Horsham Downs Estate Ltd

Horsham Downs Estate

Infrastructure Report

June 2026

Document control

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Applicant	Horsham Downs Estate Ltd
Client	Horsham Downs Estate Ltd
Client representative	Sam Pemberton
BBO details	Bloxam Burnett & Olliver Ltd (BBO) Level 5, Building E, Union Square, 192 Anglesea St, Hamilton
BBO representative	Jarred Stent
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1. Introduction

1.1 Purpose

Horsham Downs Estate Ltd has engaged Bloxam Burnett & Olliver Ltd (BBO) to prepare a preliminary engineering assessment to support the Fast Track referral application for the proposed Horsham Downs Estate development at 319 Gordonton Road, Hamilton. Specifically, the proposed activity is located on **Lot 1** DP 24870, **Lot 1** DPS 9149 and **Lot 1** DPS 79016.

This report summarises the necessary infrastructure required to service the development. The purpose of the report, and supporting plans, is to provide Waikato District Council (WDC) with an overview of the project, the works required to deliver it (i.e. earthworks) and the infrastructure required to service the development.

1.2 Applicant and Site Details

Horsham Downs Estate proposes to develop land located at 319 Gordonton Road, Hamilton, for residential purposes. The sites are legally described as **Lot 1** DP 24870, **Lot 1** DPS 9149 and **Lot 1** DPS 79016, held in the Record of Titles SA63A/920, SA3D/1116 and SA63A/920, with the current title boundaries shown outlined in yellow in **Figure 1**.



Figure 1 - Location of the proposed site.

The site is zoned General Rural Zone in the District Plan and has no existing water supply and wastewater connections to Hamilton City Council's or Waikato District Council's networks.

The Project Area contains a villa and accessory farm buildings. It is a moderate sloping to the north-west. The topography is best shown in the Existing Contour Plan (Plan 149160-00-0101), contained in **Appendix A**.

For further information on the site's ground conditions refer to the Geotechnical Report undertaken by CMW Geosciences within the referral application.

1.3 The Proposal

1.3.1 Development Outcome

The development outcome is an 850 to 950 lot residential development and a neighbourhood centre with supporting three waters servicing. The site masterplan layout is shown in **Figure 2** below.



Figure 2 –masterplan

Access to and from the development is to be provided via two new intersections:

- One off the existing Haynes Place towards the south; and
- One new roundabout on Gordonton Road approximately halfway along the road frontage.

The proposed three waters servicing is set out in detail in Section 3, 4 and 5 below.

2. Earthworks

CMW Geosciences conducted a preliminary geotechnical assessment of this site and confirmed its suitability for the proposed development, subject to further works as described in the CMW Geotechnical Assessment. The nature and scale of the proposed work is conventional for land development projects of the scale proposed.

The development will involve carrying out necessary earthworks as needed, which will encompass:

- Formation of site geometry, building platforms and roading network.
- Recontouring site levels to ensure overland flow paths integrate with the new site geometry.
- Excavation to construct the stormwater wetland.
- Excavations for three waters infrastructure.

This site requires earthworks, in the form of cutting and filling, to create suitable grades for the stormwater flows and site lot development. The design provides for varying depths of cut and fill across the majority of the site.

The site will be graded between 0% and 20% to ensure optimal earthwork. Excess excavated material is not envisaged, and any material will remain on site. Volumes of imported structural fill maybe required.

Table 1 presents a preliminary analysis of the projected earthworks volumes, calculated from the solid volume extending from the existing ground to the design level. Compaction factors have not been accounted for in these estimations. Furthermore, the cut and fill volumes outlined do not encompass the pavement and footpath box cuts. The preliminary design earthworks can be found on Plan 149160-00-0102 in **Appendix A.**

Table 1 - Estimated Earthworks Volumes

	Quantity (m^3)
Cut Volume*	520,000 m^3
Fill Volume *	580,000 m^3
Imported fill	80,000 m^3
Disturbed area	54.00Ha

* Solid volumes, including topsoil

2.1 Sediment and Erosion Controls

A number of erosion and sediment controls will be employed for the duration of construction in accordance with the Waikato Regional Council's TR2009/02 (Erosion and sediment control: guidelines for soil disturbing activities).

These measures could include:

- Rapid stabilisation of earthworks surfaces.
- Sediment Retention Ponds.
- Decanting Earth Bunds

- Stabilised construction entrances to allow access from Main roads.
- Silt fences along the site boundary with regular returns.
- Clean water diversion where no earthworks are taking place.
- Dirty water diversion to take runoff from Haul roads to Decant Earth Bunds.
- Dirty water diversions dividing the catchments taking run-off to relevant treatment devices.

Earthworks methodologies and an Erosion and Sediment Control Plan will be provided as part of the substantive application that will address sequence of works and sediment and erosion control monitoring.

2.2 Wind and Dust Monitoring

If earthworks are undertaken during dry periods, there may be the potential for dust generation and erosion by wind from un-stabilised site areas. Accordingly, it is proposed to implement measures to control wind erosion and to minimise the spread of airborne dust, and any nuisance created by it through construction management plans to be prepared as conditions of consent to any substantive application.

3. Water Supply

3.1 Current and Proposed Condition

The development of the site will require a fire and potable supply to be provided. There is no suitable existing water supply within the Gordonton Road frontage for the development to connect into.

The Project can be serviced for water infrastructure by either of the following methods:

- **Option 1:** Private Bore/Treatment supplemented by on lot tanks.
- **Option 2:** Connection to the public water supply network (via necessary extensions to that network). Drawing 149160-00-0106 in **Appendix A** indicates the proposed connection location.

3.2 Predicted Flows

Water demand flows are based on the standard RITS v2 method to calculate potable water demand and FW2 fire supply. This site is based on medium density residential land use, assuming 45 people per ha and 260 litres per person per day. The RITS calculations are provided in **Table 2** below.

Table 2 – Water Use calculations

Water Use Calculations	
Proposed Development Area	44.11 ha
Population	1,985 Based on 45 persons per hectare
Firefighting Supply	FW 2 as defined in SNZ PAS 4509 (25 l/s)
Potable consumption	11,700 litres per hectare per day (based on 260 l/p/d and 45 people per hectare from the RITS)
Peaking factor	5 (from RITS)
Average Daily flow	516.1 m^3/d
Peak flow	29.9 l/s

3.3 Connection to Public Reticulation/Supply

Throughout the internal roads, reticulation will be installed on both sides of the roads in accordance with RITS v2, with all dwellings have connections off a vested road corridor.

Hamilton City Council has a process for modelling capacity and network upgrades to service development. This would be utilised for the substantive application to evaluate a reticulated network connection and any necessary upgrades. Drawing 149160-00-0106 in **Appendix A** indicates the proposed connection location.

3.4 Bore Abstraction

A Groundwater Availability & Drawdown Assessment of the site was undertaken by CMW (December 2025) to consider groundwater as a potable water solution which determined that there was feasible capacity to service the development

If there is no availability for a connection to the public water supply network,, then the use of ground water can provide for development to occur by implementation of Bore Water abstraction, treatment, and storage.

On-site treatment would typically include processes such as filtration, disinfection (e.g., UV or chlorination), and possibly additional treatment steps to address site-specific concerns such as hardness, iron, or manganese.

Treated water can be stored in a dedicated reservoir, with booster pumps and a reticulation network distributing potable water to the development. It would be owned by a residents association as explained below.
The water supply will be designed to comply with the relevant drinking water standards.
Based on the test data and the volumes provide in table 2, the use of bore abstraction is a feasible option to service the development. The substantive application would determine the required storage volume and Firefighting flow for the decentralised option.

If water bore abstraction is required, then water allocation consents will be as part of the substantive application.

We also note that a hybrid solution comprising both bore extraction and on lot rainwater tanks are feasible.

The code of practice requires water demand to be calculated as 260 litres per day per person, with an average residential design occupancy of not less than 2.8 people per dwelling. This equates to a daily need of 728 litres per dwelling.

However, it is not uncommon for residential houses to use water saving devices to reduce water demand, which can save up to 60L-80L/per person/day.

Furthermore, it is noted that toilets and laundry water usage equate to circa 40% of daily demand per household. The stormwater re-use tanks could be dual plumbed back into dwellings which would also significantly reduce the total water consumption.

Final sizing of any tanks would be undertaken as part of the substantive application.

3.5 Assessment of Effects

Potential effects on the aquifer availability and drawdown effects from bore supply can be addressed at the substantive application stage. All water that will be supplied by the bore will be suitability treated to avoid effects on human health.

On lot rainwater tanks may have the potential to reduce groundwater recharge of the aquifer. Although rainwater tanks intercept roof runoff, the proposed closed site system, where wastewater generated onsite is retained and treated within the development, means that water that would reduce the overall take from the aquifer.

Consequently, if private water supply is required, the potential adverse effects can be appropriately avoided, remedied and mitigated.

4. Wastewater

Wastewater servicing for the development can be provided through implementing a connection to the public wastewater network OR through the installation of an onsite treatment plant and disposal within the site (using land contact devices prior to discharge).

4.1 Predicted Flows

The standard RITS method was used to estimate wastewater flows assuming 45 people per ha and 200 litres per person per day. Total flows and required storage calculations are shown in Table 3 below.

Table 3 – Wastewater Flow calculations

Calculated Flows for Industrial Development	
Standard Values Used	
Average Daily Flow	200 l/p/d
Infiltration Allowance	2,250 l/h/d
Surface Water Ingress Allowances	16,500 l/h/d
Residential Population Density	45 p/ha

Wastewater Flow Calculations

Catchment	Area (ha)	Zone	Eq. Pop. (persons)	Waste Water (l/d)	P/A Ratio	Infiltration (1/d)	SWI (1/d)	ADF (m^3/d)	PDF (l/s)	PWWF (l/s)
Proposed Development Area	44.11	Res	1,985	396,990	2.9	99,248	727,815	5.7	14.5	22.9

4.2 Connection to Public Reticulation

It is proposed that the full development will be serviced by a gravity network with all networks in the vested road corridors. The network will discharge at the onsite treatment plant if treated onsite or a centralised pumpstation location should connections be available to the Hamilton City network. Refer to drawing 149160-00-0105 in **Appendix A** for location.

Hamilton City Council has a process for modelling capacity and network upgrades to service development. This would be utilised for the substantive application to evaluate a reticulated network connection and any necessary upgrades.

4.3 On site Treatment Plant

An onsite solution for wastewater treatment can be provided.

This option involves deploying a modular, containerised treatment plant that can be sized according to the staging requirements of the development.

The main features and benefits include scalable capacity allowing for incremental expansion as the development progresses, shorter installation timeframes, supporting rapid response to development needs. The plants will be customised for the required flows and may include membrane bioreactors (MBR) and/or membrane aerated biofilm reactors (MABR). It is likely that an MBR or MABR/MBR hybrid (with nutrient removal and disinfection) will be required for the Project. It would be owned by a residents association (or similar) as explained below.

While the contaminant concentrations from the residential component of the Project are expected to be in line with standard domestic strength wastewater, the commercial components will have a waste strength of approximately three times that of the domestic sources. The key parameters for raw influent contaminant concentrations are likely to be:

- ▪ Carbonaceous Biochemical Oxygen Demand (cBOD5)
- ▪ Total Suspended Solids (TSS)
- ▪ Total Nitrogen (TN)
- ▪ Total Phosphorus (TP)

Preliminary discussion has been had with Hydro flux around the supply of a system suitable to provide a single treatment plant for the flows provided above. This would be located near the wetland and requires a footprint of approximately 750sq.m. The images below show the preliminary configuration of the site and a 3d view. Final sizing will be confirmed at the detailed design phase.

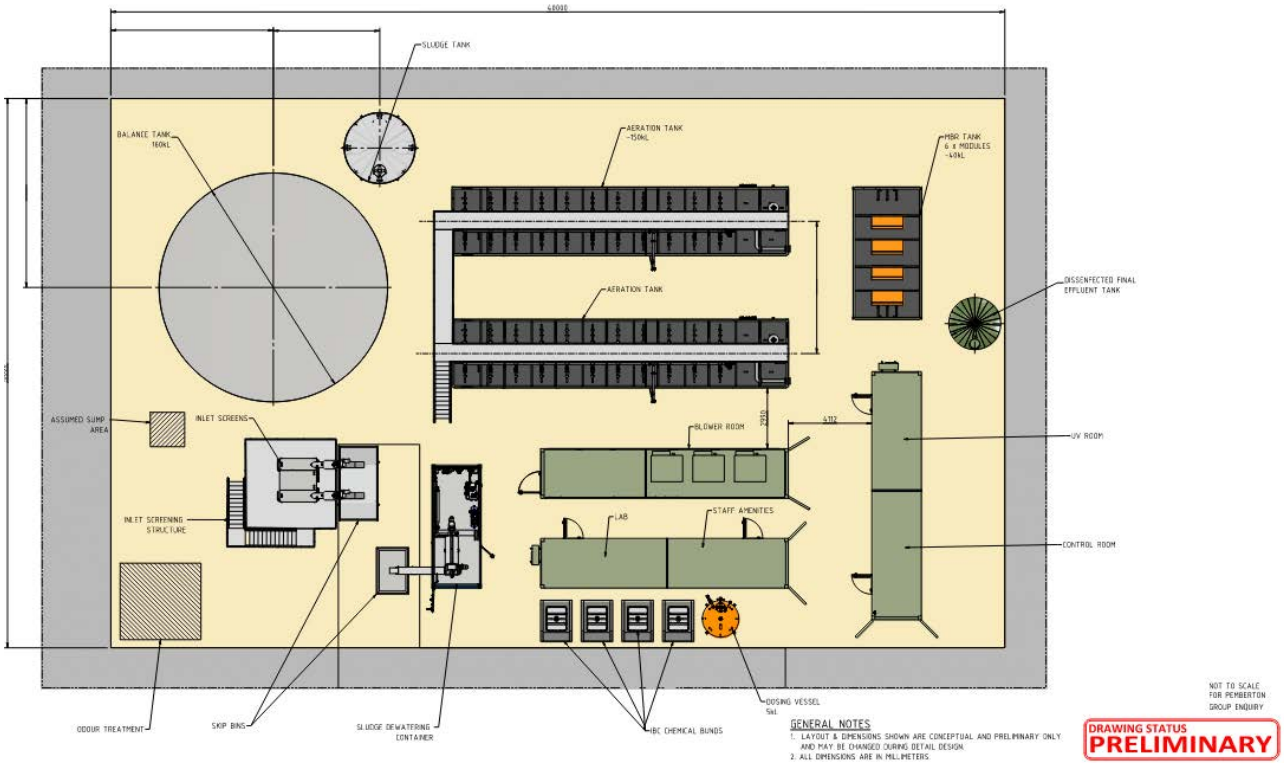


Figure 3 – Wastewater Treatment plant plan

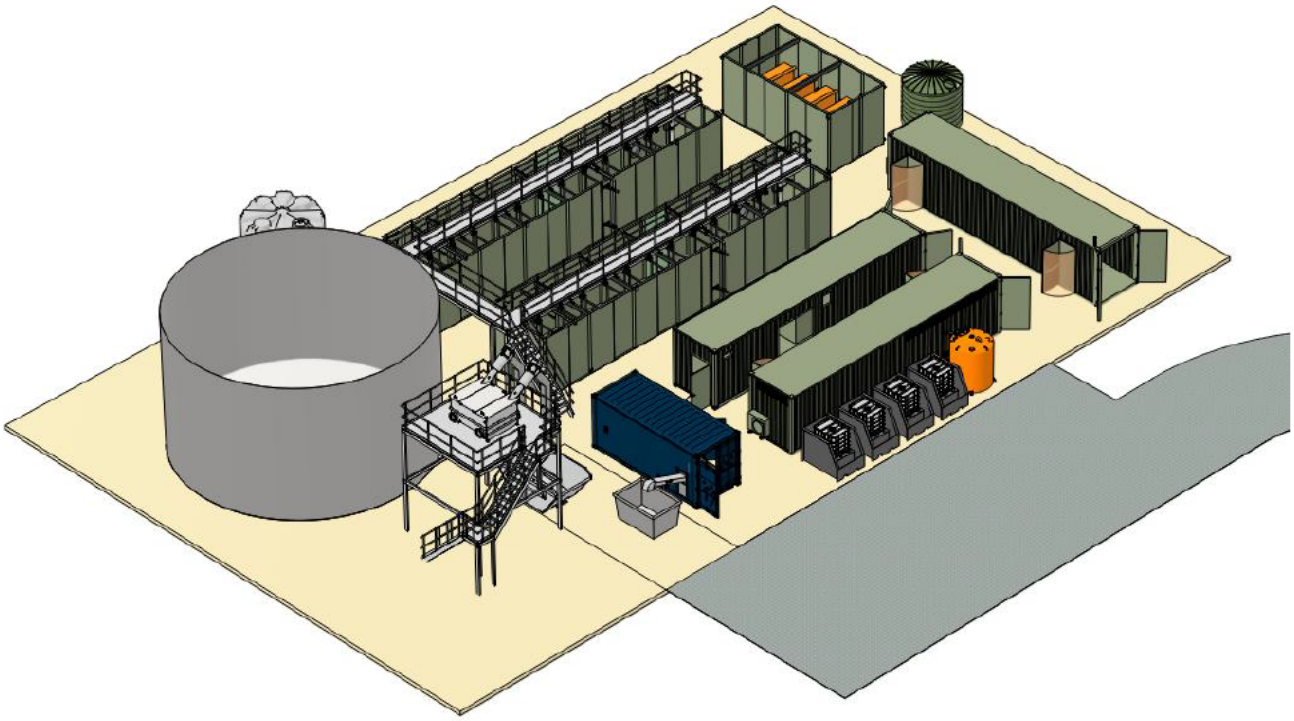


Figure 4 – Wastewater Treatment plant 3d view

4.4 Treated Wastewater Quality

The MBR WWTP solutions are able to prove wastewater quality outputs that exceeds the standard quality of discharges from standard wastewater treatment systems within New Zealand.

For example, WSL operates with the current discharge quality limits discharging into the Waikato River identified in Table 4 whereas Table 5 identifies recent private WWTP's which have been approved with MBR technology:

Table 4: Watercare Pukekohe WTTP Discharge to the Waikato River

PARAMETER	TREATED DISCHARGE (AVERAGE)	PERCENTILE
5-Day Carbonaceous Biochemical Oxygen Demand ($cBOD_5$)	<12	90th
Total Suspended Solids (TSS)	<18	90th
Total Nitrogen (TN)	-	-
Total Phosphorus (TP)	<18	-
Faecal Coliforms (FC)	<1000 CFU/100 mL	90th

Table 5: Private WWTP Discharge Quality

WWTP	BOD	TSS	NH	TN	RP3	TP	FC
Kingseat	<2	<5	<2	<2	-	0.5	<5 CFU/100 mL
Karaka North	5	4	2	5		2	2 CFU/100 mL

The quality of treated wastewater discharge is typically determined by the characteristics of the receiving environment. However, it will also be derived from the potential effects on a number of different elements, including overall water quality, ecology and cultural values.

This will be determined as part of the substantive application which will include a comprehensive Assessment of Environmental Effects (AEE).

Polishing Wetland/Land Contact Device and Discharge to Surface Water
Following treatment, the wastewater can be further treated using a polishing wetland or land contact device that will meet the cultural requirements of local Iwi.

Reticulation
If the site is to be serviced by a private MBR, to minimise the peak wastewater flows at the on-site treatment plant, the wastewater reticulation within the site is likely to be a via low pressure sewer reticulation network. This system requires a pump chamber containing a grinder pump on each lot. The pump chamber is connected to a pressure main which transfers wastewater to the WWTP.

Assessment of Effects
Where the discharge would enter any freshwater tributary, the existing water quality would also be assessed (via sampling across several months) to determine the required quality of treatment to be applied to any discharge to ensure that the existing freshwater quality is not impacted.

Using the wastewater treatment technologies that are readily available and well proven, the wastewater can be treated to a level that will have very little impact on receiving environment where the direct discharge occurs.

However, viruses are often as much an issue as bacteria and can be much more difficult to kill, remove, or disinfect. Modern pathogen reduction techniques, such as ultraviolet treatment, membrane filtration, and ultra filtration are capable of reducing all pathogens to near undetectable levels. The ultimate level of disinfection required will be appropriately defined during design for the substantive application.
Consequently, if a private wastewater supply is required for the Project, the potential adverse effects can be appropriately avoided, remedied and mitigated.

5. Ownership and operation

Ownership and management of any private water supply or wastewater infrastructure could be via private utility entity or a body corporate/residents' association. A clear ownership, operation and management framework will be required through the life of the resource consent, including provisions relating to operation, maintenance, repair and renewal of the assets (as well as a sinking fund for the renewal and replacement of assets as they reach the end of their design life). The assets would be operated by a suitably qualified and experienced contractor to ensure that day to day as well as long term operational and maintenance requirements are met.

There are numerous examples of consented/operating private water and wastewater entities successfully operating in New Zealand.

6. Stormwater

A comprehensive preliminary stormwater and flooding assessment has been undertaken for the development. A copy of this memo is attached in the referral application.

7. Conclusion

The proposed Project presents significant opportunities for urban expansion and to meet the demand for residential housing in the Waikato Region. Notwithstanding the site's current rural zoning and the absence of existing infrastructure connectivity, there are feasible and sustainable servicing solutions available for the Project to ensure that the site can be appropriately serviced.

The final servicing strategy will be further developed during the substantive application phase, with further assessment of environmental effects, and consultation with relevant stakeholders.

8. Authors Experience

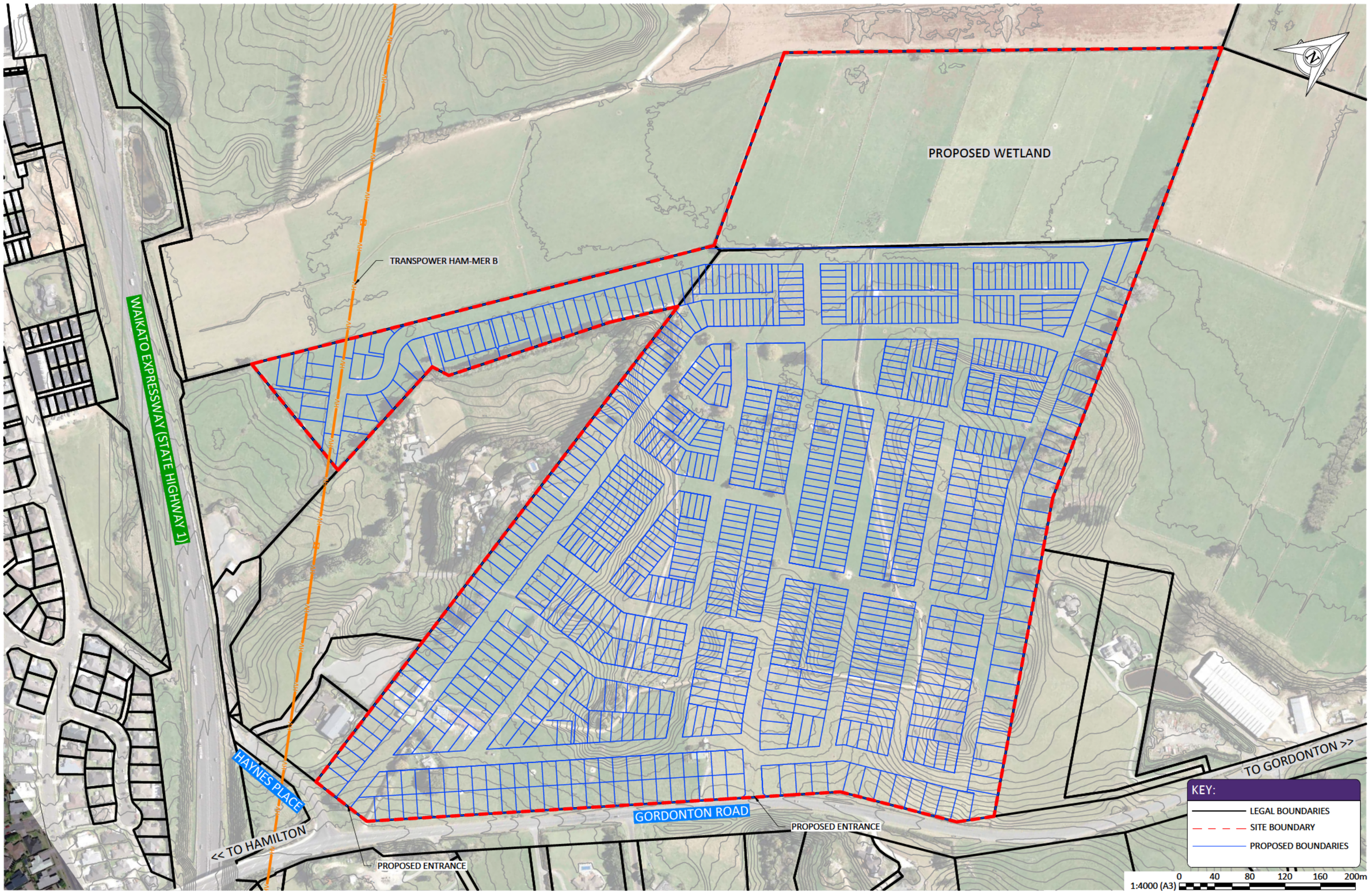
I hold qualifications of Bachelor of Engineering Technology from Western Institute of Technology and a National Diploma in Civil Engineering from Wintec. I am a member of Engineering New Zealand. I have practised as a Civil Engineer in New Zealand for 22 years.

I have been involved in a range of civil engineering and land development projects throughout New Zealand, including:

- Preparation of consent and plan change documents for land development projects;
- Preliminary design infrastructure, energy and Land development; and,
- Detailed design and implementation supervision of infrastructure, energy and Land development projects.

Although this report is not for a hearing before the Environment Court, the author records that they have read the Code of Conduct for Expert Witnesses Contained in the Environment Court Practice Note 2023 and agree to comply with it.

The authors confirm that the issues addressed in this report are within the authors' area of expertise, except where the authors state they have relied on the information of other persons.



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PROJECT: HORSHAM DOWNS ESTATE

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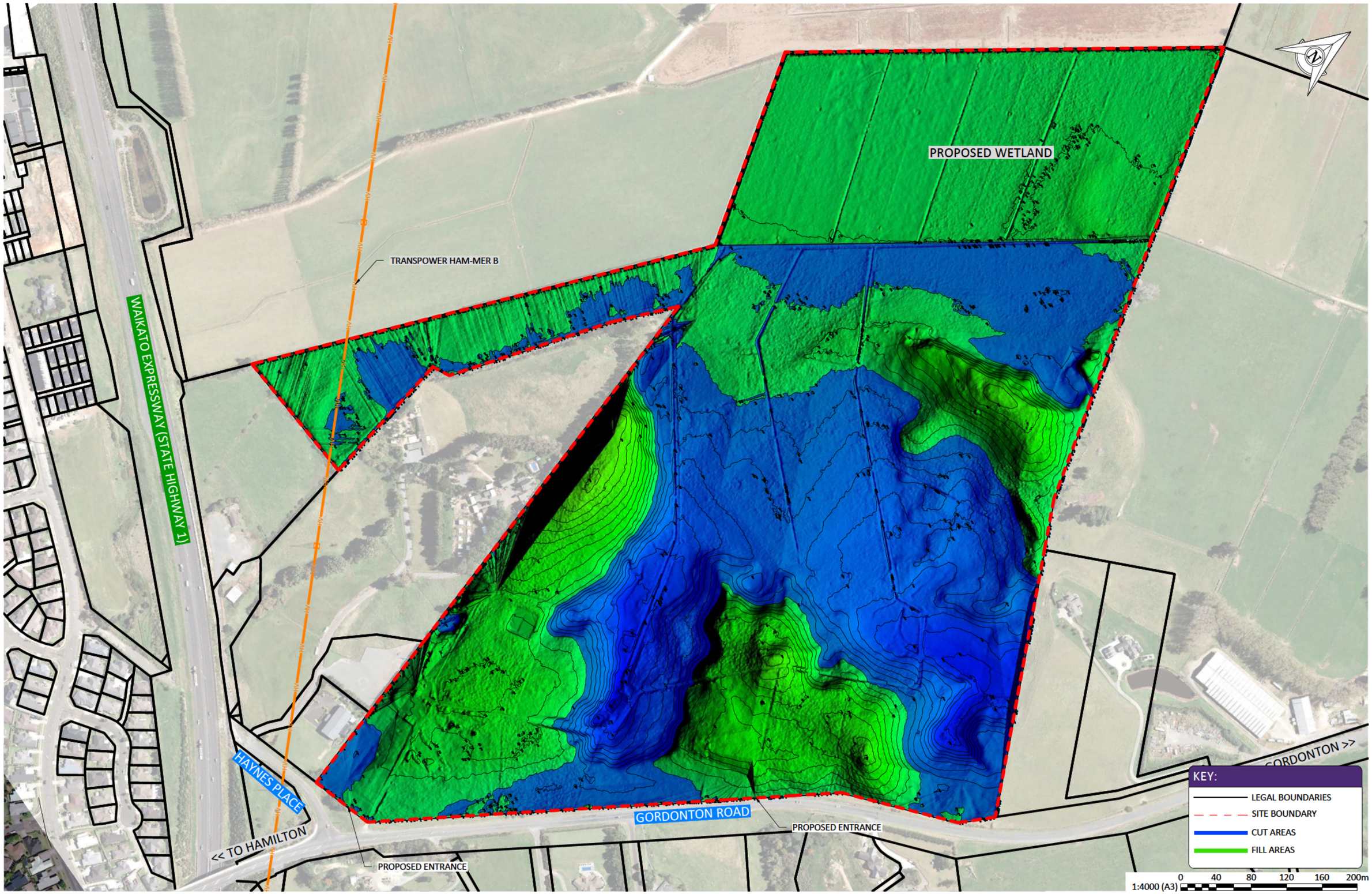
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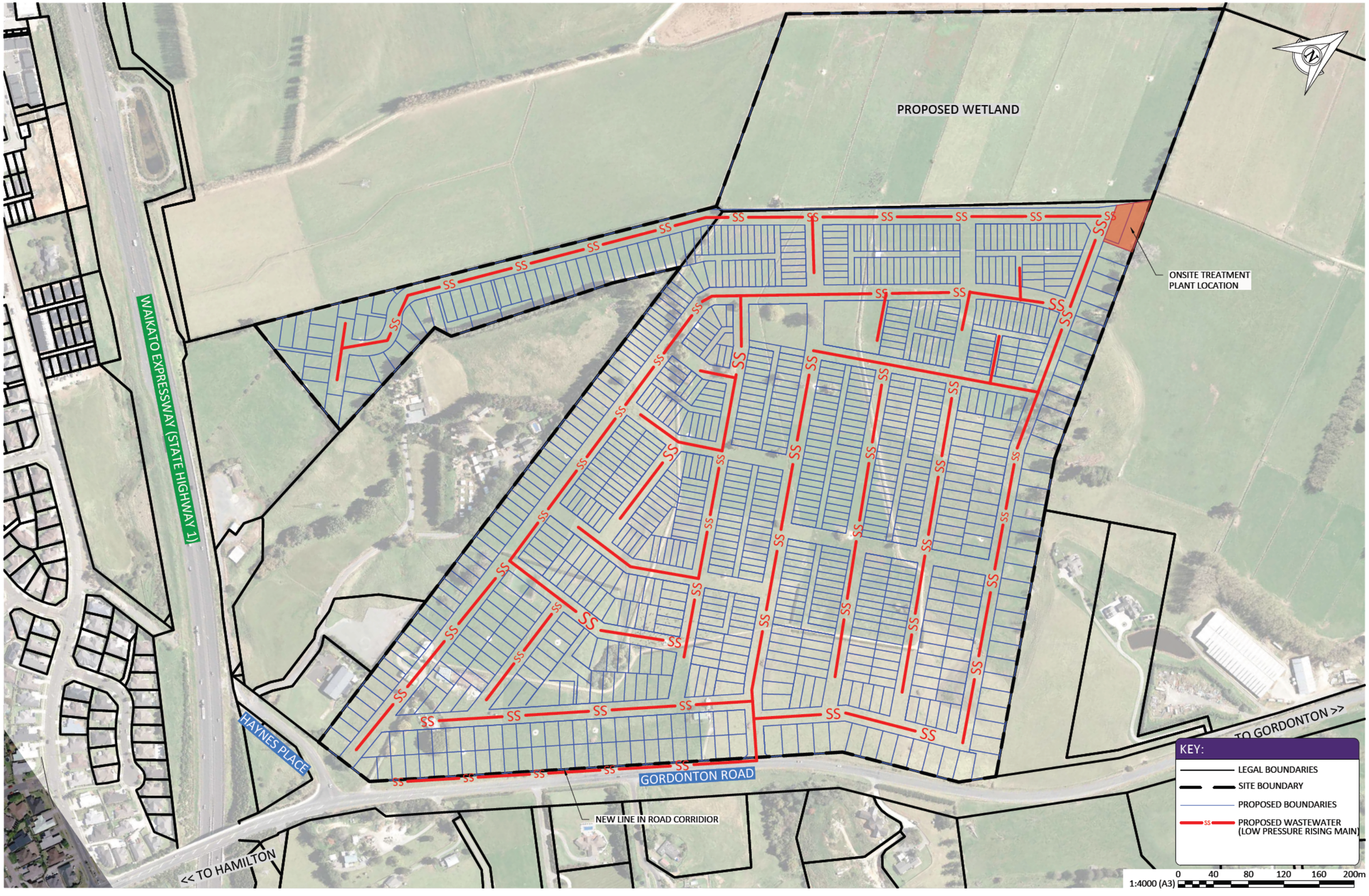
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PROJECT: HORSHAM DOWNS ESTATE

DRAWING: PRELIMINARY WASTEWATER LAYOUT PREFERED OPTION

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PROPOSED WETLAND

WASTEWATER PUMPSTATION
IN ACCORDANCE WITH RITS

WAIKATO EXPRESSWAY (STATE HIGHWAY 1)

HAYNES PLACE

GORDONTON ROAD

NEW RISING MAIN IN ROAD CORRIDIOR
TO CONNECTION AT GORDONTON ROAD/
WAIRERE DRIVE ROUNDABOUT

NEW LINE IN ROAD CORRIDIOR

<< TO HAMILTON

TO GORDONTON >>

KEY:

- LEGAL BOUNDARIES
- SITE BOUNDARY
- PROPOSED BOUNDARIES
- PROPOSED WASTEWATER (GRAVITY RETICULATION)
- PROPOSED WASTEWATER (RISING MAIN)

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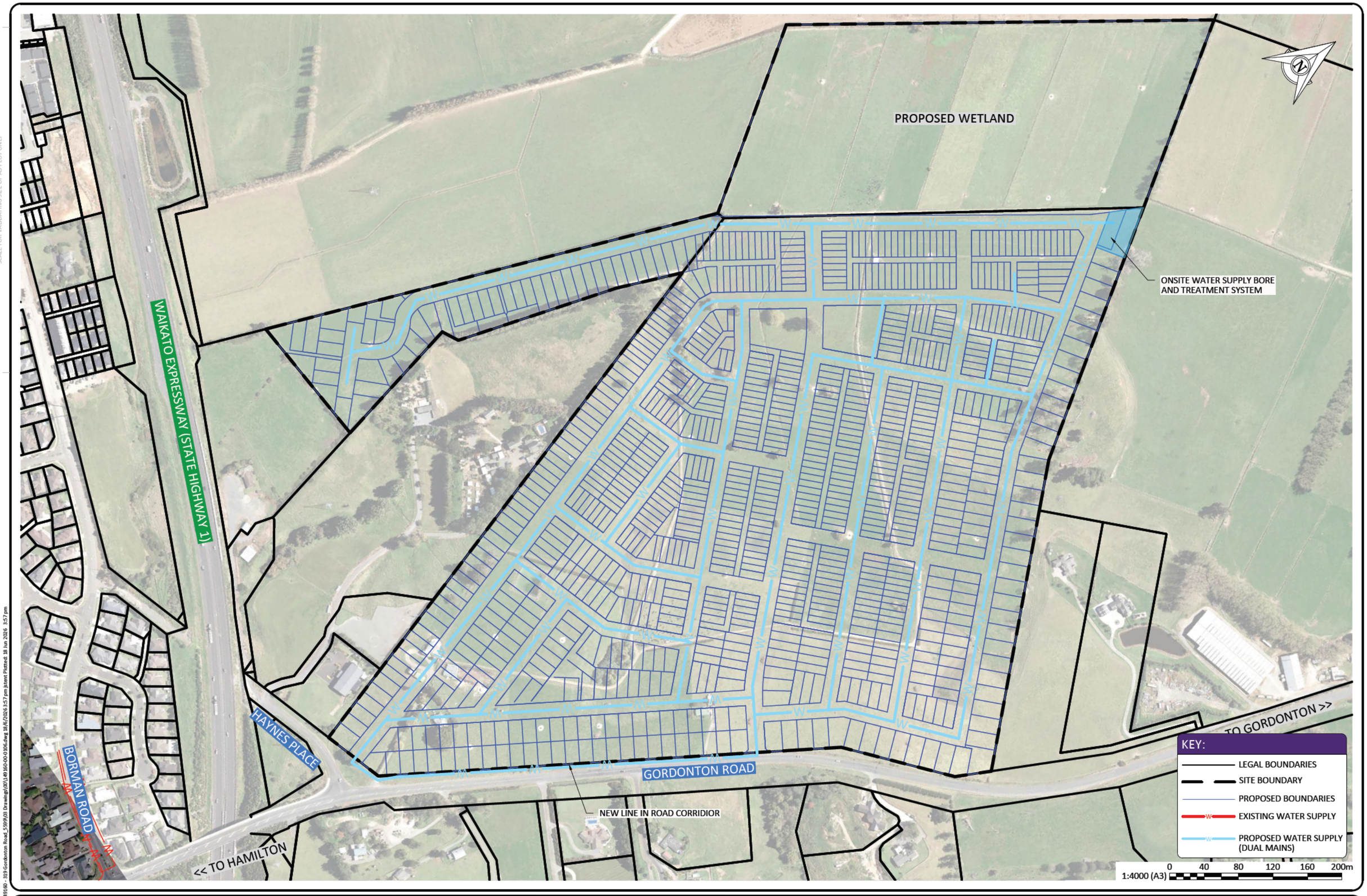
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DRAWING: PRELIMINARY WATER SUPPLY LAYOUT PREFERED OPTION

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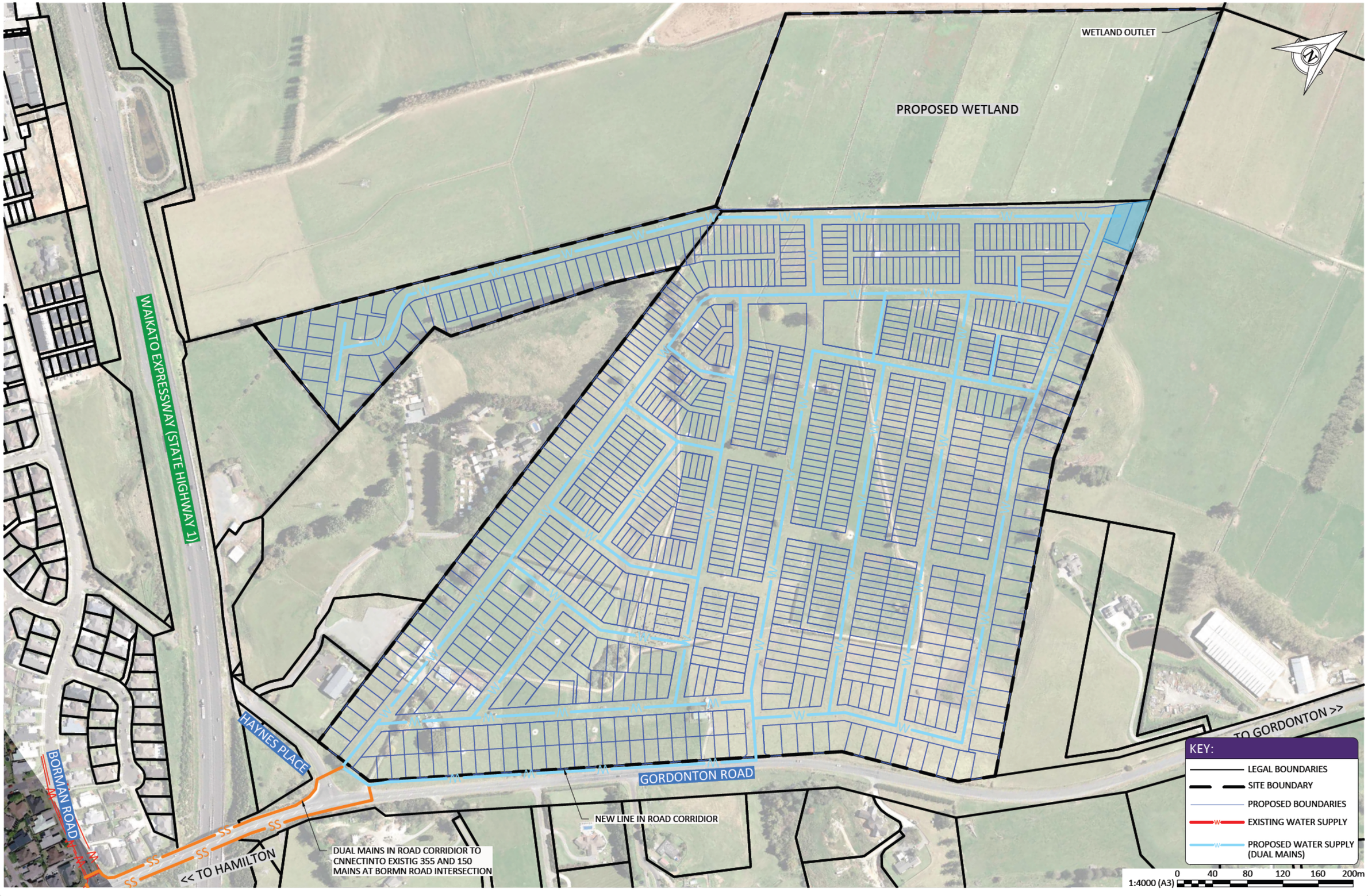
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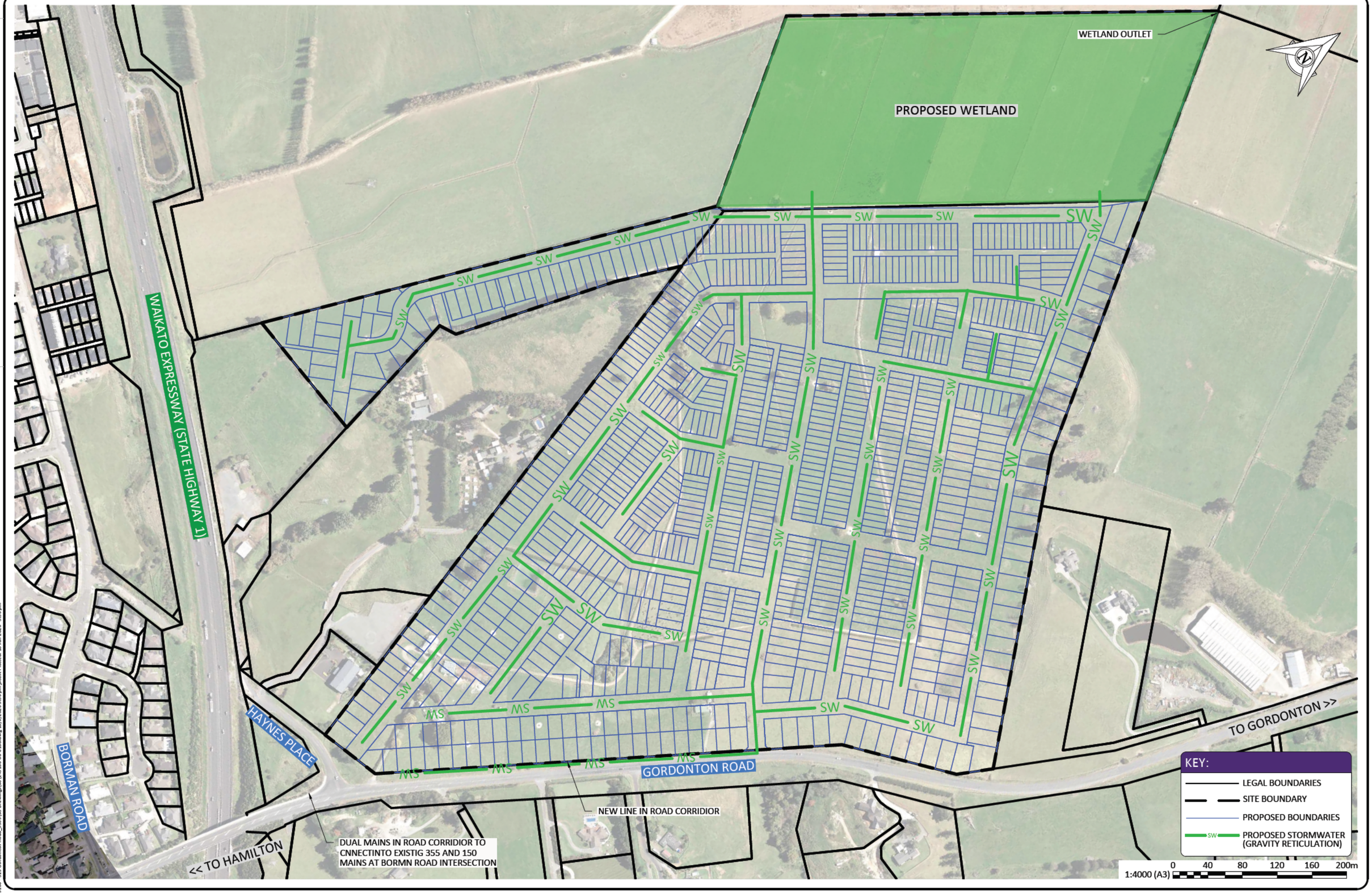
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Appendix A – Preliminary Drawings