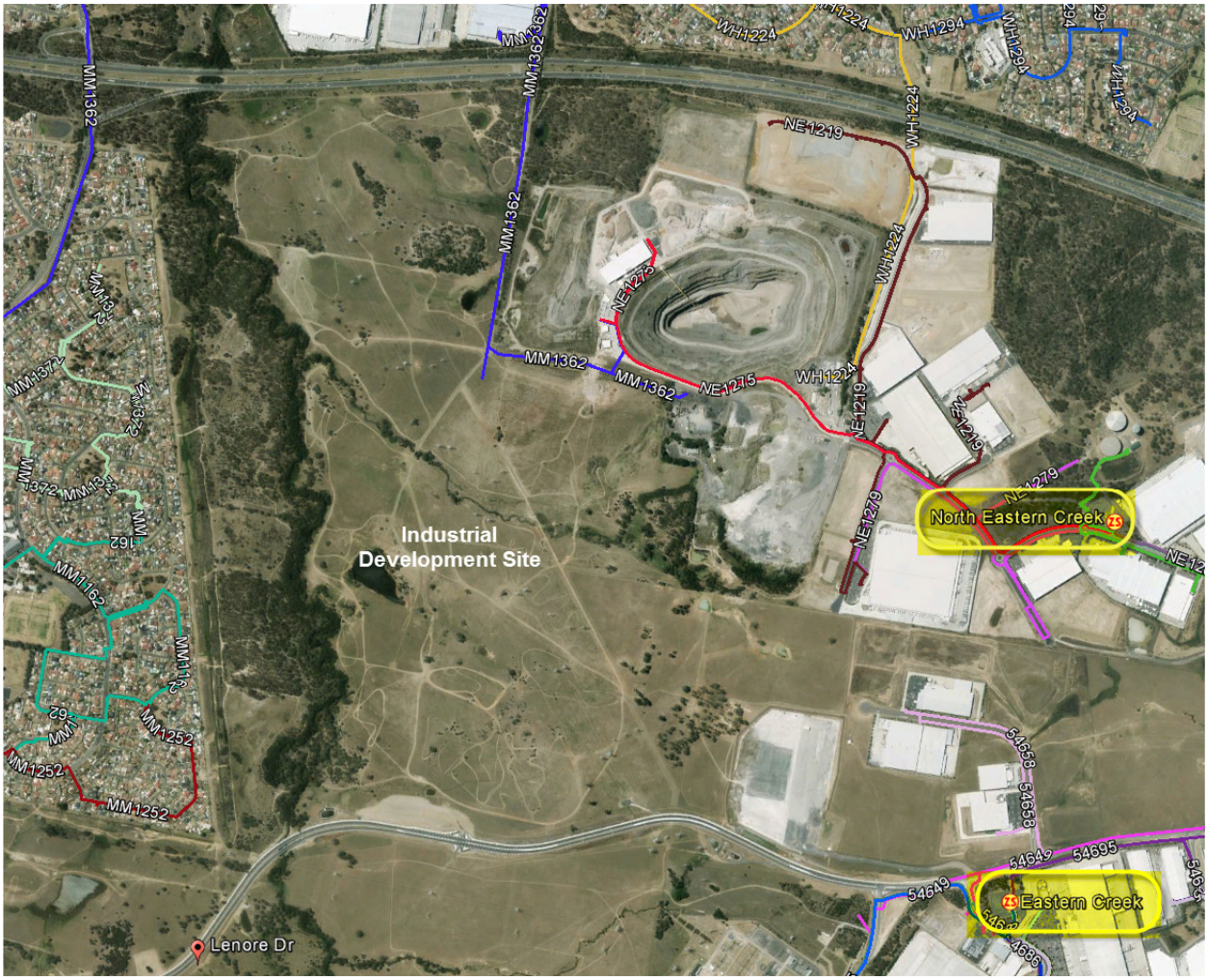


As advised, the development is proposing to develop this precinct to accommodate general industrial complex that is similar to those facilities in the surrounding area and estimated load is based on the following assumptions:

Average Loading (kVA/m^2)	Developable Land (ha)	Facility Area (ha)	Total Loading (kVA)
0.05	90	54	***27,000***

Preliminary analysis indicates that both existing North Eastern Creek (in Wonderland Drive) and Eastern Creek ZS (in Old Wallgrove Road) have enough capacity to support this type of the required load.

Depending on the final road layouts of this precinct development, it is anticipated that Eastern Creek ZS will supply the southern part of the precinct while North Eastern Creek ZS will supply the northern part.



Hope this assists for the meantime and this advice provided is in response to an enquiry only and does not constitute a formal method of supply. An application must be submitted and subsequent designs have been certified or approvals granted will Endeavour Energy reserve capacity on the network.

Should you have any questions regarding this response to your request for technical review, please contact me.

Yours faithfully,

David HO

David Ho
Contestable Works Project Manager
Network Connections

☎ Direct: (02) 9853 7901 | 🗐 Fax: (02) 9853 7925

✉ Email: david.ho@endeavourenergy.com.au