

SL1 HOUCHENS DEVELOPMENT

INFRASTRUCTURE ASSESSMENT

PROJECT INFORMATION

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	s 9(2)(a)
AUTHOR	
	s 9(2)(a)
	Senior Engineer
	s 9(2)(a)
REVIEWED BY	
	s 9(2)(a)
	Senior Engineer
	s 9(2)(a)
APPROVED BY	
	s 9(2)(a)
	Associate

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Project Overview

The SL1 Houchens Development is a combined residential and industrial development that comprises an area of circa 141.6 hectares, which will be split into a mix of residential densities and industrial development. The residential component comprises circa 55ha of net residential, including 1,300 residential units of varying typologies (including single detached, duplex, terraced apartment), a 400-unit retirement village, along with two supporting mixed-use neighbourhood centres, open spaces, waterbodies and infrastructure devices including wetlands. The SL1 Houchens Development also includes a net 25ha of industrial, generating between 24 – 47 industrial sized lots for industrial activities.

The residential development is underpinned by a series of design principles, which focus on creating a well-connected, legible, and diverse community on Hamilton City's urban fringe. The proposed transport network, with a 30-metre-wide spine road running north-to-south, is supported by existing and proposed local roads, cycle connections and pedestrian pathways to create an accessible and legible development. As aforementioned, a range of housing typologies and densities are proposed to meet the growing and changing needs of the housing market to ensure there are options for future residents. Each typology has been located based on opportunities and constraints, with density ranging from terraced, duplex and detached dwellings to ensure integration with the adjoining urban footprint.

Located on the eastern and central portions of the Houchens Development are neighbourhood centres that will provide a range of amenities and services to support the residential and industrial developments. This neighbourhood centre will likely include commercial properties, childcares, cafés, and a local superette.

Sitting at the lower, southern point of the site is a retirement village that comprises approximately 15 hectares and provides 400 units of varying typologies, including traditional villa and apartment typologies. This will be serviced by its own private transport network, infrastructure, and high amenity open spaces.

On the north-western edge is strategic industrial land that provides key connectivity to the potential Southern Links Houchens interchange, a Road of National Significance (RONs).

The wider SL1 Houchens Development integrates throughout a number of open spaces, waterbodies and wetlands that are well distributed to create a high amenity community that will be a pleasant and enjoyable place to live for future residents. These open spaces, waterbodies and wetlands support ecological restoration through the retention of a number of natural species and riparian revegetation and support broader cultural biodiversity outcomes within SL1 Houchens Development.

The SL1 Houchens Development includes a proposed water reservoir, to provide the ability for a long term strategic water asset to be vested with Hamilton City Council (HCC) and designated by council in the future.

The development will be appropriately serviced via a robust infrastructure strategy, which includes the addition of a water reservoir to accompany the one already existing, utilisation of existing services and stormwater artificial wetlands

1. Introduction

1.1. Background

Maven Associates Ltd has been engaged by Chinamans Hill Ltd and Ohaupo Land Partnerships Ltd to explore the feasibility and concept of land development for residential and industrial use. The Houchens area is located within the Southern Link area (SL1). It is an emerging area identified by HCC for future housing and industrial development.

The greater SL1 area is a circa 440ha block of land within the Waipa District. The area has a northwest to southeast orientation from Dinsdale in the north to Rukuhia in the south. Most of the site is low-lying flat farmland, once a peat bog in pre-European times, interspersed with straight artificial farm drains.

The design and layout of the SL1 structure plan (Figure 1, Structure Plan concept prepared by Barker & Associates) have been developed through ongoing consultation and collaboration with developers.

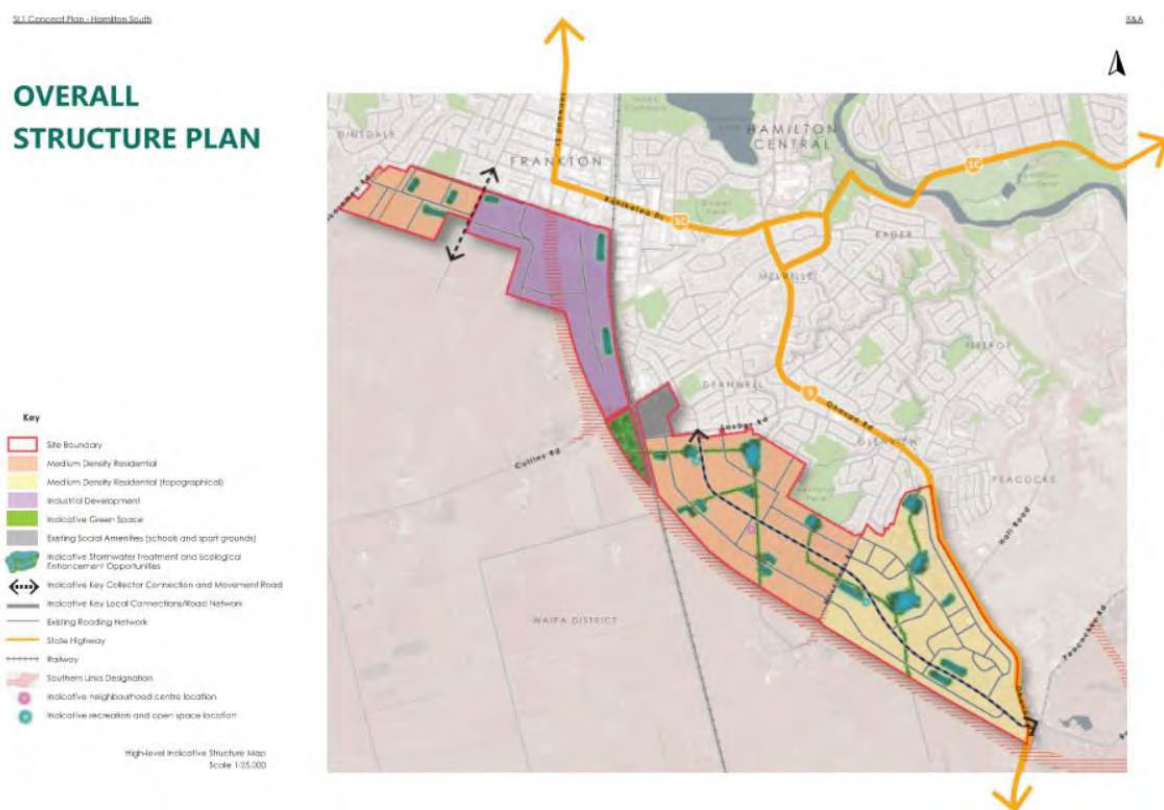


Figure 1 – SL1 Structure Plan

1.2. Purpose of this Report

The purpose of this report is to provide developers and stakeholders with an initial assessment of infrastructure servicing to support a Fast-track referral application for the “SL1 Houchens Development” area.

Maven Associates Ltd has provided various infrastructure reports to support the development of the greater SL1 area to date. This specific report has been prepared to support an area within the southern portion of this SL1 area which will be referred as “SL1 Houchens Development”. The extent of area is as shown below.



Figure 2 – Locality Plan

The site covers a total area of 141.7 hectares. It is bounded by Ohaupo Road (State Highway 3) to the east, Houchens Road to the west, the Southern Links Road designation to the south, and an existing residential area to the north. The terrain rises from the northern boundary and along Ohaupo Road, gradually sloping down towards a modified farm drain that runs east–west through the centre of the site. While the majority of the land is relatively flat, the site currently functions as a rural property, with farming activities and a few existing dwellings located along Ohaupo Road.

Maven has been engaged to represent the broader group of landowners in support of the Southern Links area, identified as an emerging development zone under the Hamilton Urban Growth Strategy. Portions of this area have been either listed or referred through the Fast-track Process under the Fast-track Approvals Act 2024. To facilitate development, Maven has prepared a comprehensive master infrastructure plan, including provisions for essential services and an overarching stormwater management strategy. This plan aligns with the draft Integrated Catchment Management Plan (ICMP) for the Mangakootukutuku catchment. The consultation package prepared for this development also includes a proposed southern dry basin, located south of the SL1 designation and detached away from the main development area. The purpose and function of this stormwater device are outlined in the SMP Addendum, which is provided in the appendices of this report.

This following report is specifically for the development area with information specifically to support for the SL1 Houchens Development area.

1.3. Legal Description

The development site is split across multiple parcels of land, and the legal descriptions for these parcels of land are listed in table 1 below:

Lot Description	Area (Ha)
Lot 1 DPS 84715	43.0
Lot 1 DPS 29779	29.3
Lot 4 DPS 59241	30.1
Lot 2 DP 569695	39.2

Table 1: Lot Descriptions

1.4. Proposed Staging Options

A development of this scale will be delivered over multiple years and is expected to proceed through several stages and substages. As shown in the Barkers consultation package, the site has been divided into eight stages. These stages can be developed in various sequences and are not required to follow the numerical order assigned to them. Several options are available to enable the commencement of the initial stage of development within SL1 Houchens which these will be discussed below and throughout the report.

Proposed Option 1A

The first option, referred to as Option 1A, proposes the development of stage 1A and stage 7 as mentioned below:

- Stage 1A (Western portion of the site): Approximately 23 hectares, comprising 8.7 hectares of light industrial land and ~200 medium-density residential dwellings.
- Stage 7 (Eastern portion of the site): approximately 30 hectares including the retirement village, approximately 300 residential dwellings, and a small neighbourhood centre.

Access for Stage 1A will be provided from Houchens Road and the access for Stage 7 will be provided via a new intersection on Ohaupo Road. The industrial development of Stage 1A will be within its own substage and can only be developed once the new intersection/ interchange is constructed on the New Zealand Transport Agency (NZTA) delivered Southern Links Road, or via the collector road out to Ohaupo Road at a later stage.

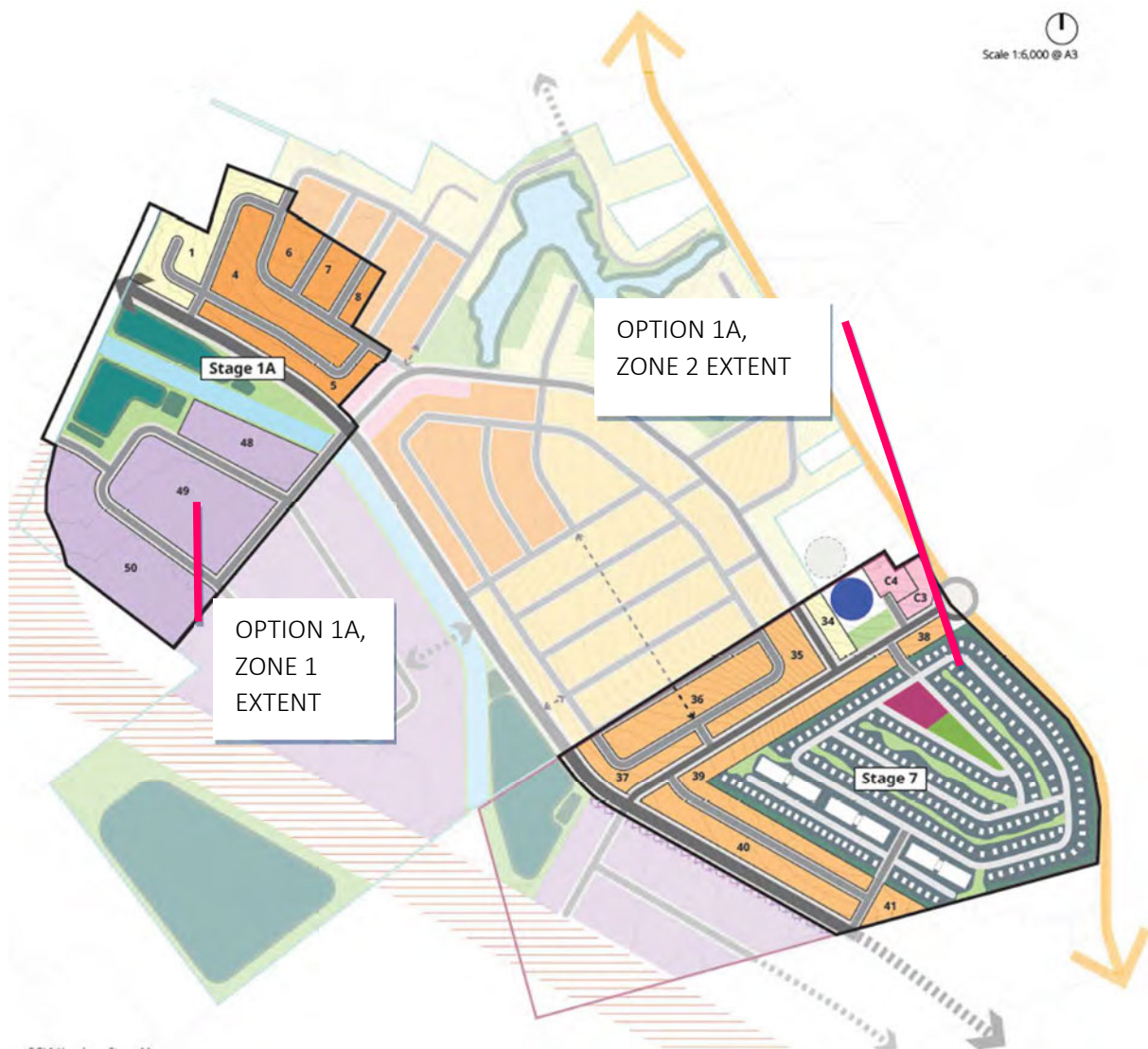


Figure 3 – Option 1A Development Plan

Proposed Option 1B

Under this option, the first stage of development will cover approximately 45 hectares comprised of stage 5/1B and Stage 7. This will include around 545 medium-density residential dwellings, a neighbourhood centre, and approximately 400 retirement village units. Access to the site will be provided via a new intersection on State Highway 3.

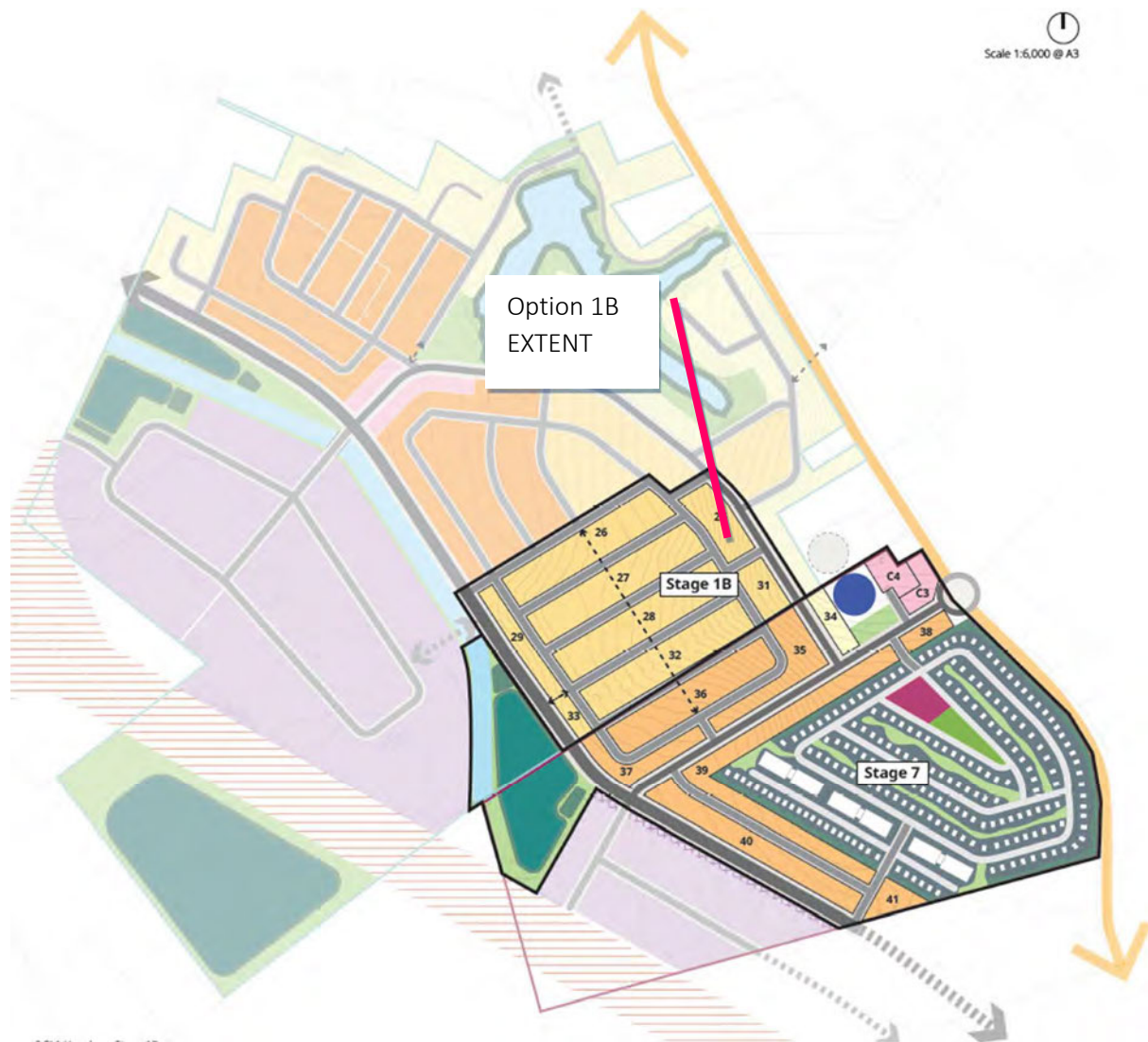


Figure 4 – Option 1B Development Plan

2. Earthworks

A geotechnical desktop report for the proposed SL1 Houchens Development area was undertaken by CMW in October 2025.

The report identifies the approximate distribution of prevailing landforms and geologies for the local area (Figure 3 of CMW report), typical geotechnical challenges associated with subdivision development on those landforms and presents strategies to mitigate hazards by further geotechnical investigation and design.

Within SL1 Houchens Development, the extent of earthworks will vary considerably depending on demand and yield, driving design considerations such as developable lots, transport corridors, and protection and mitigation from flooding and overland flow.

The CMW Report recommends mitigation options for liquefaction/lateral spread, slope stability management and ground improvement for static settlement, also recommending detailed geotechnical investigation analysis and reporting and earthworks management in support of resource consent application.

2.1. Low-Lying Peatland

Future land suitable for development consists of low-lying peat. The peat is a characteristic deposit of the Waikato Basin and is described as normally to near normally consolidated and therefore is susceptible to significant settlement when subjected to loading or drainage. As peat areas are low-lying, they can be susceptible to flooding as well.

Please see in CWM Report – CMW - “Peat Contour Plan” for underground mapping that was created to show depths of indicative peat soils using surrounding ground investigation results.

2.1.1. Development in Peatland

Where development in peat is proposed, developers will need to comply with the requirements of the draft ICMP for the Mangakotukutuku catchment (consultation revision November 2020):

- Identify if peat is to be removed and advise if it is to be replaced.
- Confirm that this does not change groundwater flows sufficiently to cause any adverse effects.

The ICMP for Mangakotukutuku catchment is currently being revised and it is not available on the Waikato Regional Council website.

2.1.2. Earthworks in Peatland

Peat is a sensitive soil type, and earthworks involving peat require carefully considered methodologies to achieve reliable outcomes. It is particularly vulnerable to changes in moisture content; when water is drained from peat, significant shrinkage and settlement can occur. These effects must be thoroughly assessed and mitigated, primarily through groundwater recharge and preload measures. For further details, refer to Chapter 4.3: *Groundwater Recharge*.

Peat and any existing over-lying fill material may require undercut and replacement with engineered fill where peat depths are up to 2m (above the water table) to minimise differential settlement issues.

Preload fill material may be suitable in areas where depths of peat are greater than 2m. Specific, underfill drainage, temporary pre-loading, and settlement monitoring, under the direction of a Geotechnical Engineer, will be required to limit post construction ground settlements.

2.1.3. Building Foundations

Where development in peat is proposed, pile foundations beyond base of peat or preload to induce ground settlements may be practical. Preload depths of approximately 2m with settlement hold periods of 3 to 6 months are expected based on historical works.

Lightweight buildings may require raft foundations that are designed to accommodate ground settlements. Where development in peat results in high foundation loads (i.e., heavy industrial buildings exceeding preloading weight), piled foundations beyond the base of the peat will likely be required. Foundations for larger structures resulting in high foundation loads typical to the zone. It would require specific design from a Geotechnical Engineer. Specific design (often requiring piling) is typically required in any case even if building foundations were in clay.

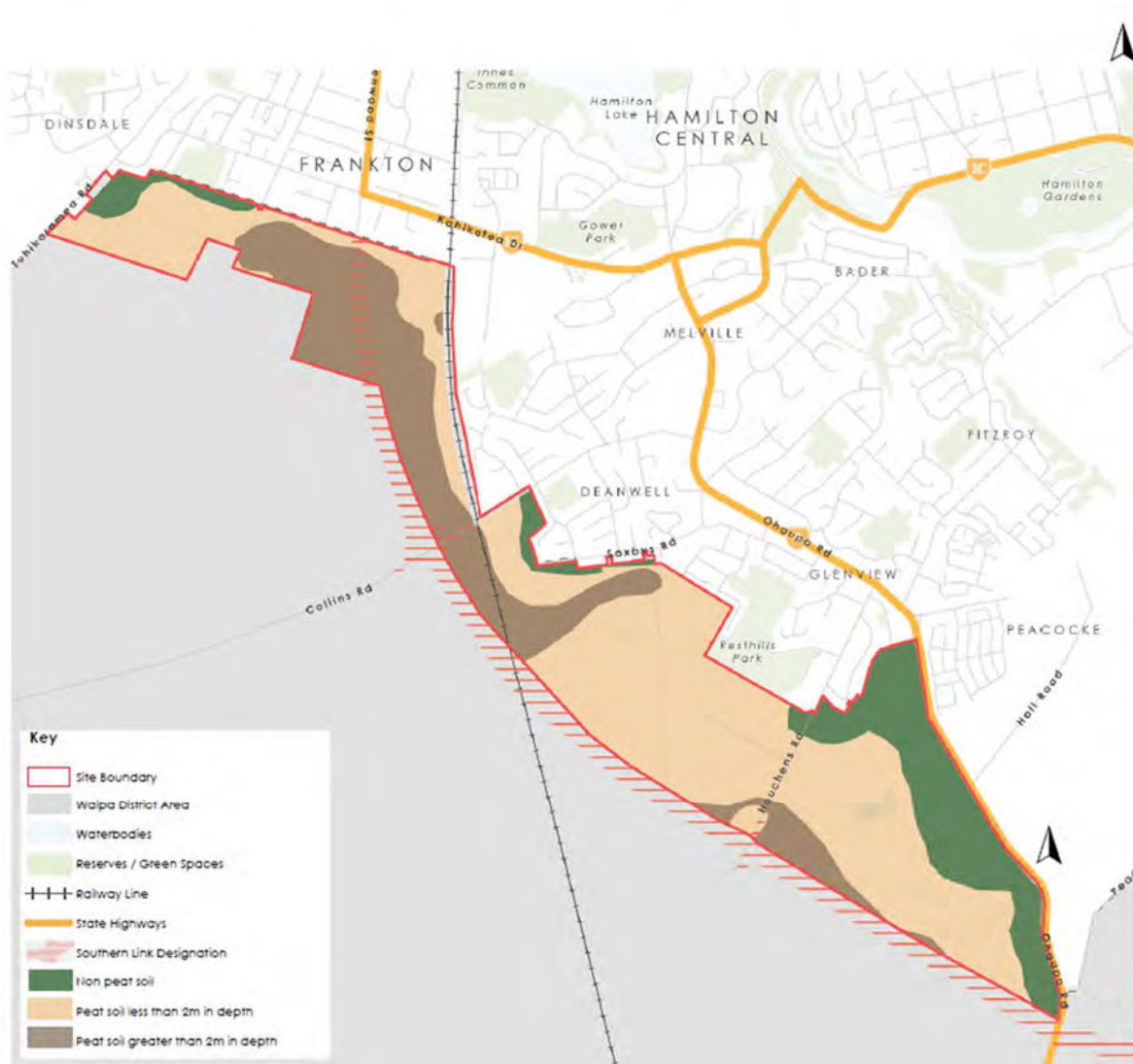


Figure 5 – Soils

2.2. Roothing Construction

For construction of any new roads, HCC will not typically accept new roads being built directly over existing peat soils. Where the peat is less than 2m, the peat will likely need to be undercut and removed, and approved engineered fill placed. For peat soils greater than 2m in depth, the peat will likely be preloaded to induce ground settlement and the settlement monitored. The expected settlement time is 3 to 6 months based on historical results for surrounding areas.

2.3. Sediment and Erosion Control

Sediment and erosion control measures are to be established in accordance with Waikato Regional Council's (WRC) erosion and sediment control guidelines for soil disturbing activities. Erosion and sediment controls should be in place before earthworks commence and inspected onsite by the Engineer. Sediment and erosion control drawings will be provided prior to construction.

2.4. Preliminary Earthworks

A preliminary earthworks assessment has been undertaken for the proposed development. The design terrain was developed based on the structure plan layout for the roading and stormwater. This demonstrates an earthworks balance is generally achievable.

Earthworks Volumes	
Total Cut =	1,565,000m ³
Total Fill =	1,523,000m ³
Net (Cut) =	42,000m ³

Volumes indicated are solid measure in place, no bulking or compaction factors have been applied, and topsoil stripping has not been included. These will be further advanced in the substantive application package.

3. Rooding

The preliminary roading layout for SL1 Houchens includes constructing a 1.5km section of minor arterial (Spine Road) along with collector and local roads. The local low volume roads have been provided in the preliminary roading layout in the master plan for the SL1 Houchens development. These local roading networks layouts are subject to change at a future detailed design stage. BBO has been engaged as the transport engineering leads for the development. BBO are working with the local stakeholders to determine the proposed roading network for the development. Refer to the consultation drawings and Appendix A for the high level roading layout drawing. A preliminary typical cross section of each of the roads is shown below.

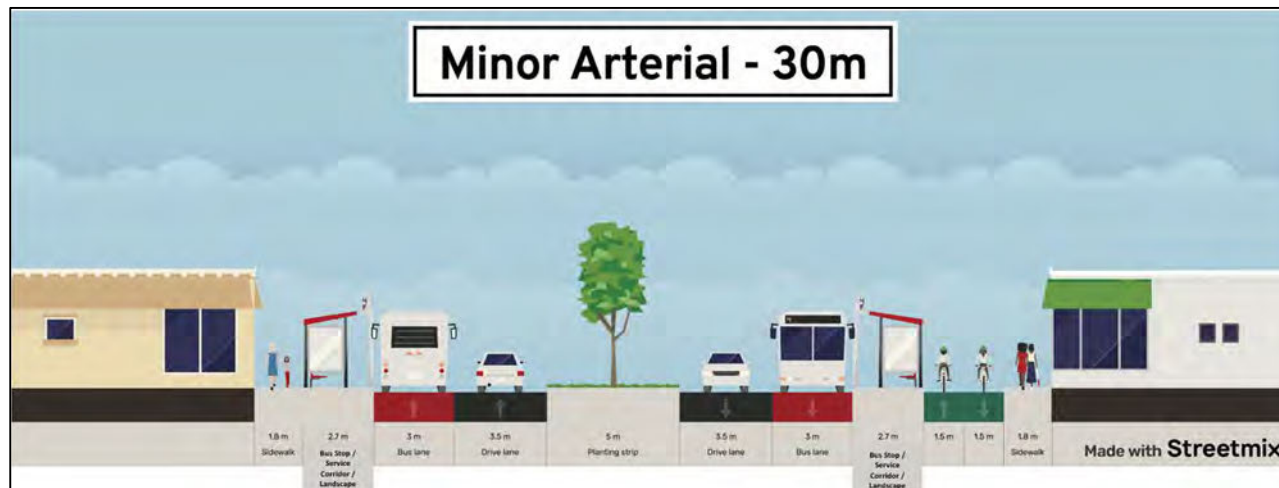


Figure 6 – Indicative Typical Cross Section - Minor arterial road (Spine Road)

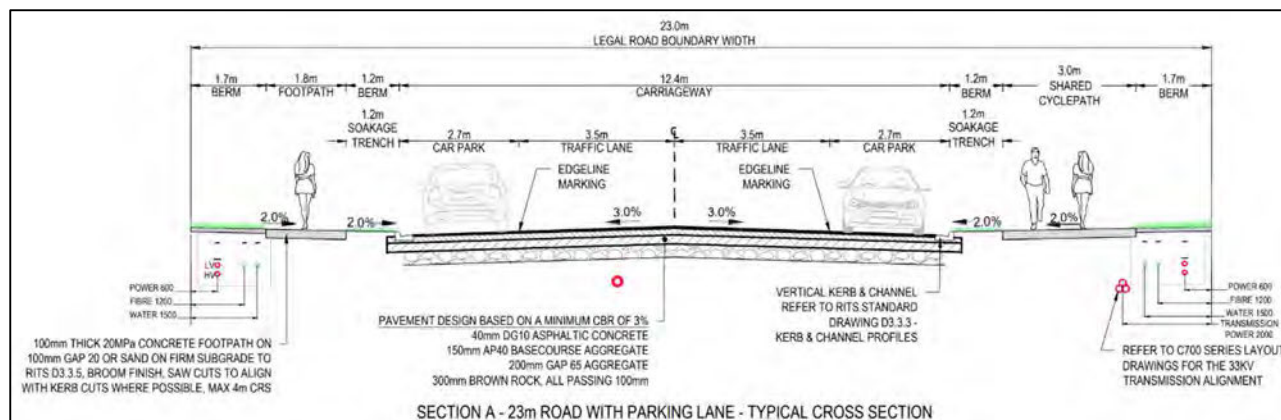


Figure 7 – Indicative Typical Cross Section - Collector road

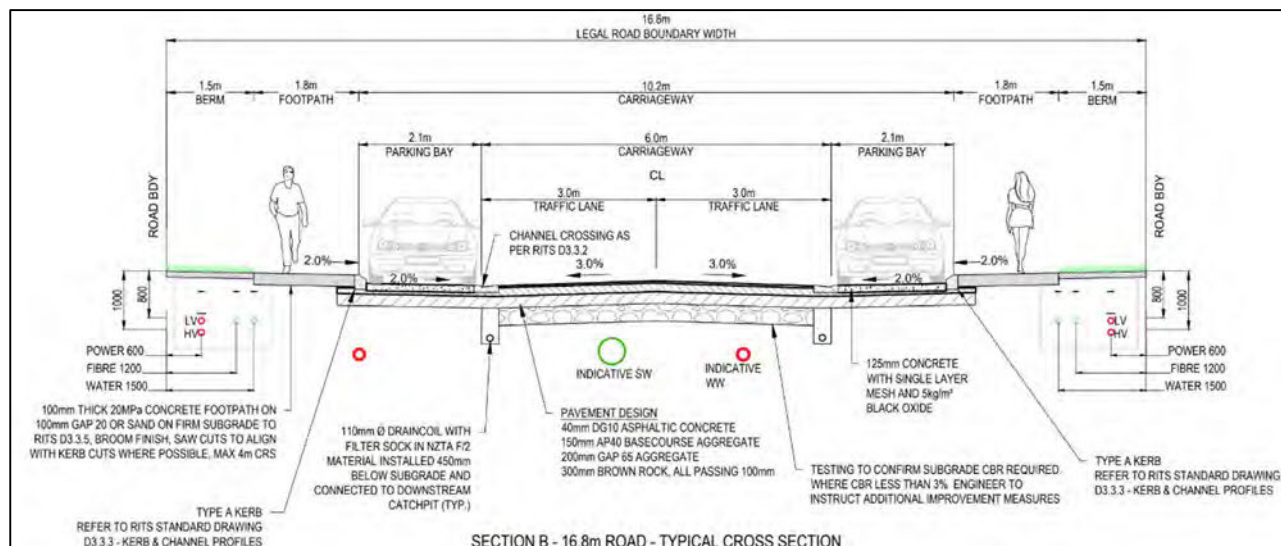


Figure 8 – Indicative Typical Cross Section – Local Road

4. Stormwater

A preliminary Stormwater Management Plan (SMP) has been developed for the wider SL1 area to establish a best-practice framework for stormwater management. Currently, stormwater is conveyed across the site via existing wetlands, farm drains, and culverts. The draft consultation document for the Mangakootukutuku Integrated Catchment Management Plan (ICMP) outlines proposed stormwater management guidelines.

To demonstrate compliance with the overarching SMP prepared by Maven for the wider SL1 area, a Stormwater Management Plan Addendum memo has been developed specifically for the SL1 Houchens Development. This Addendum is included in Appendix C of this report. A high-level summary of the SMP is provided below.

4.1. Objectives

Proposed objectives of the stormwater strategy are:

- Consideration of future public networks required in support of the study areas.
- Identify existing overland flowpaths.
- Identify existing flood hazards.
- Provide an option-based assessment for water quality treatment in support of the future development of the study areas.
- Consideration and requirement for extended detention in support of the future development of the study areas to avoid any downstream flooding, erosion, and scouring.
- Confirming the need for attenuation of peak flow during storm events up to the 100-year events.
- On-site retention (volume reduction) to ensure pre-development runoff rates and volumes are maintained within catchments and streams.
- Recommendations to guide future plan change application(s) to ensure positive environmental outcomes are achieved.

4.2. Reticulation

Existing stormwater infrastructure within SL1 Houchens is limited to farm/roadside drains and streams. Development of SL1 Houchens will be supported by new public stormwater networks that will discharge into groundwater recharge pits (where peat is present) and into the existing and proposed wetlands for water quality treatment and attenuation. The future public networks would be constructed by the developers. The stormwater infrastructure will need to comply with the conditions for resource consent and engineering approval before being vested with HCC. Where possible, the stormwater network will be designed and constructed within the roads.

4.3. Stormwater Quality and Quantity

An assessment has been undertaken to establish the best practical design options for stormwater quality and quantity design in support of SL1 Houchens. These options include treatment train and at source stormwater quality control as listed below:

- Inert roofing materials for all future buildings.
- 10mm initial abstraction mitigation via on lot rainwater harvesting tank for reuse as required by Plan Change 12.
- Mitigating the initial abstraction on the roading networks via the use of bioretention devices/recharge pit (where peat present).
- Reduction of impervious areas using permeable paving (where possible).

- Lot development supported by approved propriety devices such as raingardens, treepits, stormwater filters, etc.
- Treatment of public roads and right of ways via approved propriety devices (raingardens, swales, stormwater filters etc) as per TR20/07 design guidelines (and other applicable).
- Sub-catchment wide stormwater quality provision through detention basins and wetlands.
- Planting of riparian areas and protection of any existing bush features within SL1 Houchens.
- Use of the treatment train devices (swales and/or amalgamated raingardens and artificial wetlands) to provide storage and attenuation for the required storm events from WQV, ED, 2-year, 10-year and 100-year ARI.
- A secondary option is to provide online storage and attenuation within the existing (rehabilitated) streams in addition to wetlands. This is detailed further in the SMP.
- Alternative treatment train solution is proposed where amalgamated raingardens are provided next to wetlands for each catchment. This provides centralised two-step treatment and reduces the amount of maintenance required by creating one location per catchment to attend to.
- HCC preference is for the consolidated/amalgamated raingarden approach above. However, roadside raingardens or swales could be used in place of amalgamated raingardens before discharging into wetlands/ recharge pits if required.
- Proposed wetlands would be sized at minimum 4% of their respective catchments, and discharge into the existing/enhanced streams. Refer to Appendix A for the concept stormwater plans which provides preliminary catchments and wetland locations.

4.4. Groundwater Recharge

Soakage and recharge of stormwater into peat will be required to maintain hydrology to prevent shrinkage/ excess settlement on the peat soil and to maintain the baseflow of the downstream natural wetland and streams. For areas of deep peat, the preference would be to construct wetlands through these areas. Recharge pits should be designed at regular intervals throughout the development (where peat is present) to encourage even distribution and recharge of groundwater.

Detailed investigations by a suitable qualified Geotechnical Engineer, to determine the suitable recharge treatment measure to be implemented for each area. Recharge treatment measures will need to consider the future infrastructure and buildings in the decision-making process.

4.5. Existing Stream Enhancement

The proposed artificial wetlands are located adjacent and upstream of the main existing conveyance channels/streams within the development. This will allow conveyance and mitigation of flow from the development area into the existing environment. We have investigated the existing farm drain depths and levels based on available survey data and it appears most existing streams are very shallow. In their current state, this will restrict attenuation and flood storage ability for the adjacent catchment.

Based on the above, an option to address this would be enhancement of existing streams which would include widening to accommodate conveyance and build up the development site to increase storage and attenuation for the SL1 Houchens development. Altering the streams provides the opportunity to rehabilitate the streams enhancing ecological habitat by providing a more natural meander, wetland areas and planting. Proposed enhanced farm drain locations can be found on the stormwater plan in Appendix A.

4.6. Flooding

HEC HMS was used for the hydrology and HEC RAS was used to model flooding within SL1. The modelling confirms the extent, location, flow, and depth of flood waters. The existing flood assessment was modelled by Golovin in 2021. Maven has updated the flood modelling using HEC RAS and Tuflow with the recent survey data for a more accurate flood model.

Flood modelling confirms that flooding within SL1 occurs during the 100-year flood event. Depths vary and are concentrated within the existing watercourses. Outside of the watercourses the bulk of the lower lying areas are subject to sheet flows only, with depths ranging from 100-300mm. This is illustrated in Figure 9 below.

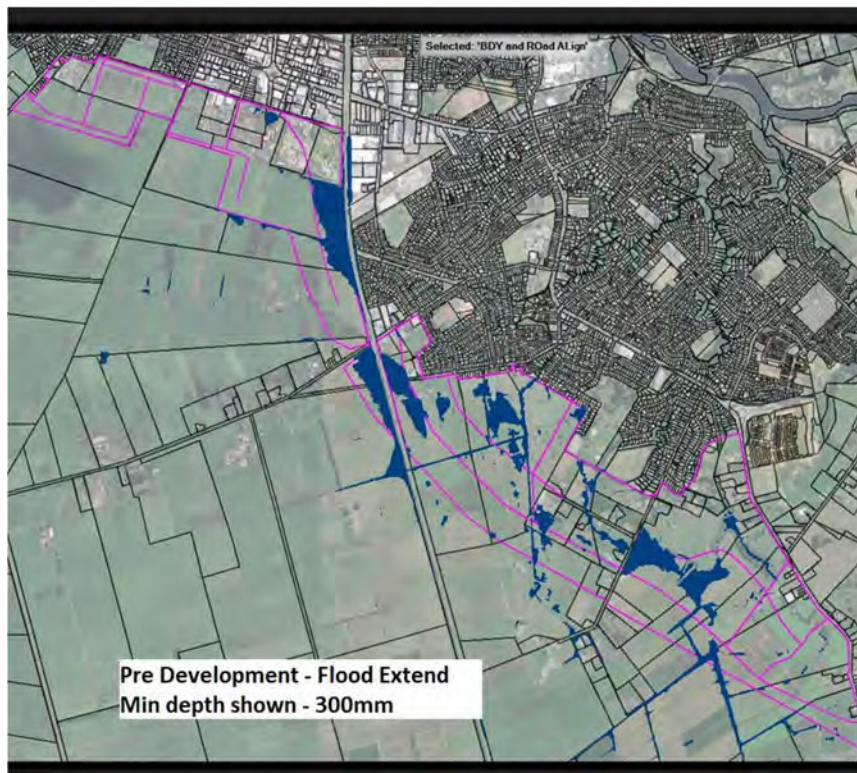


Figure 9 – Existing site flood map

As mentioned in section 4.3, flood volumes and flows are proposed to be stored and attenuated within artificial wetlands for each catchment. The wetlands would provide attenuation by means of a discharge control device installed within the wetland high-flow bypass. Alternatively, the enhanced existing streams could also be used to provide attenuation and storage. The discharge from the development area would need to be controlled to ensure attenuation targets can be met. This is discussed in further detail in the SMP.

Subject to the future development complying with the above, there will be no adverse downstream effects from the development of SL1 Houchens. Additional investigation and detailed design are required to refine the preferred solution as part of any future resource consent or plan change approval.

4.7. Initial Staging Option

The stormwater infrastructure has been designed to align with the proposed staging of development on the site. In Option 1A scenario, a more comprehensive stormwater mitigation outcome is achieved. All three artificial wetlands and the majority of the conveyance channel will be constructed as part of this stage. This approach will deliver enhanced water quality treatment across the catchment and

provide final stormwater mitigation for the entire development area. Please refer to figure below for more information.

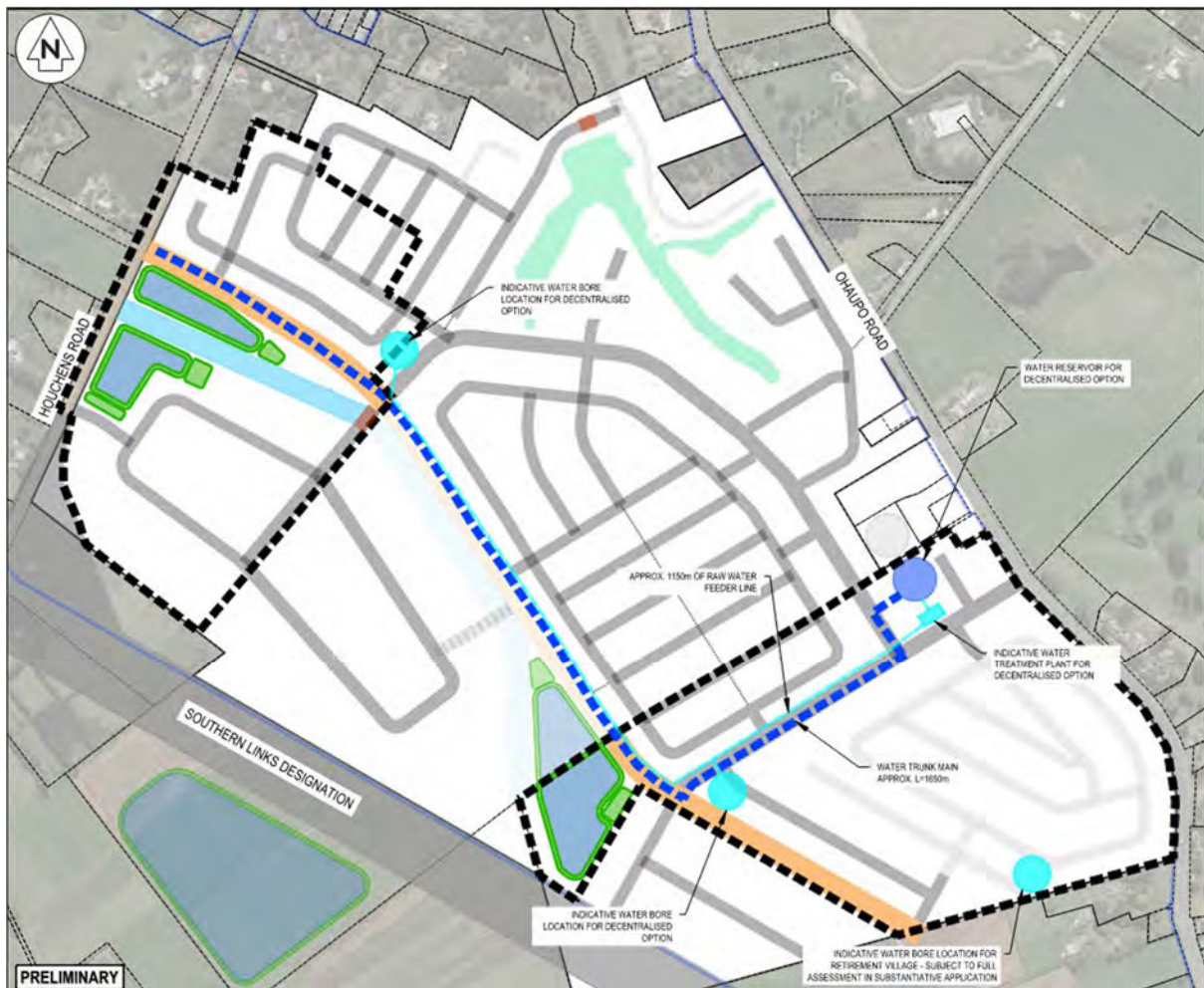


Figure 10 – Stage 1A proposed Stormwater devices

As the site develops beyond the initial stage, the remaining sections of the stormwater channel and artificial wetlands will be constructed alongside the spine road to connect the developed stormwater catchments. The southern dry basin will be built as required, based on future flood modelling that confirms whether additional stormwater mitigation is needed. Under the Option 1B scenario, Wetland 3 and a section of the conveyance channel will be constructed. Artificial Wetland 3 will provide both stormwater quality and quantity treatment for the development area, while the 100-year flood storage requirements will be met through a combination of Artificial Wetland 3 and the adjacent section of the conveyance channel. The remaining wetlands and conveyance channel sections will be constructed as the corresponding development stages progress.

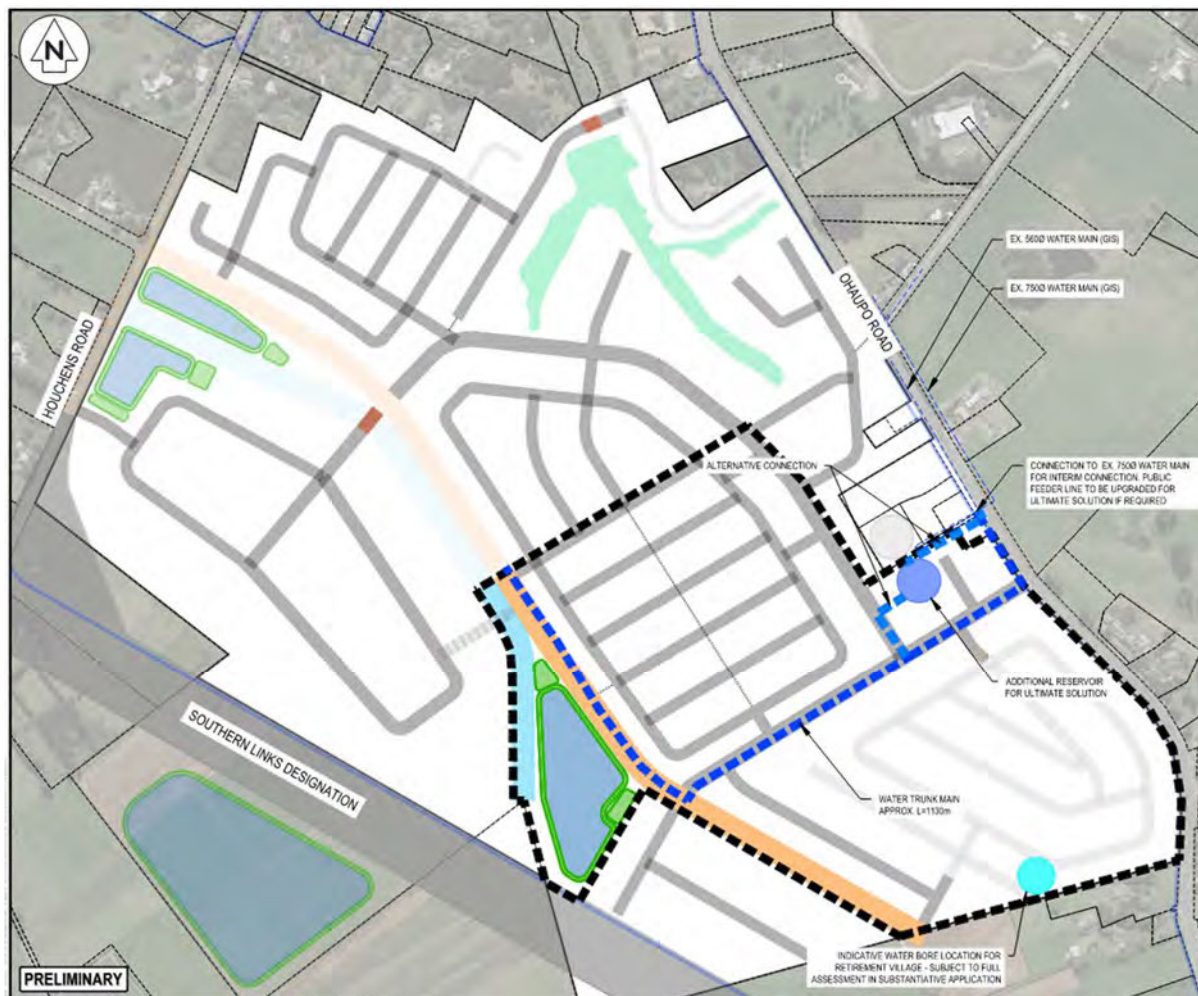


Figure 11 – Stage 1B Proposed Stormwater devices

5. Wastewater

Maven has undertaken a desktop study to identify the most suitable wastewater disposal options for the wider SL1 area, including other fast-track and emerging development zones. For the SL1 Houchens Development specifically, these options have been further explored to determine the most appropriate solution for the site. Reticulated, decentralised, and at-source systems have all been considered.

As the site is located in a rural area with no existing wastewater infrastructure, a staged approach to infrastructure development is anticipated. Where feasible, preference will be given to connecting into existing wastewater networks. Refer to Appendix A for the concept wastewater layout drawing.

4.6 CONCEPT PLAN - INFRASTRUCTURE

Key

- Site boundary
- State Highway
- Railway
- Southern Link Designation
- Indicative Proposed Road Network

High-level Indicative Infrastructure Concept Plan
Scale 1:25,000

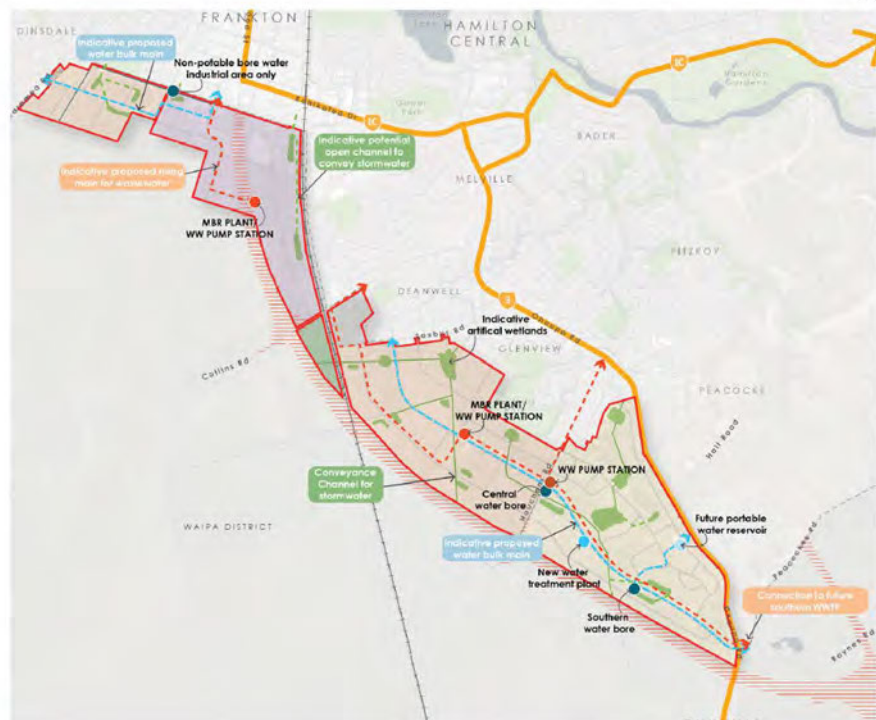


Figure 12 – Concept Infrastructure Plan

5.1. Existing and planned Public Infrastructure

Hamilton operates a single centralised wastewater treatment plant located in Pukete, which services the entire city. Hamilton City Council (HCC) is investing \$56 million to upgrade the facility, increasing its treatment capacity and improving the secondary treatment processes. Upgrade works commenced in 2018 and were originally expected to be completed and operational by 2024. However, delays have occurred, and HCC has not publicly confirmed a revised completion date. Once complete, the upgrade will provide improved treatment quality, increased capacity, and greater operational resilience for the next 30 years.



Figure 13 - Pukete Wastewater Treatment Plant (Google Map)

A new wastewater transfer station was recently established and completed within the recent Peacocks development. This new wastewater transfer station is located opposite the existing Hamilton water treatment plant.

The wastewater transfer station will hold up to 1.8 million litres of wastewater. The wastewater will be pumped over the new bridge across the Waikato River, through to the eastern wastewater interceptor. 7.1km of new wastewater pipeline will be constructed to make the connection to the eastern wastewater interceptor. The infrastructure will provide wastewater solution to service 21,000 future residents of the new Peacockes' suburb. The screen shot shown below is an aerial photo taken of the Peacocke wastewater transfer station during construction.

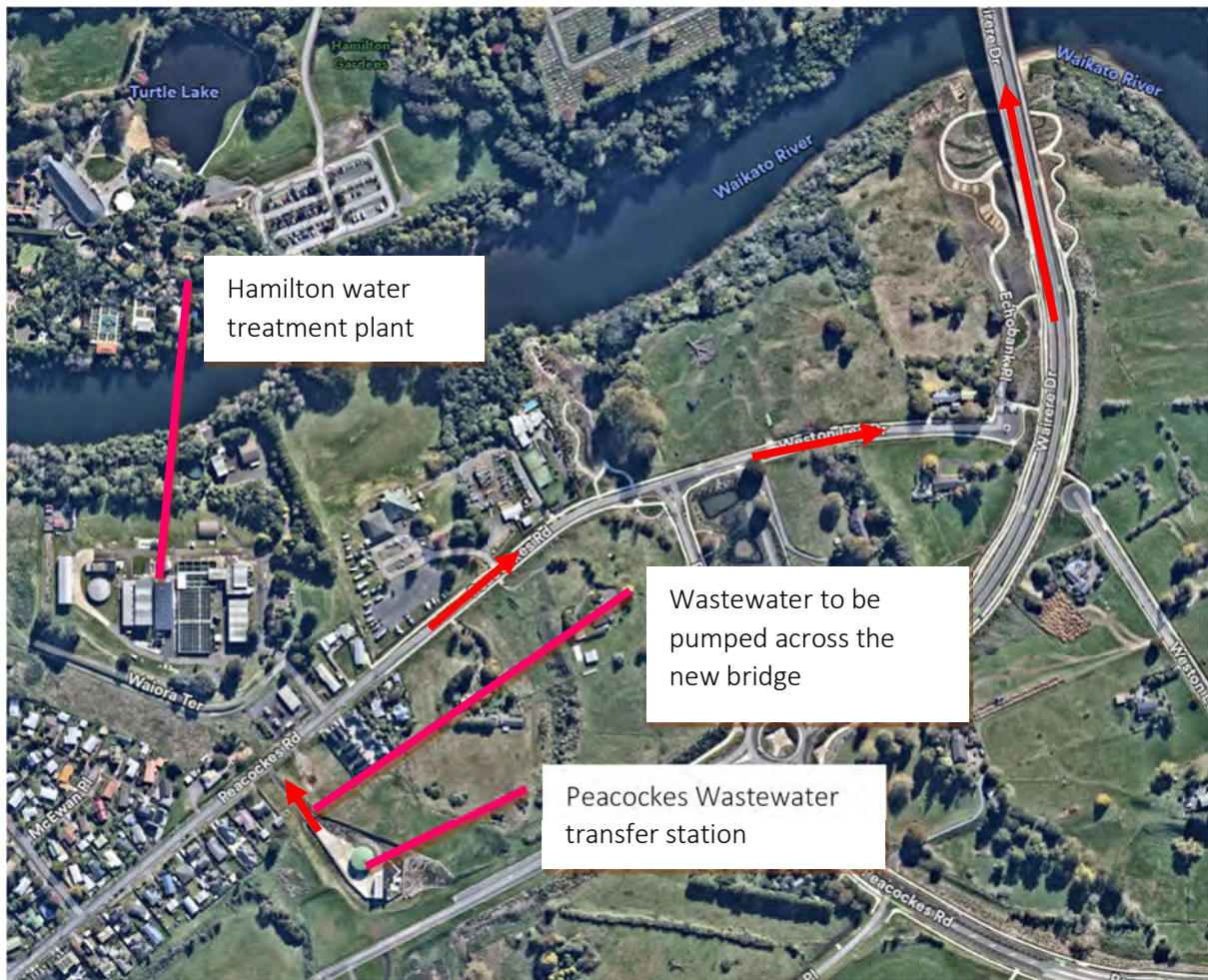


Figure 14 - Peacockes Wastewater Transfer Station (Nearmaps)

In addition to the Peacockes transfer station, new bulk underground wastewater storage tanks are currently being installed in the reserve area between Collins Road and Katherine Place. These new bulk underground wastewater storage tanks will provide an extra 2 million litres of wastewater storage to the existing network. These storage tanks will provide further resilience to the existing wastewater network for the area, and it will reduce the risk of overflows after heavy rainfall events. These additional tanks also provide increase of the existing wastewater networks capacity via off peak pumping. This would provide an opportunity for an interim solution for the Southern Links area to discharge its wastewater generation while a new treatment plant is constructed as mentioned in the following section of this report.

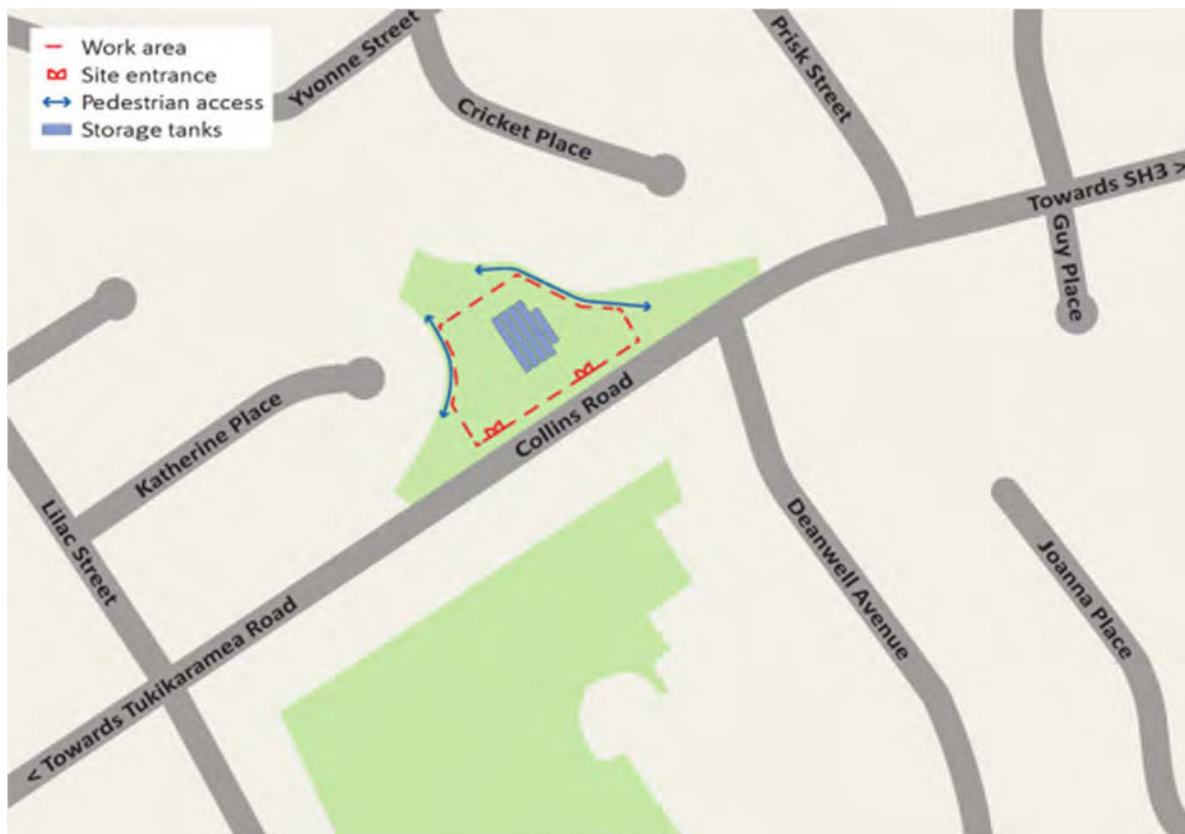


Figure 15 - Collins Road underground wastewater storage tanks (HCC)

HCC has been planning for a new southern wastewater treatment plant with similar size and capacity of the current Pukete treatment plant. This treatment plant would provide wastewater treatment for a portion of Southern Links area and portion of Peacockes area along with Waipa north. This treatment plant would future proof the development of wider Hamilton. Currently, HCC only have funding to acquire the land and progress on the detail design of this WWTP. Additional funding required to build this treatment plant which timing is not yet been committed/ announced yet.

With the current and planned upgrades to the wider wastewater network within the HCC catchment area, both treatment and conveyance capacities are expected to improve. These enhancements present an opportunity for the broader SL1 development area to adopt an interim wastewater disposal solution, potentially utilising existing infrastructure until the Southern Wastewater Treatment Plant is constructed.

5.2. Reticulation

The site topography is generally flat. SL1 Houchens would be predominantly serviced by gravity mains that would drain to a proposed wastewater pump station located in the low point. This wastewater pump station can be used to convey the wastewater toward existing HCC wastewater networks or toward a wastewater treatment plant.

Maven have not undertaken an in-depth review of the existing wastewater network capacity, however connection into the existing reticulation will be challenging, as the network bordering SL1 Houchens has overflow and capacity issues identified by previous analysis undertaken by HCC.

To address these issues HCC have been upgrading the existing wastewater treatment plant in Pukete to provide more treatment capacity and they are, also introducing new large underground wastewater

storage tanks in 8 new locations around the city. The underground tanks will provide additional wastewater holding capacity for the wet weather flows and the tanks that will release the wastewater back to the treatment plant at off peak times. The first location selected is in Collins Road, near the SL1 development. A new assessment of the existing network capacity will be considered post the public network upgrades covered above.

5.3. Strategic Wastewater Connections

HCC has prepared a draft ICMP for the Mangakootukutuku Catchment (consultation revision November 2020). The ICMP summarises infrastructure planned for zoned growth and options for hypothetical growth. SL1 falls within the Hahawaru sub-catchment of this ICMP and as such will need to comply with the requirements of the ICMP (if adopted) and RITS unless agreed otherwise by Council. The ICMP has identified options for wastewater infrastructure needed to service the Hahawaru sub-catchment.

5.4. Discharge to Existing Local Hamilton City Council Infrastructure

Connection into the existing HCC infrastructure would be the preferred option, the wastewater options are discussed further in Section 5.7.

5.5. Discharge via Peacockes Strategic Infrastructure

Connection to the Peacockes strategic infrastructure, could provide some wastewater capacity to support a portion of the SL1 development and for the wider Hahawaru sub-catchment, in the short term or long term.

The Peacockes Wastewater Transfer Station, along with its associated pump stations and rising main network, has been designed specifically to service the Peacockes development. This infrastructure presents a valuable interim opportunity for SL1 Houchens to discharge wastewater utilising the Peacockes infrastructure prior to the commissioning of the HCC Southern WWTP.

Once the Southern WWTP becomes operational, there will be an opportunity to divert wastewater flows from both the Peacockes and SL1 Houchens areas to the new facility. This diversion would alleviate pressure on the Pukete WWTP, enabling it to better service developments in the northern parts of Hamilton.

5.6. Discharge to a New Southern Wastewater Treatment Plant

The Mangakootukutuku ICMP references The Metro Spatial Plan investigations into strategies for wastewater servicing for Hamilton and the surrounding settlements. As Hamilton City grows, the Pukete WWTP will be limited by the population equivalent that it can realistically treat, so resilience will be required within the network to support growth.

HCC have included constructing a new wastewater treatment plant in their long-term plan with an estimated start date of 2030. The exact timing is still to be confirmed by HCC, however some funding towards the treatment plant may shift the start date. This option should be further investigated and discussed with council.

HCC have suggested providing funding towards the wastewater treatment and they also said they would not provide for conveyance to the plant. There may be an opportunity to negotiate with HCC to construct the pipeline to the wastewater treatment plant, which would provide for SL1 development and for the surrounding areas, as a contribution towards the plant infrastructure.

5.7. Alternative Treatment Options

Recognising the issues and constraints around traditional centralised solutions identified above, Maven have considered “at source” and “decentralised” wastewater treatment solutions.

5.8. At Source Treatment

At-source wastewater treatment solutions are being considered as an interim option to service the SL1 Houchens area prior to the construction of the Southern WWTP. This approach could provide a temporary means of wastewater disposal for the residential portion of the development, with the associated disposal field potentially located within the light industrial land area.

While this option remains viable, it is the least preferred due to several constraints. These include the significant land area required for the disposal field, restrictions on land use, and the potential need for land rehabilitation following the removal of the disposal infrastructure. Further investigation can be undertaken if necessary.

5.9. Decentralised Treatment

Decentralised approaches identified in the Mangakootukutuku ICMP will offer long term viability for development of SL1, however, prohibitive costs and programme to implement capital infrastructure for surrounding areas and downstream capacity upgrades could unnecessarily delay or prolong initial development of the SL1 Houchens area. If early release of initial stages is desired, then Membrane Bioreactor (MBR) package plant technology or similar package plant systems could be a viable and affordable medium-term alternative.

Recent advances in MBR technology have enabled package plants to be implemented to land development projects elsewhere in New Zealand. The benefits of doing so would avoid capacity constraints on existing infrastructure and enable early release of developable areas. Whilst treated liquid waste is “clean” and can be discharged to a stream environment, consideration would need to be given to the effects of such discharge into the environment for water quality, soakage (especially in low lying peat areas). Treated wastewater flows will likely need to discharge into an artificial wetland.



5.10. Feedback from Hamilton City Council

5.11. Proposed Wastewater

5.11.1. Interim Option A : Connection to Existing Public Wastewater Networks

To service the SL1 Houchens development as an interim option, a wastewater pumpstation, is proposed near the intersection of the new collector and Houchens Road. The wastewater would be pumped up Houchens Road and then it would continue along Ohaupo Road to tie in with the existing 225 diameter trunk main, located near the intersection of Ohaupo Road and Dixon Road. This will be conditional based on if the Peacocks development can provide for some wastewater capacity.

Alternatively, the SL1 Houchen development can coordinate with the central catchment of SL1 for a combined interim solution. Given a centralised holding point, the wastewater can be redirect toward the southern WTPP once it is operational. This option has been demonstrated within the previous SL1 Stage 1 referral package and is discussed within the reports provided for that application.

5.11.2. Interim Option B – Decentralised Wastewater Treatment

If the existing infrastructure does not have adequate capacity to service the development, portable MBR/Aeration wastewater treatment plants will be considered for the short to mid-term. Treated wastewater from the MBR/Aeration plants would be discharged to artificial wetlands or land and not

directly into existing waterways. The number of portable MBR/Aeration units required onsite will increase over time, as the site is further developed to meet the new demand requirements. When the wastewater network has been upgraded and can now service the development. The wastewater will be redirected to the existing network and the MBR/Aeration plants decommissioned.

HCC have said they will not support decentralised wastewater options and therefore these MBR/Aeration plants would need to be privately owned and managed for the duration of their operations. Resource consent, consent notice conditions on the property titles should include maintenance costs for running the MBR/Aeration plants will be covered by the new property owners, until the wastewater is connected into the public network.

5.12. Initial staging option

A staged approach in developing the proposed infrastructure will likely be adopted, with a preference to connect into the existing wastewater infrastructure where possible. Further discussions will be held with HCC to see if there would be any provision to make a minor wastewater connection to the existing network to manage a portion of this development stage.

Please refer to Appendix A for the wastewater drainage option drawings. For the wastewater calculations refer to Appendix B.

The wastewater calculations are summarised in the table below based on the different staging scenarios.

SL1 Houchens Wastewater Generation			
Stage	Developable Area (Ha)	Population	Peak Flow (l/s)
Option 1A	53	1944	22.43
Option 1B	45	2025	22.89
Ultimate Development	110	4950	53.66

Both the SL1 Houchens Option 1A or Option 1B will be serviced by a wastewater gravity reticulation network. This gravity networks will terminate at the main wastewater pump station which is located near Wetland One. The wastewater pumpstation will pump the wastewater generated from this development toward the existing trunk wastewater manhole WWX23125 that is located within Ohaupo Road.

If the capacity within this existing trunk wastewater main is constrained in terms of capacity, there is option of wastewater storage and off peak pumping.

Alternatively, the wastewater can be collected at this wastewater pump station and discharged toward an interim wastewater treatment plant that is located near this pump station. This would provide a mean of wastewater disposal. Please refer to the engineering drawings in Appendix A for the interim and permanent wastewater servicing strategy for these potential staging option.

5.13. Recommendation

Ultimately, wastewater generated from the SL1 Houchens development is expected to be conveyed and treated at the proposed Southern WWTP, via a dedicated pump station located near the

intersection of Houchens Road and the proposed Collector Road. This pump station can be designed to accommodate flows from the wider SL1 area.

However, due to uncertainty around the timing of the Southern WWTP's commissioning, an interim wastewater disposal solution will be required to enable the initial stages of development at SL1 Houchens. Option A—connecting to the existing wastewater network—is recommended as the preferred interim solution.

Further consultation with Hamilton City Council (HCC) is advised to confirm the details and timeline of the proposed Southern WWTP.

6. Water

Maven have undertaken a desktop study to identify the most suitable option for potable water for the SL1 area. Reticulated and decentralised solutions have been considered. Refer to Appendix A for the proposed water layout drawings.

6.1. Existing Public Infrastructure

Hamilton has one centralised water treatment plant located at 1A Waiora Terrace, Fitzroy, Hamilton, that currently treats the water from the Waikato River that provides water supply for the vast majority of Hamilton City.

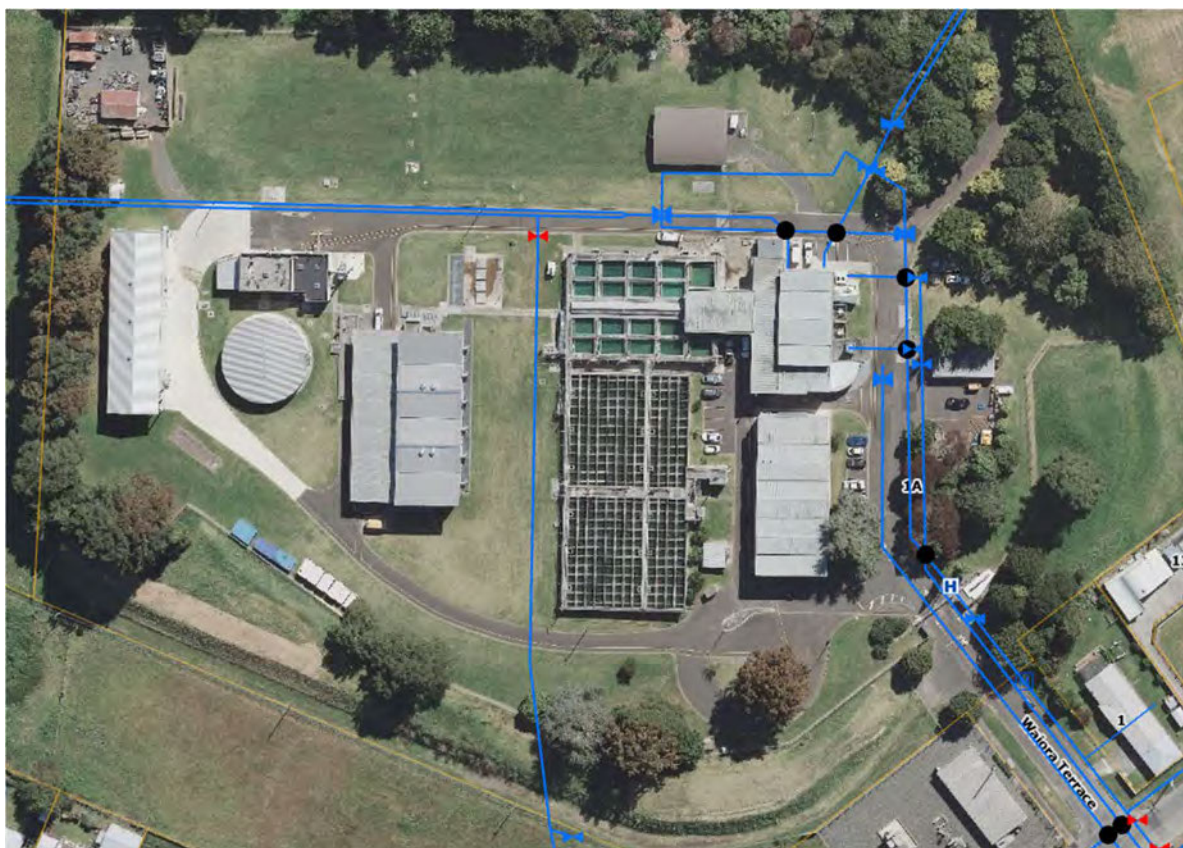


Figure 16 - Hamilton Water Treatment Plant

The Hamilton South Reservoir, located at 3122 Ohaupo Road, sits directly adjacent to the SL1 Houchens Development. It currently services the surrounding areas and will also provide an interim water supply to the Peacockes development.

To support the long-term growth of Peacocks, a new water reservoir has been identified as necessary. The preferred location for this new reservoir is within the SL1 Houchens Development, and further detail on this proposal is provided in Chapter 6.2.

This existing reservoir is supplied by a 750 mm DICL trunk main installed in 2005. In 2017, a 560 OD HDPE bulk water main was constructed between the reservoir and the Hamilton Water Treatment Station at 1A Waioara Terrace. This bulk main was installed to improve resilience of the existing water supply system and to future-proof capacity for the new reservoir that will ultimately service the Peacocks area.



Figure 17: Hamilton South Reservoir

6.2. Future Public Networks

As noted in the previous chapter, a new water reservoir is required to support the long-term water supply needs of the Peacocks development. The preferred site for this reservoir is within the SL1 Houchens Development area. Several delivery scenarios are possible, as outlined below.

Option 1: Reservoir Delivered by Peacocks Developer (HCC Partnership)

Under this option, the reservoir would be designed and constructed by the Peacocks developer in partnership with HCC, assuming no development occurs within the wider SL1 area.

- The reservoir would be sized only to service Peacocks and the existing pressure zone.

- Ongoing consultation and financial contributions from SL1 landowners would be required to ensure that, if the reservoir is later upgraded, it has sufficient capacity to serve the wider SL1 area, including SL1 Houchens.

Option 2: Reservoir Delivered by SL1 Consortium or SL1 Houchens

In this scenario, the SL1 landowners—either collectively as a consortium or individually as SL1 Houchens—would design and construct the reservoir to service the development within SL1.

- The reservoir could be vested as a public asset.
- It may also be sized to accommodate Peacockes demand, provided a financial agreement is reached with the relevant stakeholders.

Option 3: Privately Owned Reservoir for SL1 Houchens Only

Under this option, the reservoir would be privately owned and would service only the SL1 Houchens development.

- Water supply would be supported by an on-site groundwater bore and treatment plant.
- Further details on this private supply system are provided in Section 6.4 below.

The ultimate sizing and configuration of the future reservoir will depend on detailed design work and further consultation with HCC.

6.3. Public Reticulation and Capacity

Local water reticulation networks will be designed to provide SL1 Houchens with a suitable means of potable and firefighting water supply. Maven has not undertaken an in-depth review of the existing network; however, Mott MacDonald was commissioned by Golden Valley Farms to assess the system performance in terms of Level of Service (LOS) and firefighting capacity within the eastern residential area of SL1.

Mott MacDonald assessed system performance for the 2013, 2021, 2041, and 2061 peak day scenario of the existing network considering demand resulting from the proposed Golden Valley Farm development which equates to around 25% of the SL1 area. Without any network upgrades, Mott MacDonald concluded that residential fire flow requirements could not be met for any scenario.

Mott MacDonald identified that connecting to the Hamilton south reservoir supply main and likely upgrades to the water treatment plant delivery pump(s) and the Hamilton south reservoir filling main would allow levels of service to be met both in the development and in the remainder of the network.

In summary, the existing HCC water infrastructure network has the potential to service a portion of the SL1 Houchens area in the short term, subject to some local upgrades. Further consultation with HCC is required to determine whether there is surplus capacity within the existing network to provide interim water supply to SL1 Houchens.

Alternatively, the new water reservoir could be designed to meet the water supply demands of both SL1 Houchens and the wider SL1 development. As this new network would be semi-detached—servicing a different zone but sharing a feeder main with the existing network—it is not expected to impact the level of service provided to the existing catchment.

There is currently a limit on the water-take consent held by Hamilton City Council (HCC). While HCC has some buffer capacity within its existing consent to service new and emerging areas such as SL1, this allowance has already been earmarked to accommodate natural population growth within the HCC

boundary over the next 30 years. As a result, the SL1 landowners have initiated a new water-take consent application for the Waikato River. Once granted, this consent will be transferred to HCC to enable additional water supply beyond the current limits, supporting the wider SL1 area and, in particular, the SL1 Houchens development.

6.4. Decentralised Supply Options

In addition to the public infrastructure solutions identified above, a hydrogeological desktop review of the SL1 area was undertaken by WGA in May 2021 to assess the feasibility of groundwater as a potable water source.

According to the findings, the aquifer beneath the SL1 area has sufficient capacity to meet the water demand of the entire SL1 development. A decentralised solution is considered feasible, involving on-site groundwater extraction and treatment. The treated water could then be pumped to the new water reservoir, from which it would supply both SL1 Houchens and the wider SL1 area. The final treatment solution could be either public or private ownership and will meet the applicable drinking water standards.

The proposed Retirement Village within the SL1 Houchens development may also operate its own private water bore and on-site water treatment plant, allowing it to be fully self-sufficient in meeting both potable water demand and fire-fighting requirements. This arrangement is appropriate and common within the retirement village sector, where dedicated management structures are in place to operate and maintain private water supply systems. The groundwater assessment memo prepared by WGA supports the feasibility of this approach.

6.5. Initial staging Options

There is an existing water reservoir abutting SL1 Houchens development area. As mentioned above there are multiple options to service this development through public connection or decentralised approach. Regardless of the stage 1A or 1B development scenario, the proposed internal water supply networks remain unchanged.

The water supply calculations are summarised in the table below.

Stage	SL1 Houchens Water Demand		
	Developable Area (Ha)	Population	Peak Flow (l/s)
Option 1A	53	1944	42.45
Option 1B	45	2025	38.39
Ultimate	110	4950	85.99

6.6. Recommendations

Ultimately, a new water reservoir is essential to support the long-term growth of both the SL1 and Peacockes developments. In the interim, SL1 Houchens may be serviced through a connection to the existing 750 mm water main, with or without minor local network upgrades. Should constraints arise in the existing water supply network or treatment plant, a decentralised solution—such as groundwater extraction and on-site treatment—could provide an alternative water source for SL1 Houchens and the wider SL1 area.

At this stage, connection to the public water network is the recommended option. Further consultation with HCC is required to confirm servicing capacity and infrastructure planning as part of the substantive application.

7. Services

We understand that based on discussions with service providers for the wider SL1 development area that provision for power, gas, and fibre can be made available to the area.

8. Conclusions

The high-level earthworks model, supported by the desktop geotechnical study undertaken by CWM, has confirmed that the site is suitable for development. While the presence of peat soils within parts of the development area presents a challenge, these constraints can be effectively mitigated through appropriate engineering interventions. Overall, the site is considered manageable, with no inherent geotechnical risks that would preclude its development.

The roading network for the area has been carefully planned to provide efficient connectivity across all transport modes. Key collector and arterial routes have been identified, and the master plan has been structured around these primary transport corridors. The site is therefore well-suited for development and will facilitate the provision of key infrastructure upgrades to support the wider community.

Stormwater drainage can be provided for SL1 Houchens through wetlands, ground water recharge, piped stormwater networks and conveyance channel. Overland flow paths will be managed through the development, and it will reduce any potential flooding risks. An overarching stormwater strategy has been developed, and this sets out the high-level, best practice approach for stormwater management within the catchment.

Wastewater management can be provided for SL1 Houchens through piped networks to pump stations that will transfer wastewater through the site for discharge into the existing HCC wastewater network. If the existing network cannot provide sufficient capacity for the initial stage of the development decentralised onsite wastewater treatment will be implemented, until the downstream public network can support them.

Potable water can be provided for SL1 Houchens through water supply networks through the development and connection into the existing network. A potential new water reservoir may be constructed next to the existing southern water supply reservoir, to provide water supply to SL1 Houchens and wider SL1 development. If the existing network cannot provide sufficient capacity for the initial stage of the development, private water bores will be established at strategic locations and onsite portable water treatment devices will treat the water before distributing within the development.

Additional investigation work and detailed reporting for three waters and earthworks will be required to support future substantive application along with further advancement on the proposed sub staging approaches and interim solutions if required.

9. Limitations

The calculations and assessments included in this report are a 'desktop' analysis and are preliminary in nature based on information available at time of issue. To the best of our knowledge, it represents a reasonable interpretation of available information including the outcomes of the Mangakootukutuku ICMP which status is draft for consultation at the time of this issue.

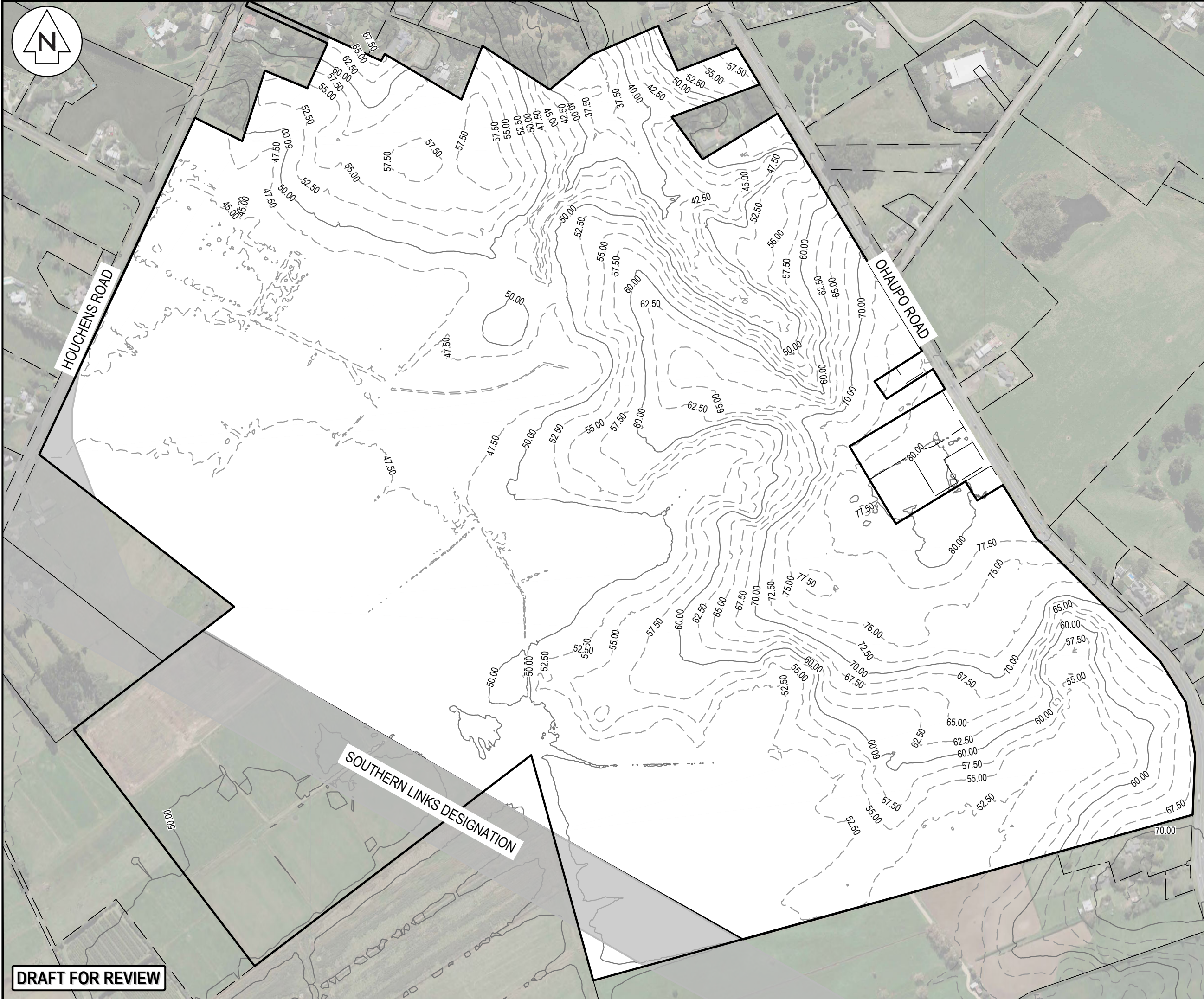
Depending on the outcome of the high-level structure plan, further community; stakeholder engagement; and feasibility investigations, including engineering design and calculations, will be required to determine the suitability of the areas proposed for industrial and residential development.

This report is solely for our clients use for the purpose for which it is intended in accordance with the agreed scope of work. It may not be disclosed to any person other than the client and any use or reliance by any person contrary to the above, to which Maven has not given its prior written consent, is prohibited.

This report must be read in its entirety and no portion of it should be relied on without regard to the limitations and disclaimers set out.

Maven makes no assurances with respect to the accuracy of assumptions and exclusions listed within this report and some may vary significantly due to ongoing stakeholder engagement.

Appendix A – Engineering Drawings



- NOTES
1. ALL WORKS TO BE IN ACCORDANCE WITH RITS.
 2. COORDINATES IN TERMS OF NZ GEODETIC DATUM MT EDEN 2000
 3. LEVELS IN TERMS OF THE NEW ZEALAND VERTICAL DATUM 2016.
 4. ORIGIN OF LEVELS = SM XXXX SO XXXX(XXXX) PUBLISHED RL-XX.XX, SOURCED FROM THE LINZ DIGITAL GEODETIC DATABASE.
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 10. SEDIMENT CONTROL TO COMPLY WITH GD05 STANDARDS.

LEGEND

---	EX BDY
---	PROP BDY
---	EX MAJOR CONTOUR
---	EX MINOR CONTOUR

A	PRELIMINARY	KN	07/25
Rev	Description	By	Date
	By	Date	
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Design	KH	07/25	
Drawn	KH	07/25	
Checked	RW	07/25	

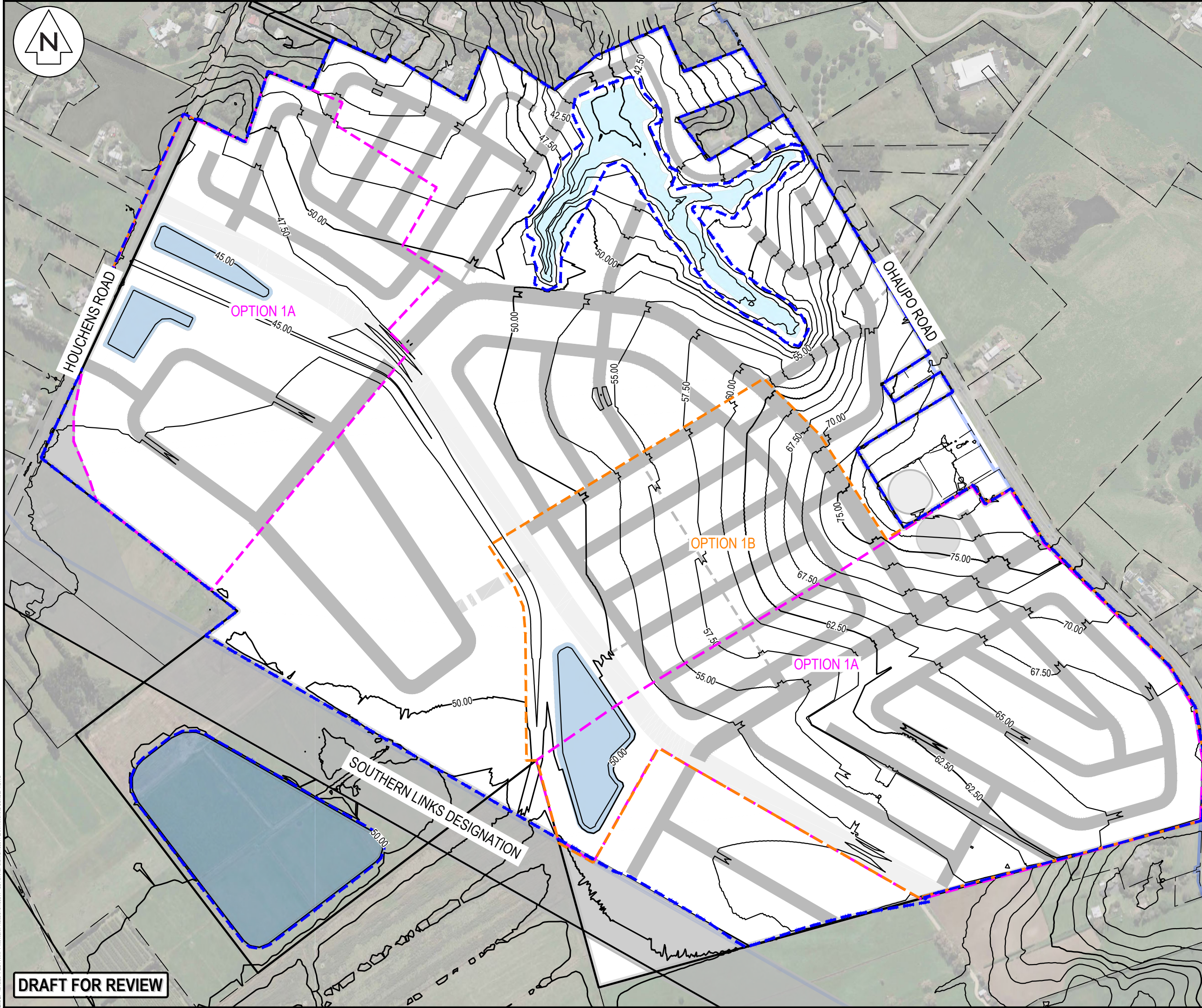
M **Maven Associates**
09 571 0050
info@maven.co.nz
www.maven.co.nz
5 Owens Road, Epsom
Auckland 1023

Project
SL 1
HOUCHENS
DEVELOPMENT

Title
EXISTING
CONTOURS
PLAN

Project no.	180014
Scale	1:5000 @ A3
Cad file	180014 EARTHWORKS CONCEPT.DWG
Drawing no.	C102-1
Rev	A

DRAFT FOR REVIEW



- NOTES
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LEGEND

---	EX BDY
---	PROP BDY
---	PR MAJOR CONTOUR
---	PR MINOR CONTOUR
---	PROP EXTENT WORK
---	PROP EXTENT WORK OPTION 1A
---	PROP EXTENT WORK OPTION 1B

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Drawn	KH	07/25	
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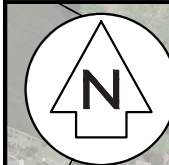


Maven Associates
09 571 0050
info@maven.co.nz
www.maven.co.nz
5 Owens Road, Epsom
Auckland 1023

Project
SL 1
HOUCHENS
DEVELOPMENT

Title
PROPOSED
DESIGN COUNTOURS
PLAN

Project no.	180014
Scale	1:5000 @ A3
Cad file	180014 EARTHWORKS CONCEPT.DWG
Drawing no.	C102-2
Rev	A



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3	-7.500	-5.000	Red
4	-5.000	-2.500	Dark Red
5	-2.500	0.000	Dark Red
6	0.000	2.500	Light Green
7	2.500	5.000	Light Green
8	5.000	7.500	Light Green
9	7.500	10.000	Light Green
10	10.000	12.500	Light Green
11	12.500	15.000	Light Green

- NOTES
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---	PROP EXTENT WORK
---	PROP EXTENT WORK OPTION 1A
---	PROP EXTENT WORK OPTION 1B

A	PRELIMINARY	HN	07/25
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Maven Associates
09 571 0050
info@maven.co.nz
www.maven.co.nz
5 Owens Road, Epsom
Auckland 1023

Project
SL 1
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DEVELOPMENT

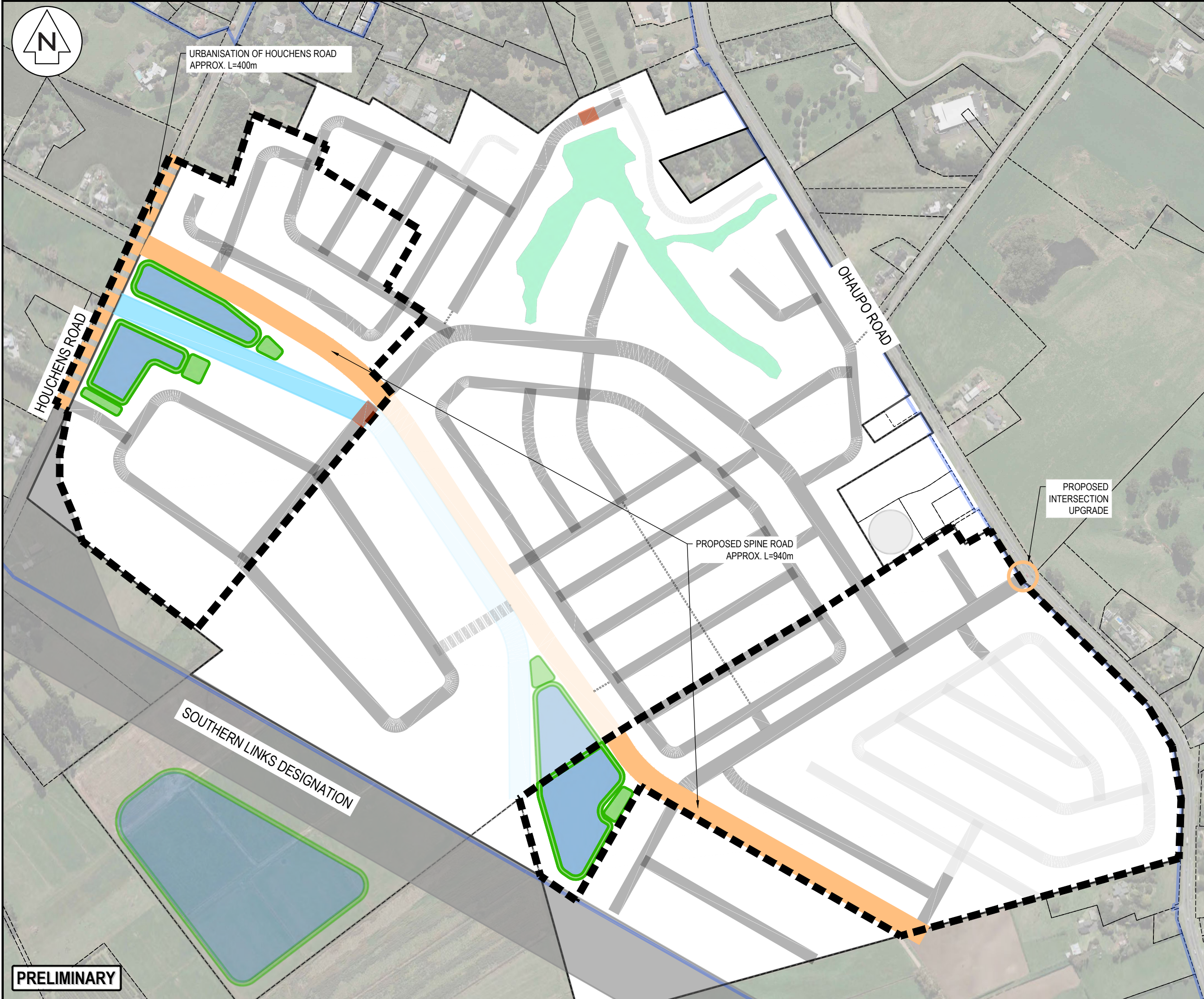
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PLAN

Project no.	180014
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Drawing no.	C102-3
Rev	A

EARTH WORKS (SURFACE E-GL COMPARISON WITH SURFACE P-GL)	
CUT VOLUME	1,565,000 m³
FILL VOLUME	1,523,000 m³
NET CUT	42,000 m³
TOPSOIL STRIPPED (300mm) =	381,900 m³
EARTHWORKS AREA =	127.3 Ha
NOTE: NO ALLOWANCE FOR SERVICES TRENCHES, VOLUMES ARE UNFACTORED AND IN SITU	

DRAFT FOR REVIEW

DATE: 18/12/25 FILE PATH: F:\Maven\PROJECTS\180014-SL1\OHAUPO\DWG\180014 EARTHWORKS CONCEPT.DWG



- NOTES
1. ALL WORKS TO BE IN ACCORDANCE WITH RITS.
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- LEGEND
- PR STAGE BDY
 - PR SPINE ROAD
 - PR URBANISATION ROAD
 - PR INTERSECTION UPGRADE
 - PR WETLAND
 - PR CHANNEL
 - PR PUBLIC ROAD
 - PR FUTURE PUBLIC ROAD
 - PR PRIVATE ROAD
 - PR FUTURE WALKING AND CYCLING
 - PR CULVERT OR BRIDGE
 - SOUTHERN LINKS DESIGNATION
 - EX WETLAND

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Rev	Description	By	Date
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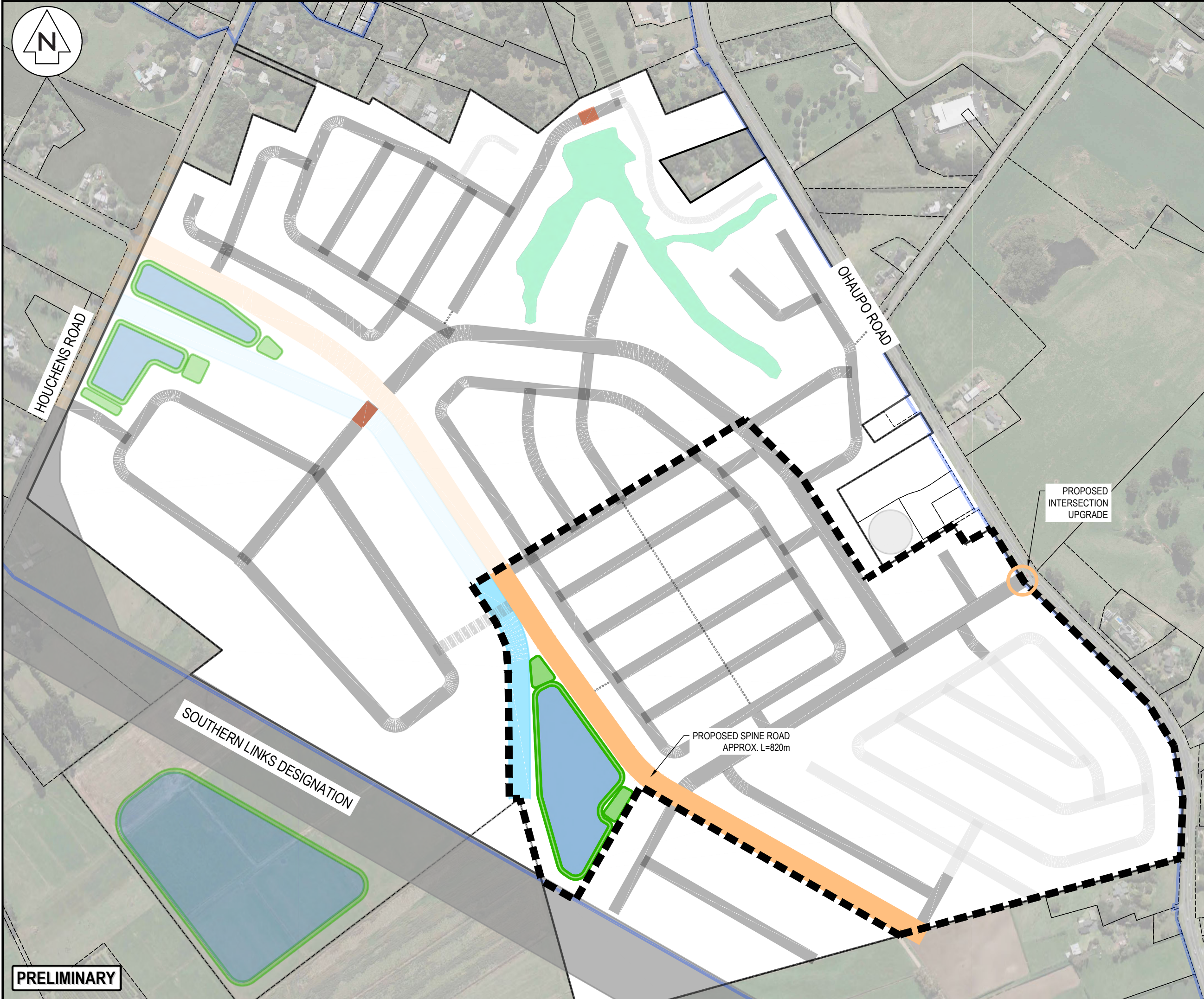
M **Maven Associates**
09 571 0050
info@maven.co.nz
www.maven.co.nz
5 Owens Road, Epsom
Auckland 1023

Project
SL 1
HOUCHENS
DEVELOPMENT

Title
PROPOSED 1A
ROADING
PLAN

Project no.	180014
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Cad file	180014 100- MASTER CONCEPT PLAN 1A.DWG
Drawing no.	C103-1
Rev	A

DATE: 12/12/25 FILE PATH: F:\Maven\PROJECTS\180014 - SL1 OHAPU\DWG\180014_100- MASTER CONCEPT PLAN 1A.DWG



DATE: 12/12/25 FILEPATH: F:\Maven\PROJECTS\180014-SL1\OHAUPO\DWG\180014-100-MASTER CONCEPT PLAN 1B.DWG

PRELIMINARY

- NOTES
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 10. SEDIMENT CONTROL TO COMPLY WITH GD05 STANDARDS.

LEGEND

	PR STAGE BDY
	PR SPINE ROAD
	PR URBANISATION ROAD
	PR INTERSECTION UPGRADE
	PR WETLAND
	PR CHANNEL
	PR ROAD
	PR FUTURE ROAD
	PR PRIVATE ROAD
	PR FUTURE WALKING AND CYCLING
	PR CULVERT OR BRIDGE
	SOUTHERN LINKS DESIGNATION
	EX WETLAND

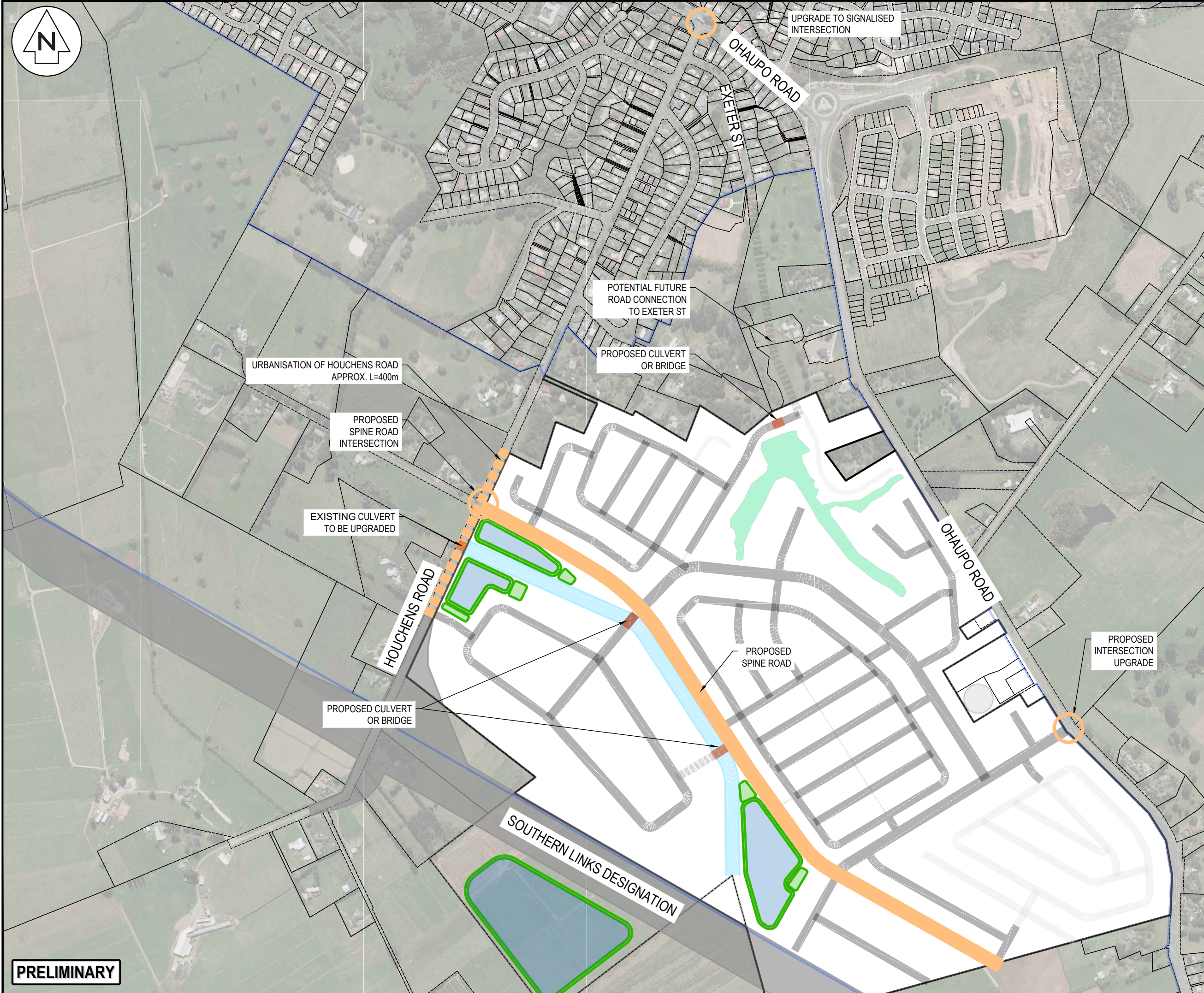
A	PRELIMINARY	HN	08/25
Rev	Description	By	Date
Survey	LANDPRO		02/21
Design	KH		07/25
Drawn	KH		07/25
Checked	RW		07/25

 **Maven Associates**
09 571 0050
info@maven.co.nz
www.maven.co.nz
5 Owens Road, Epsom
Auckland 1023

Project
SL 1
HOUCHENS DEVELOPMENT

Title
PROPOSED 1B ROADING PLAN

Project no.	180014
Scale	1:5000 @ A3
Cad file	180014 100- MASTER CONCEPT PLAN 1B.DWG
Drawing no.	C103-2
Rev	A



NOTES

1. ALL WORKS TO BE IN ACCORDANCE WITH RITS.
2. COORDINATES IN TERMS OF NZ GEODETIC DATUM MT EDEN 2000
3. LEVELS IN TERMS OF THE NEW ZEALAND VERTICAL DATUM 2016.
4. ORIGIN OF LEVELS = SM XXXX SO XXXX(XXXX) PUBLISHED RL-XX.XX, SOURCED FROM THE LINZ DIGITAL GEODETIC DATABASE.
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LEGEND

	PR STAGE BDY
	PR SPINE ROAD
	PR URBANISATION ROAD
	PR INTERSECTION UPGRADE
	PR WETLAND
	PR CHANNEL
	PR PUBLIC ROAD
	PR FUTURE PUBLIC ROAD
	PR PRIVATE ROAD
	PR FUTURE WALKING AND CYCLING
	PR CULVERT OR BRIDGE
	SOUTHERN LINKS DESIGNATION
	EX WETLAND

Rev	Description	By	Date
A	PRELIMINARY	HN	08/25
Rev	Description	By	Date
Survey	LANDPRO		02/21
Design	KH		07/25
Drawn	KH		07/25
Checked	RW		07/25

Maven Associates
09 571 0050
info@maven.co.nz
www.maven.co.nz
5 Owens Road, Epsom
Auckland 1023

Project

SL 1

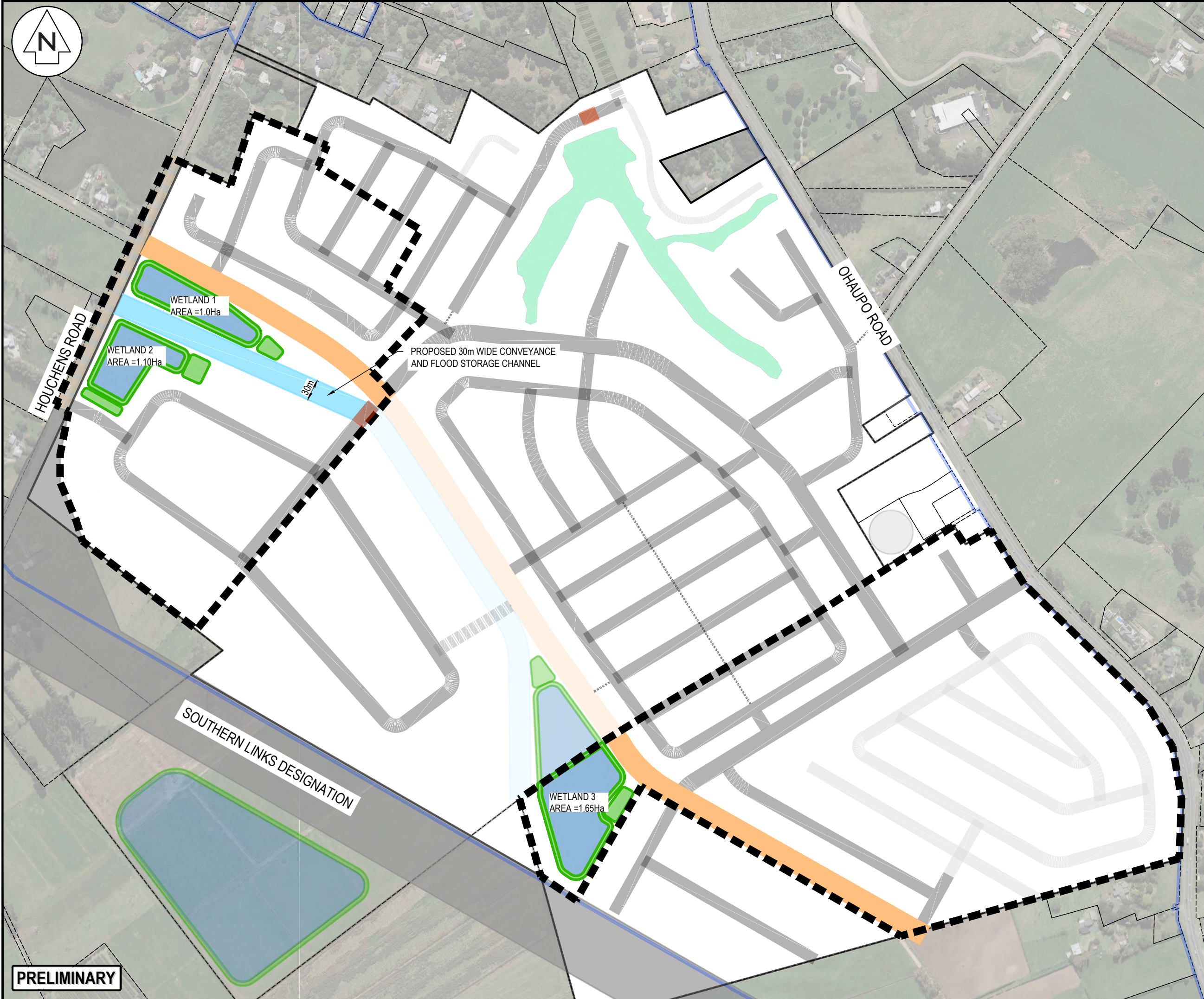
HOUCHENS DEVELOPMENT

Title

PROPOSED ULTIMATE ROADING PLAN

Project no.	180014		
Scale	1:7500 @ A3		
Cad file	180014 100- MASTER CONCEPT PLAN.DWG		
Drawing no.	C103-3	Rev	A

PRELIMINARY



- NOTES
1. ALL WORKS TO BE IN ACCORDANCE WITH RITS.
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LEGEND

	PR STAGE BDY
	PR WETLAND
	PR CHANNEL
	PR CULVERT OR BRIDGE
	EX WETLAND

A	PRELIMINARY	HN	08/25
Rev	Description	By	Date
		By	Date
Survey	LANDPRO		02/21
Design	KH		07/25
Drawn	KH		07/25
Checked	RW		07/25

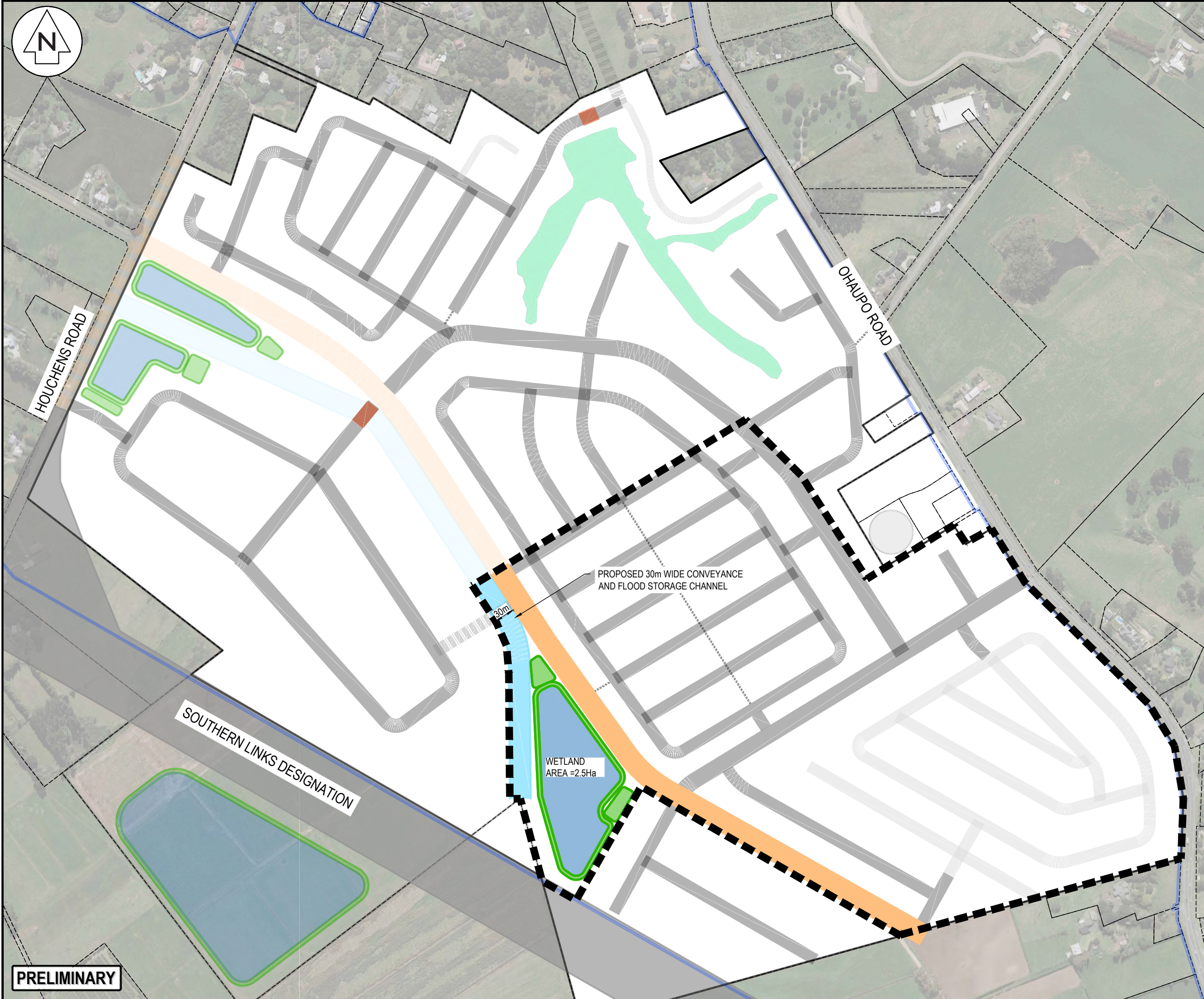
M **Maven Associates**
09 571 0050
info@maven.co.nz
www.maven.co.nz
5 Owens Road, Epsom
Auckland 1023

Project
SL 1
HOUCHENS
DEVELOPMENT

Title
PROPOSED 1A
STORMWATER
PLAN

Project no.	180014
Scale	1:5000 @ A3
Cad file	180014 100- MASTER CONCEPT PLAN 1A.DWG
Drawing no.	C104-1
Rev	A

PRELIMINARY



- NOTES
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LEGEND

	PR STAGE BDY
	PR WETLAND
	PR CHANNEL
	PR CULVERT OR BRIDGE
	EX WETLAND

A	PRELIMINARY	HN	08/25
Rev	Description	By	Date
		By	Date
Survey	LANDPRO		02/21
Design	KH		07/25
Drawn	KH		07/25
Checked	RW		07/25

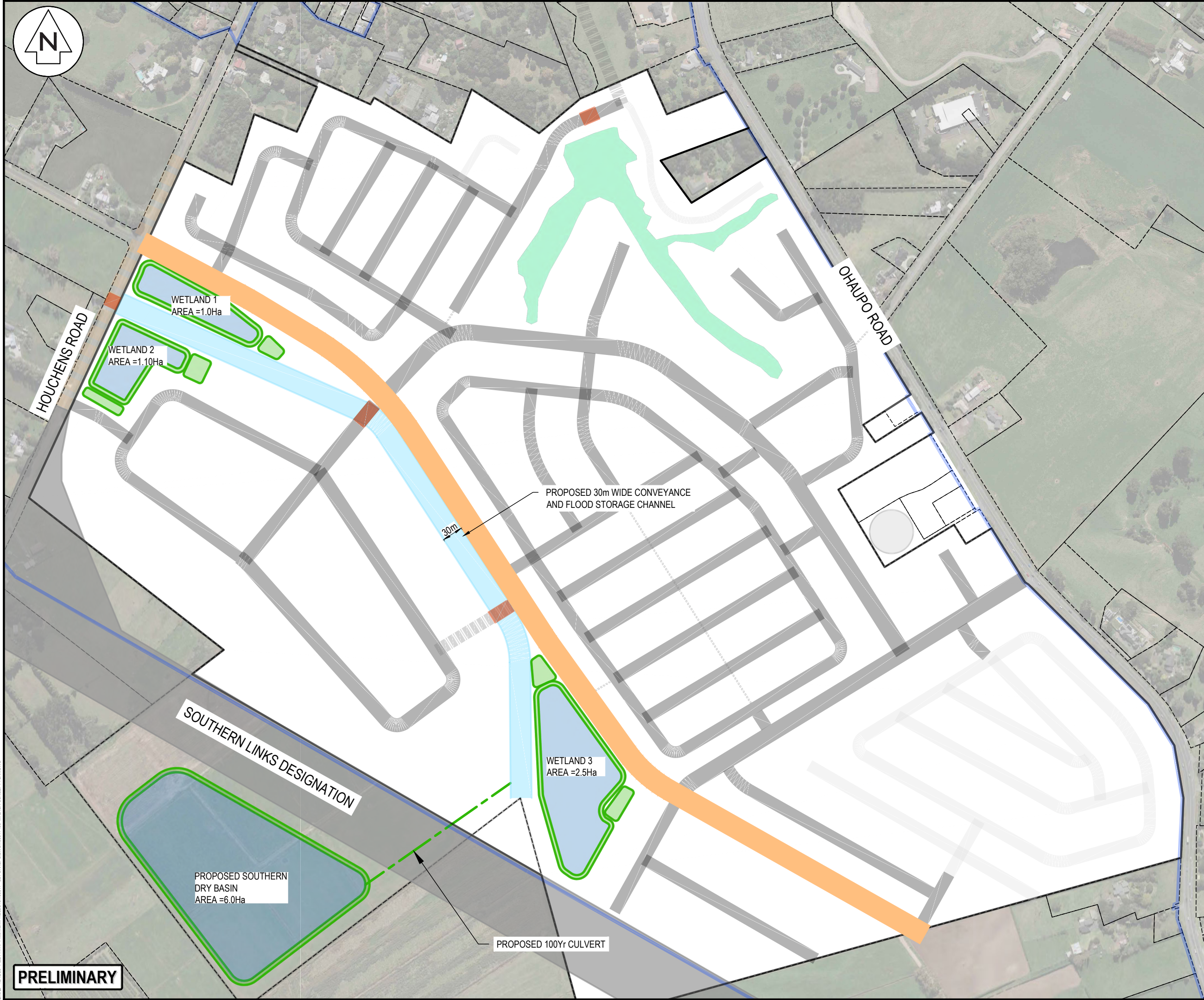
M **Maven Associates**
09 571 0050
info@maven.co.nz
www.maven.co.nz
5 Owens Road, Epsom
Auckland 1023

Project
SL 1
HOUCHENS
DEVELOPMENT

Title
PROPOSED 1B
STORMWATER
PLAN

Project no.	180014
Scale	1:5000 @ A3
Cad file	180014 100- MASTER CONCEPT PLAN 1B.DWG
Drawing no.	C104-2
Rev	A

PRELIMINARY



- NOTES
1. ALL WORKS TO BE IN ACCORDANCE WITH RITS.
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- LEGEND
- PR STAGE BDY
 - PR SPINE ROAD
 - PR WETLAND
 - PR CHANNEL
 - PR LOCAL ROAD
 - PR JOAL
 - PR CULVERT OR BRIDGE
 - SOUTHERN LINKS DESIGNATION
 - EX WETLAND

A	PRELIMINARY	HN	08/25
Rev	Description	By	Date
		By	Date
Survey	LANDPRO		02/21
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Drawn	KH		07/25
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M Maven Associates
09 571 0050
info@maven.co.nz
www.maven.co.nz
5 Owens Road, Epsom
Auckland 1023

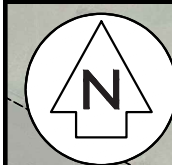
Project
SL 1
HOUCHENS
DEVELOPMENT

Title
PROPOSED ULTIMATE
STORMWATER
PLAN

Project no.	180014
Scale	1:5000 @ A3
Cad file	180014 100- MASTER CONCEPT PLAN.DWG
Drawing no.	C104-3
Rev	A

PRELIMINARY

DATE: 12/12/25 FILE PATH: F:\Maven\PROJECTS\180014-SL1\OHAUPO\DWG\180014-100-MASTER CONCEPT PLAN.DWG



A) PUBLIC RETICULATED OPTION:
PUMP STATION AND WASTEWATER
RISING MAIN CONNECT TO EX. 225Ø
(REFER TO BLOWUP "A")
APPROX. L=1650m

B) DECENTRALISED OPTION:
MBR WASTEWATER TREATMENT
PLANT AND DISPOSAL WETLAND

WASTEWATER PUMP
STATION TO DISCHARGE TO
ADOPTED INTERIM
DISCHARGE SOLUTION

GRAVITY
WASTEWATER LINE
APPROX. L=830m

CONNECT TO
EX. 225Ø WASTEWATER (GIS)

BLOWUP "A "

- NOTES
1. ALL WORKS TO BE IN ACCORDANCE WITH RITS.
 2. COORDINATES IN TERMS OF NZ GEODETIC DATUM MT EDEN 2000
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- LEGEND
- PR STAGE BDY
 - PR GRAVITY WASTEWATER
 - PR RISING MAIN
 - POTENTIAL WASTEWATER TREATMENT PLANT
 - PR WASTEWATER PUMP STATION
 - EXISTING WASTEWATER

A	PRELIMINARY	HN	08/25
Rev	Description	By	Date
Survey	LANDPRO		02/21
Design	KH		07/25
Drawn	KH		07/25
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Maven Associates
09 571 0050
info@maven.co.nz
www.maven.co.nz
5 Owens Road, Epsom
Auckland 1023

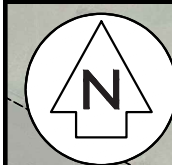
Project
SL 1
HOUCHENS
DEVELOPMENT

Title
PROPOSED 1A
INTERIM WASTEWATER
PLAN

Project no.	180014
Scale	1:5000 @ A3
Cad file	180014 100- MASTER CONCEPT PLAN 1A.DWG
Drawing no.	C105-1
Rev	A

PRELIMINARY

DATE: 18/12/25 FILE PATH: F:\Maven\PROJECTS\180014-SL1\OHAUPO\DWG\180014-100-MASTER CONCEPT PLAN 1A.DWG



A) PUBLIC RETICULATED OPTION:
PUMP STATION AND WASTEWATER
RISING MAIN CONNECT TO EX. 225Ø
(REFER TO BLOWUP "A")
APPROX. L=1650m

B) DECENTRALISED OPTION:
MBR WASTEWATER TREATMENT
PLANT AND DISPOSAL WETLAND

WASTEWATER PUMP
STATION TO DISCHARGE TO
ADOPTED INTERIM
DISCHARGE SOLUTION

GRAVITY
WASTEWATER LINE
APPROX. L=830m

CONNECT TO
EX. 225Ø WASTEWATER (GIS)

BLOWUP "A "

- NOTES
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 10. SEDIMENT CONTROL TO COMPLY WITH GD05 STANDARDS.

- LEGEND
- PR STAGE BDY
 - PR GRAVITY WASTEWATER
 - PR RISING MAIN
 - POTENTIAL WASTEWATER TREATMENT PLANT
 - PR WASTEWATER PUMP STATION
 - EXISTING WASTEWATER

A	PRELIMINARY	HN	08/25
Rev	Description	By	Date
Survey	LANDPRO		02/21
Design	KH		07/25
Drawn	KH		07/25
Checked	RW		07/25



Maven Associates
09 571 0050
info@maven.co.nz
www.maven.co.nz
5 Owens Road, Epsom
Auckland 1023

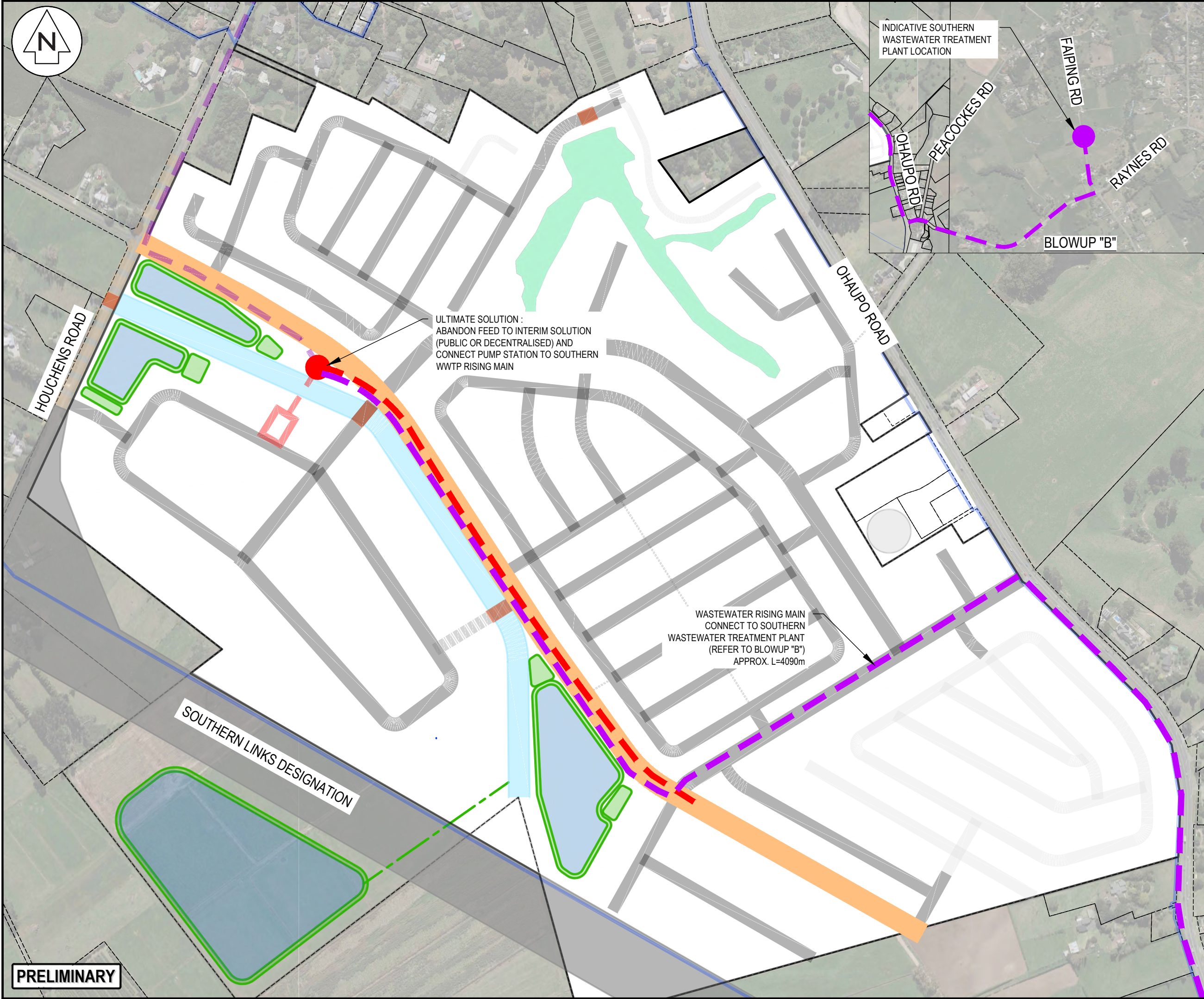
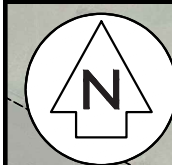
Project
SL 1
HOUCHENS
DEVELOPMENT

Title
PROPOSED 1B
INTERIM WASTEWATER
PLAN

Project no.	180014
Scale	1:5000 @ A3
Cad file	180014 100- MASTER CONCEPT PLAN 1B.DWG
Drawing no.	C105-2
Rev	A

PRELIMINARY

DATE: 18/12/25 FILEPATH: F:\Maven\PROJECTS\180014-SL1\OHAUPO\DWG\180014-100-MASTER CONCEPT PLAN 1B.DWG



INDICATIVE SOUTHERN
WASTEWATER TREATMENT
PLANT LOCATION

FAIPING RD

PEACOCKES RD

RAYNES RD

BLOWUP "B"

OHAUPO ROAD

HOUCHENS ROAD

ULTIMATE SOLUTION :
ABANDON FEED TO INTERIM SOLUTION
(PUBLIC OR DECENTRALISED) AND
CONNECT PUMP STATION TO SOUTHERN
WWTP RISING MAIN

WASTEWATER RISING MAIN
CONNECT TO SOUTHERN
WASTEWATER TREATMENT PLANT
(REFER TO BLOWUP "B")
APPROX. L=4090m

SOUTHERN LINKS DESIGNATION

- NOTES
1. ALL WORKS TO BE IN ACCORDANCE WITH RITS.
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- LEGEND
- PR STAGE BDY
 - PR GRAVITY WASTEWATER
 - PR RISING MAIN
 - POTENTIAL WASTEWATER TREATMENT PLANT
 - PR WASTEWATER PUMP STATION
 - EXISTING WASTEWATER

A	PRELIMINARY	HN	08/25
Rev	Description	By	Date
Survey	LANDPRO		02/21
Design	KH		07/25
Drawn	KH		07/25
Checked	RW		07/25

M Maven Associates
09 571 0050
info@maven.co.nz
www.maven.co.nz
5 Owens Road, Epsom
Auckland 1023

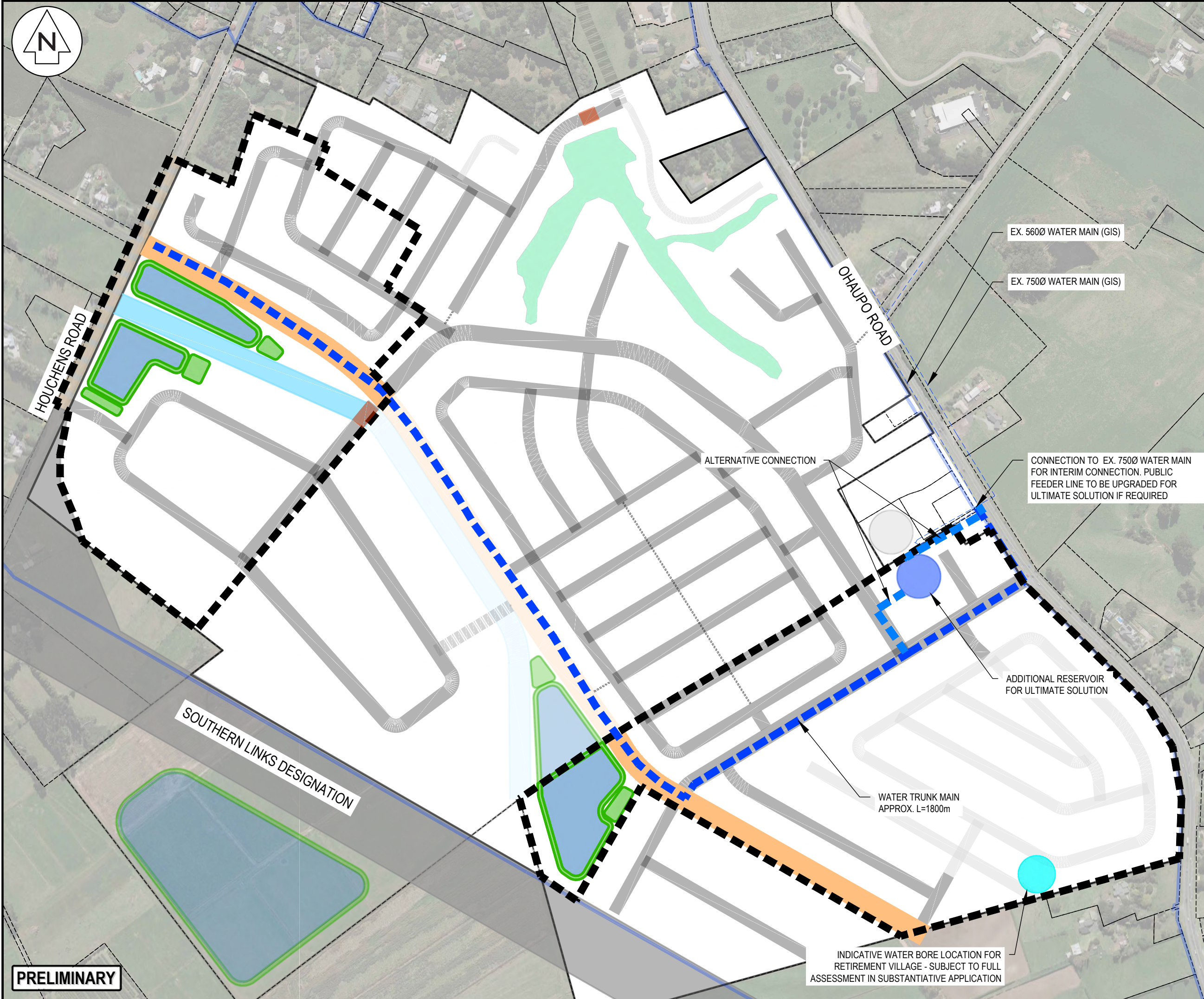
Project
SL 1
HOUCHENS
DEVELOPMENT

Title
PROPOSED ULTIMATE
WASTEWATER
PLAN

Project no.	180014
Scale	1:5000 @ A3
Cad file	180014 100- MASTER CONCEPT PLAN.DWG
Drawing no.	C105-3
Rev	A

PRELIMINARY

DATE: 12/12/25 FILE PATH: F:\Maven\PROJECTS\180014-SL1\OHAUPO\DWG\180014-100-MASTER CONCEPT PLAN.DWG



- NOTES
1. ALL WORKS TO BE IN ACCORDANCE WITH RITS.
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LEGEND

---	PR STAGE BDY
---	PR WATER TRUNK MAIN
---	PR WATER TRUNK MAIN (ALTERNATIVE OPTION)
●	RESERVOIR
---	EXISTING WATER

A	PRELIMINARY	HN	08/25
Rev	Description	By	Date
Survey	LANDPRO		02/21
Design	KH		07/25
Drawn	KH		07/25
Checked	RW		07/25

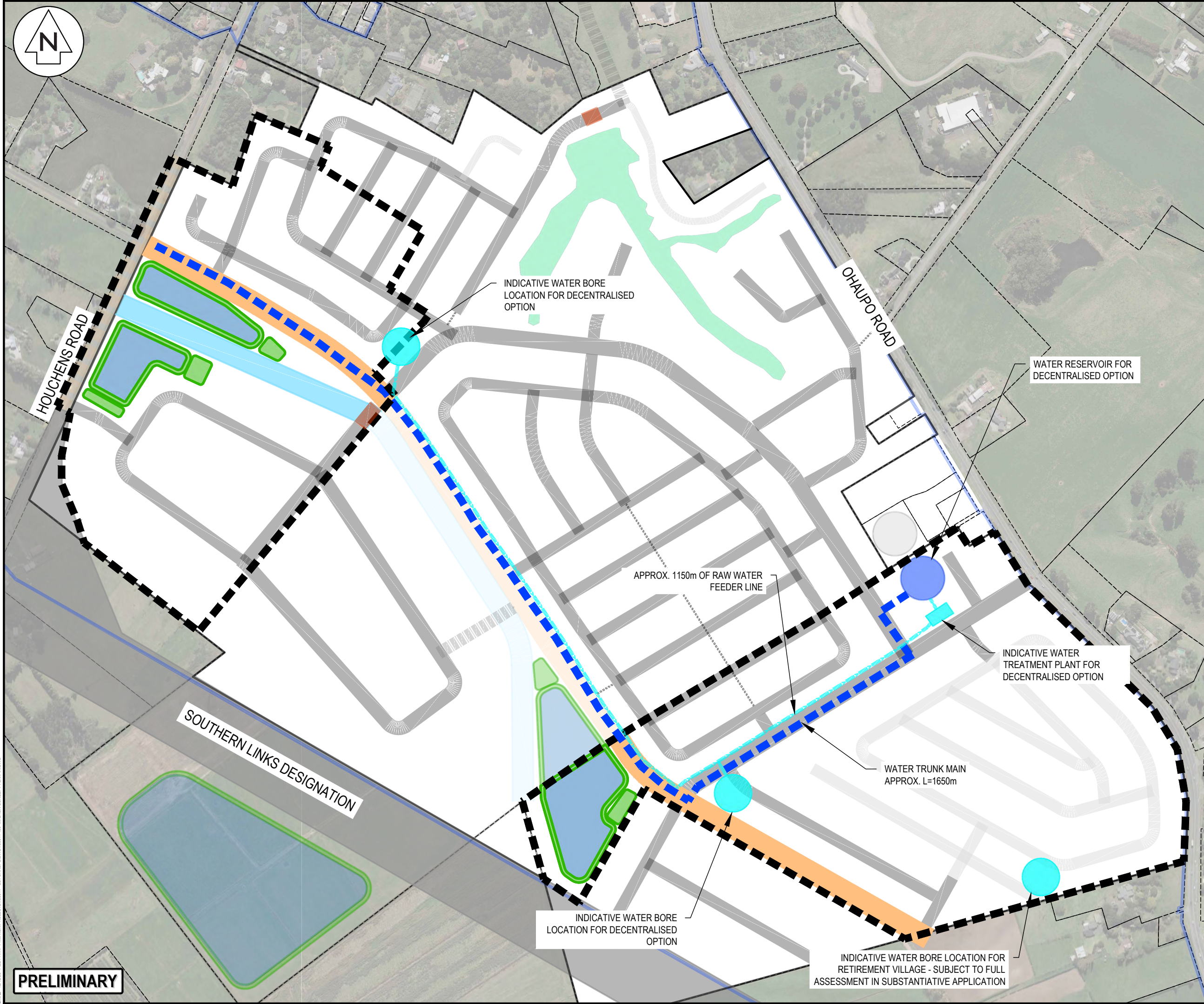
M **Maven Associates**
09 571 0050
info@maven.co.nz
www.maven.co.nz
5 Owens Road, Epsom
Auckland 1023

Project
SL 1
HOUCHENS
DEVELOPMENT

Title
PROPOSED 1A
PUBLIC WATER SUPPLY
PLAN

Project no.	180014
Scale	1:5000 @ A3
Cad file	180014 100- MASTER CONCEPT PLAN 1A.DWG
Drawing no.	C106-1
Rev	A

PRELIMINARY



- NOTES
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LEGEND

	PR STAGE BDY
	PR WATER TRUNK MAIN
	PR WATER MAIN FEEDER LINE
	RESERVOIR
	EXISTING WATER

A	PRELIMINARY	HN	08/25
Rev	Description	By	Date
		By	Date
Survey	LANDPRO		02/21
Design	KH		07/25
Drawn	KH		07/25
Checked	RW		07/25



Maven Associates
09 571 0050
info@maven.co.nz
www.maven.co.nz
5 Owens Road, Epsom
Auckland 1023

Project
SL 1
HOUCHENS DEVELOPMENT

Title
PROPOSED 1A DECENTRALISED WATER SUPPLY PLAN

Project no.	180014
Scale	1:5000 @ A3
Cad file	180014 100- MASTER CONCEPT PLAN 1A.DWG
Drawing no.	C106-2
Rev	A

PRELIMINARY

DATE: 18/12/25 FILE PATH: F:\Maven\PROJECTS\180014-SL1\OHAUPO\DWG\180014-100-MASTER CONCEPT PLAN 1A.DWG



- NOTES
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- LEGEND
- PR STAGE BDY
 - PR WATER TRUNK MAIN
 - PR WATER TRUNK MAIN (ALTERNATIVE OPTION)
 - RESERVOIR
 - EXISTING WATER

A	PRELIMINARY	HN	08/25
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M Maven Associates
09 571 0050
info@maven.co.nz
www.maven.co.nz
5 Owens Road, Epsom
Auckland 1023

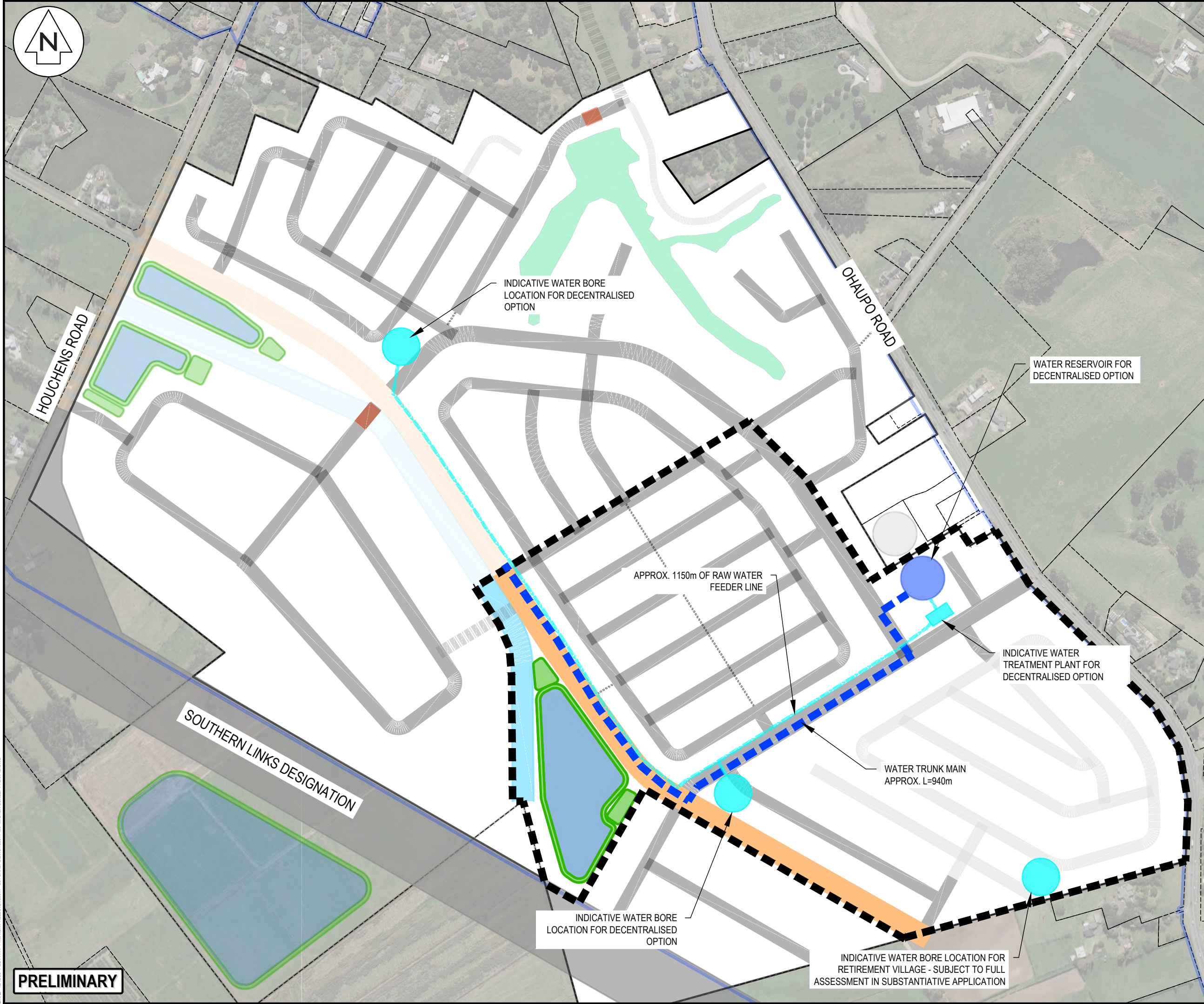
Project
SL 1
HOUCHENS
DEVELOPMENT

Title
PROPOSED 1B
PUBLIC WATER SUPPLY
PLAN

Project no.	180014
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Cad file	180014 100- MASTER CONCEPT PLAN 1B.DWG
Drawing no.	C106-3
Rev	A

PRELIMINARY

DATE: 12/12/25 FILE PATH: F:\Maven\PROJECTS\180014-SL1\OHAUPO\DWG\180014-100-MASTER CONCEPT PLAN 1B.DWG



- NOTES
1. ALL WORKS TO BE IN ACCORDANCE WITH RITS.
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 3. LEVELS IN TERMS OF THE NEW ZEALAND VERTICAL DATUM 2016.
 4. ORIGIN OF LEVELS = SM XXXX SO XXXX(XXXX) PUBLISHED RL-XX.XX, SOURCED FROM THE LINZ DIGITAL GEODETIC DATABASE.
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 10. SEDIMENT CONTROL TO COMPLY WITH GD05 STANDARDS.

LEGEND

	PR STAGE BDY
	PR WATER TRUNK MAIN
	PR WATER MAIN FEEDER LINE
	RESERVOIR
	EXISTING WATER

A	PRELIMINARY	HN	08/25
Rev	Description	By	Date
Survey	LANDPRO		02/21
Design	KH		07/25
Drawn	KH		07/25
Checked	RW		07/25



Maven Associates
09 571 0050
info@maven.co.nz
www.maven.co.nz
5 Owens Road, Epsom
Auckland 1023

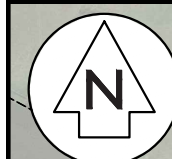
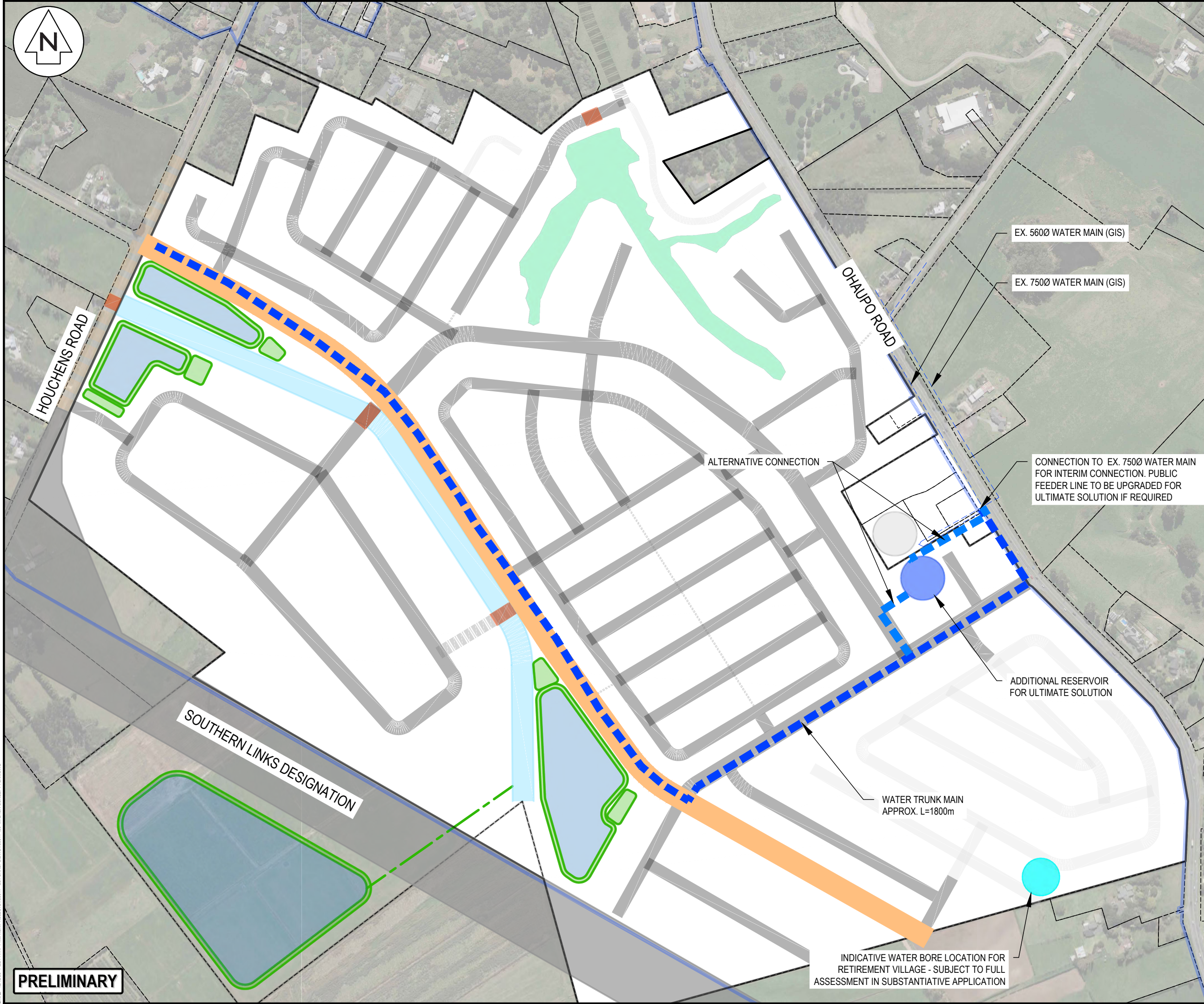
Project
SL 1
HOUCHENS DEVELOPMENT

Title
PROPOSED 1B DECENTRALISED WATER SUPPLY PLAN

Project no.	180014
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Drawing no.	C106-4
Rev	A

PRELIMINARY

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- LEGEND
- PR STAGE BDY
 - PR WATER TRUNK MAIN
 - PR WATER TRUNK MAIN (ALTERNATIVE OPTION)
 - RESERVOIR
 - EXISTING WATER

A	PRELIMINARY	HN	08/25
Rev	Description	By	Date
Survey	LANDPRO		02/21
Design	KH		07/25
Drawn	KH		07/25
Checked	RW		07/25

M **Maven Associates**
09 571 0050
info@maven.co.nz
www.maven.co.nz
5 Owens Road, Epsom
Auckland 1023

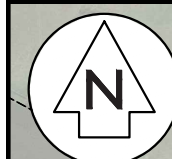
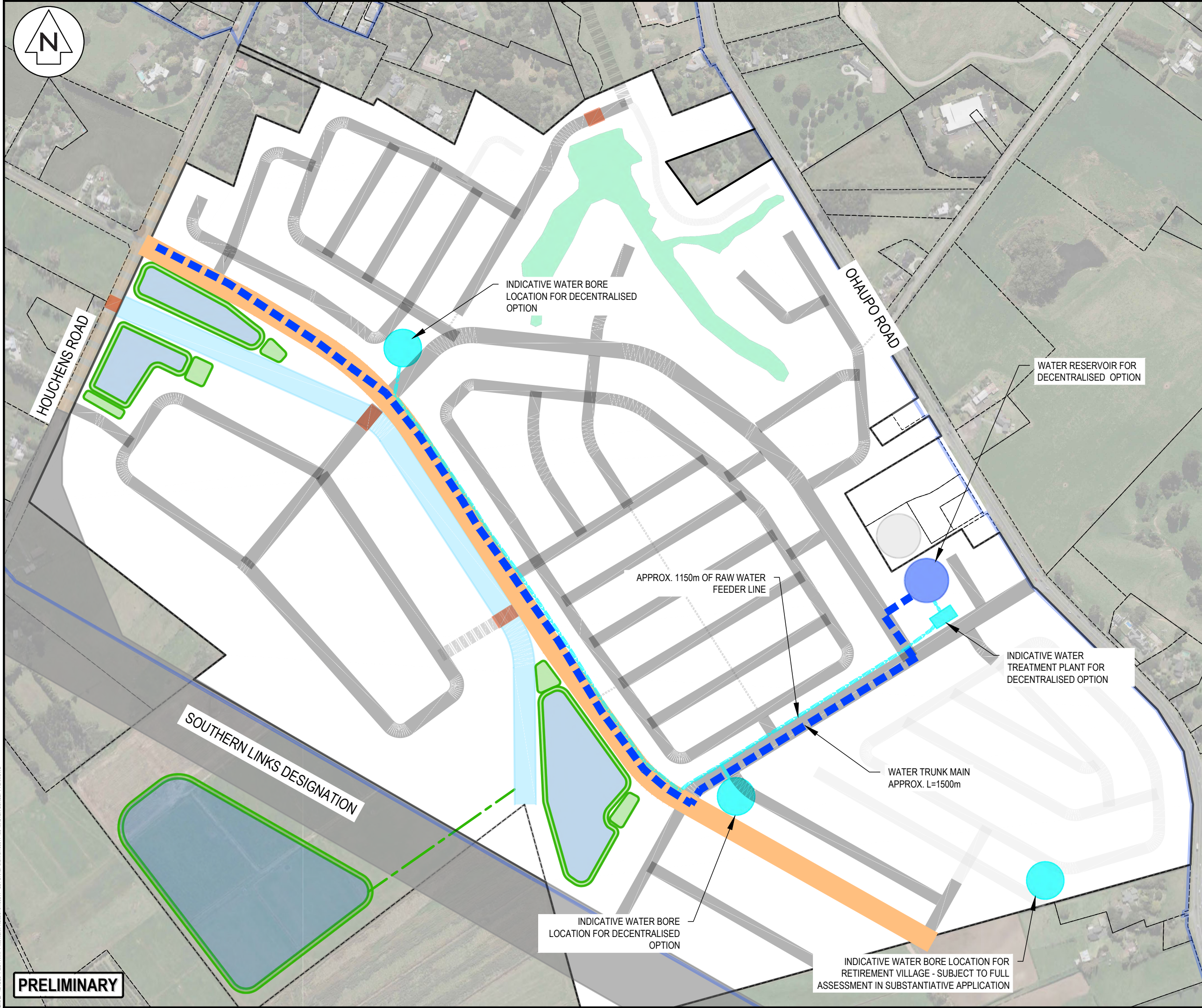
Project
SL 1
HOUCHENS
DEVELOPMENT

Title
PROPOSED ULTIMATE
PUBLIC WATER SUPPLY
PLAN

Project no.	180014
Scale	1:5000 @ A3
Cad file	180014 100- MASTER CONCEPT PLAN.DWG
Drawing no.	C106-5
Rev	A

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- NOTES
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- LEGEND
- PR STAGE BDY
 - PR WATER TRUNK MAIN
 - PR WATER MAIN FEEDER LINE
 - RESERVOIR
 - EXISTING WATER

A	PRELIMINARY	HN	08/25
Rev	Description	By	Date
Survey	LANDPRO		02/21
Design	KH		07/25
Drawn	KH		07/25
Checked	RW		07/25



Maven Associates
09 571 0050
info@maven.co.nz
www.maven.co.nz
5 Owens Road, Epsom
Auckland 1023

Project
SL 1
HOUCHENS DEVELOPMENT

Title
PROPOSED ULTIMATE DECENTRALISED WATER SUPPLY PLAN

Project no.	180014
Scale	1:5000 @ A3
Cad file	180014 100- MASTER CONCEPT PLAN.DWG
Drawing no.	C106-6
Rev	A

PRELIMINARY

DATE: 18/12/25 FILE PATH: F:\Maven\PROJECTS\180014-SL1\OHAUPO\DWG\180014-100-MASTER CONCEPT PLAN.DWG

Appendix B – Engineering Calculations

 Maven Associates		Job Number 180014	Sheet 1	Rev A												
Job Title SL1 HOUCHENS Calc Title OPTION 1A - WW Demand Calc	Author KH	Date 2/09/2025	Checked RW													
As per Waikato Local Authority RITS standards Domestic Average Daily Flow (Water Consumption)= 200 l/person/day Infiltration Allowance= 2,250 l/Ha/day Surface Water Ingress= 16,500 l/Ha/day																
Refer to C450-1 for catchment details No. of residential dwellings = 900 Catchment area = 35 Ha Population Equivalent as per Table 5-3= 45 person per Ha Light industrial area= 9 Ha Population Equivalent as per Table 5-3= 45 person per Ha Total Population 1944 Wastewater Peaking factor as per Table 5-2= 2.9																
Using a pupolation value person (max development scenario) Average Daily Flow (ADF)= 486.00 m³/day Peak Daily Flow (PDF)= 14.18 L/sec Peak Wet Weather Flow (PWWF)= 22.43 L/sec																
Pipe Ks (uPVC) = 0.60 <table border="1" style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th style="text-align: left;">PWW Flow l/s</th> <th style="text-align: left;">Pipe dia m</th> <th style="text-align: left;">Gradient %</th> <th style="text-align: left;">Capacity l/s</th> <th style="text-align: left;">Velocity m/s</th> <th style="text-align: left;">Check OK</th> </tr> </thead> <tbody> <tr> <td>22.425</td> <td>0.225</td> <td>1.00</td> <td>52.44</td> <td>1.32</td> <td>OK</td> </tr> </tbody> </table>					PWW Flow l/s	Pipe dia m	Gradient %	Capacity l/s	Velocity m/s	Check OK	22.425	0.225	1.00	52.44	1.32	OK
PWW Flow l/s	Pipe dia m	Gradient %	Capacity l/s	Velocity m/s	Check OK											
22.425	0.225	1.00	52.44	1.32	OK											

 Maven Associates		Job Number 180014	Sheet 1	Rev A												
Job Title SL1 HOUCHEMS Calc Title OPTION 1B - WW Demand Calc	Author KH	Date 2/09/2025	Checked RW													
As per Waikato Local Authority RITS standards Domestic Average Daily Flow (Water Consumption)= 200 l/person/day Infiltration Allowance= 2,250 l/Ha/day Surface Water Ingress= 16,500 l/Ha/day																
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PWW Flow l/s	Pipe dia m	Gradient %	Capacity l/s	Velocity m/s	Check OK											
22.891	0.225	1.00	52.44	1.32	OK											

 Maven Associates		Job Number 180014	Sheet 1	Rev A												
Job Title Calc Title	SL1 HOUCHENS Ultimate- WW Demand Calc	Author KH	Date 2/09/2025	Checked RW												
As per Waikato Local Authority RITS standards Domestic Average Daily Flow (Water Consumption)= 200 l/person/day Infiltration Allowance= 2,250 l/Ha/day Surface Water Ingress= 16,500 l/Ha/day																
Refer to C450-1 for catchment details No. of residential dwellings = 1700 Catchment area = 85 Ha Population Equivalent as per Table 5-3= 45 person per Ha Light industrial area= 25 Ha Population Equivalent as per Table 5-3= 45 person per Ha Total Population 4950 Wastewater Peaking factor as per Table 5-2= 2.6 Using a pupolation value person (max development scenario) Average Daily Flow (ADF)= 1237.50 m³/day Peak Daily Flow (PDF)= 32.66 L/sec Peak Wet Weather Flow (PWWF)= 53.66 L/sec																
Pipe Ks (uPVC) = 0.60 <table border="1"> <thead> <tr> <th>PWW Flow l/s</th> <th>Pipe dia m</th> <th>Gradient %</th> <th>Capacity l/s</th> <th>Velocity m/s</th> <th>Check OK</th> </tr> </thead> <tbody> <tr> <td>53.663</td> <td>0.3</td> <td>0.50</td> <td>79.13</td> <td>1.12</td> <td>OK</td> </tr> </tbody> </table>					PWW Flow l/s	Pipe dia m	Gradient %	Capacity l/s	Velocity m/s	Check OK	53.663	0.3	0.50	79.13	1.12	OK
PWW Flow l/s	Pipe dia m	Gradient %	Capacity l/s	Velocity m/s	Check OK											
53.663	0.3	0.50	79.13	1.12	OK											

Job Title	SL1 HOUCHENS DEVELOPMENT	Author	Date	Checked
Calc Title	STAGE 1B - Water Demand	KH	2/09/2025	RW

Water Catchment

As per RITS Standard 6.2.3

Demand

2.7 people per dwelling

260 l/person/day

Demand Rates

Average Demand =

260 litres/person/day

Peak Demand (5x) =

1300 litres/person/day

Population

Proposed Dwellings

Dwellings

945

People

2.7

Occupancy

2551.5

Total

2551.5

Demand

AD Water

PD Water

Persons

2551.5

2551.5

Rate l/p/day

260

1300

Flow l/s

7.68

38.39

Peak Demand

PD Water

Persons

2551.5

Rate l/p/day

1300

Flow l/s

38.39

Appendix C – Stormwater Management Plan Addendum

SOUTHERN LINKS 1 – HOUCHENS DEVELOPMENT CATCHMENT

ADDENDUM TO STORMWATER MANAGEMENT PLAN

PROJECT INFORMATION

CLIENT	Chinamans Hill Ltd & Ohaupo Land Limited Partnership
PROJECT	180014

DOCUMENT CONTROL

DATE OF ISSUE	11/12/2025
REVISION	A
AUTHOR	s 9(2)(a) Senior Civil Engineer
REVIEWED BY	s 9(2)(a) Associate
APPROVED BY	s 9(2)(a) Associate

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1. Introduction

1.1. Background

Maven Associates (Maven) has been engaged to explore the feasibility of land development for residential and industrial use within the wider Southern Links area (SL1). During this process, Maven has developed a high-level overarching Stormwater Management Plan (SMP) that supports the intended consenting of the SL1 area and provides the framework for future stormwater management plans. The SL1 Houchens Catchment is a 141.6Ha portion located within the south of the wider SL1 area. This catchment has been assessed in relation to stormwater management options and mitigation requirements outlined in the draft Integrated Catchment Management Plan (ICMP) for the Mangakootukutuku Catchment.

The SL1 Houchens Development is a combined residential and industrial development that comprises circa 141.6 hectares, which will be split into a mix of residential densities and industrial development. The residential component comprises circa 55ha of net residential, including 1,300 residential units of varying typologies (including single detached, duplex, terraced apartment), a 400-unit retirement village, along with two supporting mixed-use neighbourhood centres, open spaces, waterbodies and infrastructure devices including wetlands. The SL1 Houchens Development also includes a net 25ha of industrial, generating between 24 – 47 industrial sized lots for industrial activities.

The purpose of this addendum memo is to present a high-level stormwater design for the SL1 Houchens Catchment and to demonstrate that the proposed approach aligns with the overarching SMP developed by Maven for the wider SL1 area.

The calculations and assessments contained within this memo are based on desktop analysis and are preliminary in nature, reflecting the information available at the time of issue. The layout and design will be subject to refinement as the masterplan evolves, and as input from other specialists and site-specific constraints are considered. The final stormwater layout and design parameters will be confirmed at the substantive resource consent lodgement stage.

Please refer to the engineering drawings contained within the infrastructure report for further details of the stormwater layout.

1.2. Objectives

As part of the structure plan process, an overarching SMP has been developed for SL1. The SMP sets out the high-level, best practice approach to stormwater management within the receiving catchment.

The strategy for the future stormwater management is outcome focused. The SMP provides a solution-based approach for the receiving environment. Consideration and emphasis are given to the inclusion of Water Sensitive Urban Design principles, with the overall goal of developing environmentally conscious outcomes which help address and mitigate known and future constraints of SL1.

Proposed objectives of the SMP are outlined below:

- Consideration of future public networks required in support of SL1. The report confirms discharge location and provides a design methodology which will guide future development of the area.
- Existing waterways are identified and investigated. Parameters are set which will ensure protection of existing waterway environments in future development.
- Existing overland flow paths identified and investigated. Design parameters are set which will ensure existing overland flow paths are allowed for in future development up to and for the 100-yr event.
- Existing flood hazards investigated, mapped, and summarised. Flood mitigation strategies are developed for each of the catchments. This framework will enable the development of the structure plan areas and will guide future development controls.
- The SMP provides an option-based assessment for water quality treatment in support of the future development of SL1. A review of the relevant statutory framework is undertaken before a high-level strategy is provided for the catchments.
- The consideration and requirement for extended detention in support of the future development of SL1 to avoid any downstream flooding, erosion and scouring. Indicative flood mitigation options are developed for the catchments and receiving environments.
- Confirming the need for the attenuation of peak flow, decreasing stream bed erosion during storm events up to and including the 100-yr events. Attenuation forms part of the overall stormwater management toolbox, and solutions are considered (both at-source and catchment wide) for SL1.
- On-site retention (volume reduction) to ensure pre-development runoff rates and volumes are maintained within catchments and streams. Existing streams are located within SL1, and it is important to maintain the underlying base flows of water into the streams to avoid any effects on stream biodiversity.
- The urbanisation of SL1 presents an opportunity to provide significant ecological improvements through the protection and planting of riparian margins. Recommendations are made to guide future change application(s) to ensure positive environmental outcomes are achieved.
- Groundwater recharge would be required for the area within peatland preventing dewatering and excessive ground settlement.
- Information gaps which require further investigation and/or detailed design are identified.

The overall SMP creates a stormwater toolkit, which will guide future development of SL1. The toolkit will promote sustainable solutions, including the integration of Water Sensitive Urban Design ('WSUD') principles in future land use planning.

1.3. Stormwater Management Plan

Maven has developed the overarching SMP which takes into account all of the relevant statutory policy for this SL1. Based on this SMP the proposed stormwater management requirement which applies to the SL1 are:

Stormwater Mitigation Requirement for Southern Link Area		
	Catchment wide	Peat area
Water Quality	Use treatment train with two more treatment devices in series. Water quality to achieve Regional Infrastructure Technical Specifications (RITS) and Technical Report 2020/07 (TR20/07) requirements	Treatment at source with water quality treatment in series with recharge pit
Initial abstraction	• 10mm on lot via reused tank • 10mm via communal bioretention devices	• 10mm on lot via recharge pit • 10mm via bioretention devices and recharge pits
Extended detention	√	√
2 years mitigation back to pre-development	√	√
10 years mitigation back to pre-development	√	√
100 years mitigation back to 80% of pre-development	√	√

The overarching SMP that Maven has prepared for the SL1 is an evolving document which has potential minor modifications until it is approved and adopted by the Waikato Regional Council.

The stormwater management strategy of SL1 Houchens Road has been developed based on the requirements as shown above and how compliance with these requirements are achieved will be explained further in chapter below.

2. Stormwater

Existing stormwater infrastructure within SL1 Houchens is limited to farm/roadside drains and streams. Development of SL1 Houchens will be supported by new public stormwater networks. The future public networks would be constructed by developers, will be subject to Resource Consent and Engineering Approval before being vested to Hamilton City Council, post construction. Where possible, the network will be designed and constructed within public roads.

2.1. Stormwater Reticulation

The primary reticulated network will be sized to convey the peak discharge for rainfall events up to and including 10-year_(cc) ARI to the identified point of discharge. Calculations would need to be provided to Hamilton City Council in support of the detailed design of the new public network at Resource Consent and Engineering Approval stages. The future networks will need to demonstrate compliance with the Hamilton City Council standards for Subdivision and Land Development.

There is no overland flow predicted for the 10-year _(cc) ARI event. During the 100-year _(cc) event the stormwater runoff will be conveyed by overland flow paths ('OLFP') within the proposed development, which will follow the road reserves (where possible) which in turn discharge into the existing watercourses and/or catchment detention solutions contained within SL1 Houchens.

2.2. Stormwater Quality Mitigation

The stormwater quality treatment requirements for the SL1 catchment have been stipulated in the draft Mangakootukutuku ICMP and subsequently adopted by Maven's overarching SL1 Stormwater Management Plan (SMP). The preferred approach is a catchment-wide treatment train system, where a communal bioretention device is located upstream of an artificial wetland. This configuration provides a level of water quality treatment that exceeds the standards outlined in TR20/07 and RITS, while also minimising long-term maintenance costs.

The SL1 Houchens development follows this design philosophy. The master plan has allocated sufficient space to accommodate these communal stormwater treatment devices, providing a catchment-wide water quality solution. A communal raingarden is proposed and has been sized at 0.5% of the contributing catchment, while proposed wetlands have been sized at minimum 4% of the catchment area. Please refer to Figure 1 below for more information.



Figure 1: Example of artificial wetland and communal raingarden within SL1 development area

In addition to these communal systems, at-source stormwater quality controls have been incorporated into the SL1 Houchen development design. These include the use of inert roofing materials for all future buildings, permeable paving where practicable, and riparian planting to enhance water quality and protect existing vegetation within the catchment.

A differing approach is required in areas underlain by peat soils, as noted in the Maven's Infrastructure Report. Peat soils are highly sensitive to changes in groundwater levels—when not recharged regularly, they can experience significant settlement, compromising land stability. Therefore, groundwater recharge is considered best practice in these areas and must be implemented comprehensively to ensure uniform recharge distribution. This requirement has been factored into Maven's SL1 SMP and directly informs the stormwater quality treatment approach for peat soil zones.

Within these peat areas, stormwater will be treated at source via bioretention devices before being discharged into recharge pits placed at regular intervals. This approach is in line with Waikato Regional Council (WRC) guidelines, as it provides additional treatment prior to infiltration, reduces sediment loading, and prolongs the operational life of the recharge pits. These bioretention devices are generally sized to capture the 10 mm initial abstraction volume, with flows exceeding this directed into the public stormwater network for conveyance to the catchment-wide treatment and detention facilities.

For residential and industrial lots within peat zones, stormwater from impervious surfaces will need to be captured and directed to on-site recharge pits. In residential areas, where inert roofing materials are used, runoff from roofs and driveways will have low contaminant concentrations, and TR20/07 recognises that recharge pits provide sufficient treatment for this runoff. Please refer to the Figure 2 below for the general arrangements of stormwater treatment and recharge for peat area.

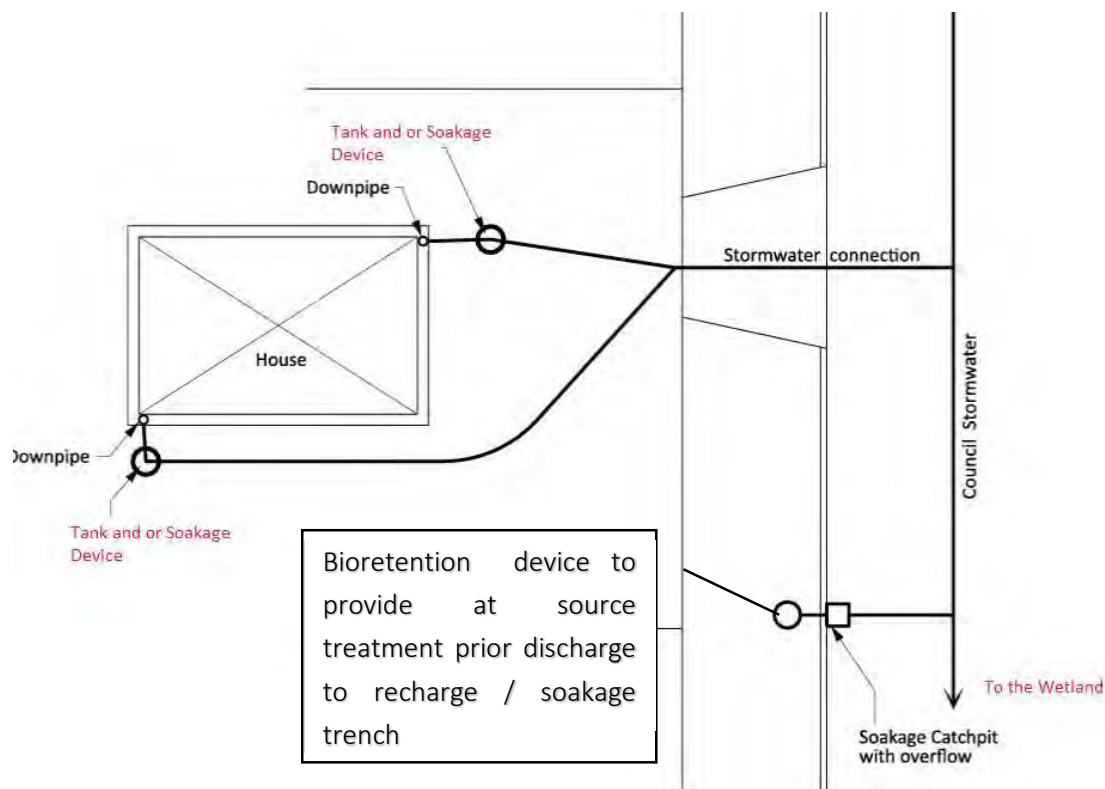


Figure 2: Example of general at-source stormwater mitigation devices for the SL1 area

For light industrial areas, multiple recharge pits will be required due to larger catchment scales. Runoff from inert roofs may be conveyed directly to recharge pits; however, runoff from driveways and operational areas will have higher contaminant loads and should undergo pre-treatment before discharge to the recharge pits.

2.3. Stormwater Quantity Mitigation

The SL1 Houchens development is located upstream of the Hamilton Township, an area that is particularly sensitive to any increase in stormwater runoff. The draft Mangakootukutuku ICMF

stipulates that hydraulic mitigation is required for developments within this catchment, ensuring that post-development peak runoff rates do not exceed pre-development levels, with the exception of the 1% Annual Exceedance Probability (AEP) event. For this critical event, the peak runoff must be mitigated to no more than 80% of the pre-development peak flow.

The overarching SL1 SMP proposes a catchment-wide hydraulic mitigation strategy, achieved either through the construction of an artificial wetland system or a combination of artificial wetlands and stream enhancement to provide additional storage capacity.

This strategy has been adopted for the SL1 Houchens area, where a catchment-wide wetlands are proposed at the lowest point of the catchment. The wetlands are designed to provide both stormwater quality treatment and hydrological mitigation for smaller rainfall events, including the water quality rainfall event, extended detention, and 2-year and 10-year return period events.

For the 100-year rainfall event, flood storage and mitigation will be achieved through a combination of stream improvements, enhanced conveyance channels, and the artificial wetland system, together forming a comprehensive catchment-wide solution that manages both stormwater quality and quantity.

2.4. Flood Mitigation

Maven has undertaken high-level flood modelling to support the master plan development, which has confirmed the extent and location of flooding and overland flow paths within the SL1 area. Detailed flood modelling specific to the SL1 Houchens catchment is currently being carried out to verify existing flood extents and assess potential impacts under the fully developed scenario. The results will inform the design of appropriate engineering interventions to mitigate any adverse flooding effects arising from the development.

2.4.1. Existing Flooding within SL1 Houchens

SL1 Houchens is located in the southern catchment of the wider SL1 area. The upstream catchment of SL1 Houchens is approximately 347 ha with mostly low lying paddocks. Given how flat it is within this catchment, there is extensive flooding which is concentrated in the low lying areas and where the farm drain is located. At the north western extent of the SL1 Houchens area, Houchens Road is constructed higher than the surrounding area. This created a man made dam to hold back the flood water from upstream of the site and slowly released it downstream toward the Hamilton City extent.

Also important to note that within the SL1 Houchens area extent there used to be a large man made pond which is recognised by the ICMP as providing some level of flood mitigation. The dam that created this pond failed in 2024 and Waipa District Council has repaired and reinstated the watercourse within this area. Currently there is a triple 1.25m diameter culvert that convey the flow through this section of the site and there is an existing twin barrel 1.25m diameter culvert draining the water away from this existing pond. As such the storage capacity of this pond has been reduced significantly and the flow is now concentrated at the downstream.

The catchment specific flood modelling reaffirms this existing condition where the flooding is mainly concentrated at the downstream of the site just in front of Houchens Road. Please refer to Figure 3 below for more information.

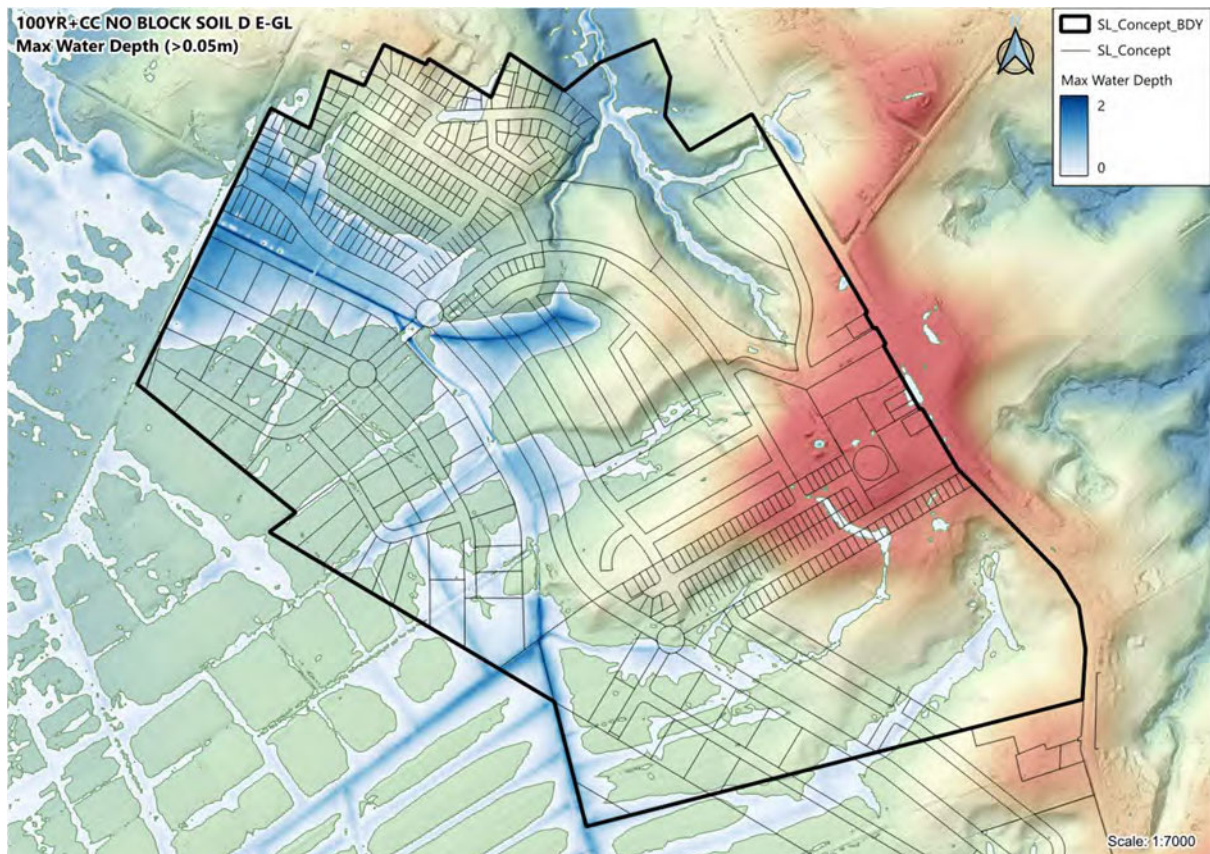


Figure 3: High Level Flood Modelling for the SL1 Houchens area (100yr+cc predevelopment)

2.4.2 Proposed Flood Mitigation

As part of the proposed site development, the existing natural floodplain will be reconfigured to direct stormwater flows toward a proposed conveyance channel and artificial wetland system. The final layout and sizing of these devices will be refined during the detailed design stage to ensure that adequate flood storage is retained and that downstream discharge does not exceed the allowable threshold, with outflows throttled to 80% of pre-development levels, as stipulated in the draft Mangakootukutuku ICMP.

As outlined in the overarching SL1 SMP, there is an opportunity to modify and enhance the existing watercourse to provide additional storage and conveyance capacity, supporting more effective management of stormwater flows across the site. The SL1 Houchens catchment receives runoff from a large upstream area, and Hamilton City Council requires that new stormwater conveyance channels be designed to accommodate the 1% AEP flood event under Representative Concentration Pathway 8.5 (RCP 8.5) climate change conditions.

The upstream catchment consists predominantly of rural farmland, with limited development anticipated apart from a small portion within the SL1 boundary. Accordingly, the design basis for the proposed conveyance channel will provide capacity for 80% of pre-development runoff from within the site, as required by the ICMP, and 100% of existing plus RCP 8.5-adjusted flows from upstream. As upstream areas undergo future development, the capacity of the conveyance channel will increase over time to maintain compliance with the overall stormwater management strategy.

2.5. Flood Modelling

In contrast to the wider SL1 area, flood modelling for the SL1 Houchens catchment has been undertaken using TUFLOW rather than HEC-RAS. The results from this model have been calibrated against the original HEC-RAS model developed for the wider SL1 area to ensure consistency in hydraulic behaviour and flood extents.

A post-development analysis has been carried out to verify the high-level stormwater design for the proposed development and to confirm that no adverse impacts are expected on the downstream environment. Further refinement of this flood model will be undertaken at the substantive consent stage to demonstrate compliance and validate that the proposed development does not adversely affect the receiving environment.

2.6. Minimum Floor Levels

Floor level requirements in relation to floodplains will be set through the approved consent conditions or at building consent stage to comply with building code. Minimum floor levels (freeboard) over the 100-yr flood level will be required for all habitable buildings in accordance with the recommendations provided below:

TABLE 7: MINIMUM FREEBOARD REQUIREMENTS

Freeboard	Minimum Height
Vulnerable Activities	500mm
Less Vulnerable Activities	300mm

* *Vulnerable activities defined as residential activities*

* *Less vulnerable activities defined as commerce, industry, and rural activities*

All future freeboard clearances shall be in accordance with the criteria stipulated above and would need to demonstrate compliance with Building Code E1 – Surface Water as required.

2.7. Overland Flow Paths – Best Practical Option

The best practical option to mitigate OLFP effects is as follows:

- Retention of natural OLFPs where possible (and practical). Emphasis is provided on the OLFPs which correlate to existing farm drains, intermittent or permanent streams within SL1.
- Maintaining the flow of OLFPs up to and for the 100yr cc ARI rainfall event under the maximum probable development scenario.
- OLFPs are to be designed where possible within the roading network and discharge into the stormwater devices or existing watercourses (green corridors).
- Minimum freeboards for habitable buildings to be provided as per below:
 - 500mm freeboard for OLFP flow rates above 2m³/s.
 - 500mm freeboard for OLFP less than 2m³/s with average flow depths of 100mm when inundation is against the building.
 - 150mm freeboard for OLFP less 2m³/s

- Resource Consents will require the provision of a depth-velocity assessment to indicate that the hazards associated with OLFPs within the road reserves are minor, with safe passage of vehicles and pedestrians within the road reserve in accordance with best practice guidelines.

2.8. Deviation from Overarching SL1 Stormwater Management Plan

The current overarching SL1 SMP is a work in progress and has not yet been approved or adopted by Waikato Regional Council. Consequently, there is scope for updates and changes to the requirements, and there may be areas within SL1 where the proposed design does not fully align with the overarching SMP due to specific site constraints.

For the SL1 Houchens area, one deviation has been identified, as outlined below:

Catchment Draining toward Dixon Road

Within the development area, there is a small catchment of approximately 24.6 ha that drains toward Dixon Road. This catchment features mostly steep, rolling terrain with a permanent stream and natural wetlands located in the low-lying areas, along with fragmented sub-catchments. Given these existing natural features, it is not feasible to provide a catchment-wide stormwater solution. For this specific catchment, the post-development catchment has been reduced sufficiently to achieve 80% of pre-development flow rates without the provision of large-scale catchment stormwater mitigation devices. However, stormwater quality treatment and initial abstraction mitigation will still be required for this catchment in accordance with the relevant guidelines.

2.9. Proposed Catchment Wide Stormwater Mitigation Devices

Within the main stormwater catchment, three catchment-wide stormwater devices are proposed. These devices include a communal raingarden, sized to approximately 0.5% of the catchment area. This design ensures that the first flush from any rainfall event is captured and treated by the communal raingarden, isolating the bulk of contaminants within this device. The raingarden is designed to treat the first 10 mm of runoff as well as the initial abstraction component from the roading network. Runoff volumes exceeding this capacity will bypass the raingarden and flow toward the artificial wetland for further treatment and attenuation.

The wetland has been sized based on TR20/07 guidelines, equivalent to 4% of the catchment area, to provide further water quality treatment and stormwater attenuation. The wetland is designed to manage extended detention events, as well as 2-year and 10-year storm events, reducing post-development peak flows back toward pre-development levels. The wetland outlet is set based on the 2-year water level within the conveyance channel, ensuring that water can drain effectively from the wetland during all rainfall events.

Given the scale of the upstream catchment and the areas unique constraint where flood water is regulated through Houchens Road. A southern dry basin has been proposed and designed to provide some assistance to flood mitigation for this development. This device is currently located to the south of the Southern Link designation and the prime duty is to regulate the flood flow from upstream if required. This will provide benefit to the land holders and NZTA as it will throttle the incoming flows passing through the designation into the site. The need and size of this device will be finalised at the substantive stage, where detail flood modelling for this development will be finalised.

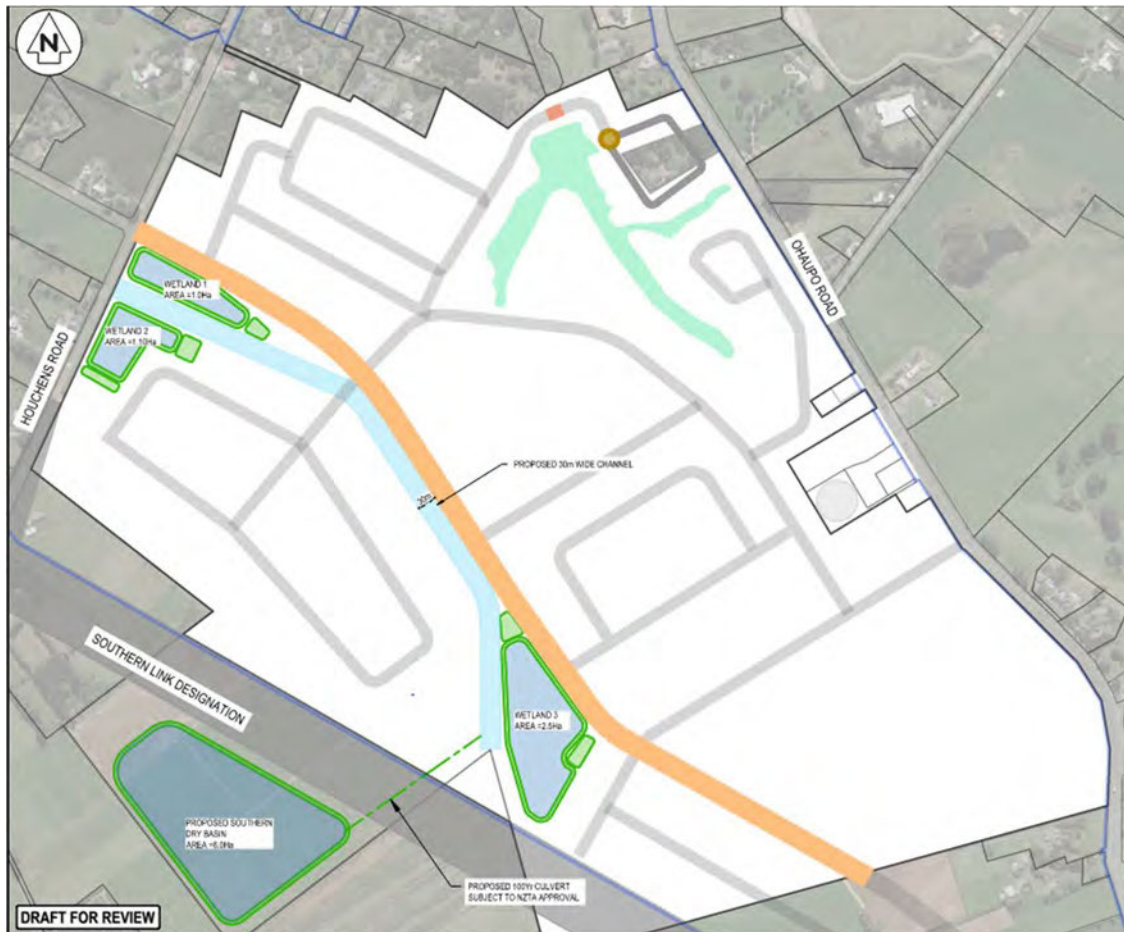


Figure 4: High level proposed stormwater mitigation devices for the SL1 Houchens

3. Green Corridors

Green corridors will be provided within SL1 Houchens, following the primary tributaries identified within the area. These corridors would support existing and proposed wetlands and detention basins and assist in providing flood storage, attenuation, and conveyance of overland flows.

The corridors would be protected from development and planted to deliver ecological and water quality benefits. Watercourses within these corridors will be mapped as part of future resource consent applications, with controls in place to retain these areas and require applicants to undertake riparian planting.

4. Conclusions

This Addendum demonstrates that the SL1 Houchens catchment has been designed in alignment with the overarching SMP for the wider SL1 area. The strategy reflects relevant Waikato Regional Council statutory requirements and provides a robust framework for future resource consent applications.

A treatment train approach—comprising forebay, raingarden, and wetland systems—has been adopted to provide both water quality and hydrological mitigation. Artificial wetlands have been sized to 4 % of their contributing catchment, ensuring extended detention and flood attenuation. Overland flow paths and existing stream corridors will be retained and enhanced to improve conveyance and ecological outcomes.

Groundwater recharge measures will be implemented throughout peat soil areas to maintain groundwater neutrality, avoid dewatering effects, and reduce settlement risk. Public stormwater networks will be designed to convey at least the 10-year ARI event in accordance with Hamilton City Council's Code of Practice.

Stormwater attenuation will ensure peak discharge rates are limited to 80 % of pre-development flows up to the 100-year ARI event, protecting downstream environments. Stream enhancement works—including deepening and widening—will support conveyance and storage capacity.

Hydraulic modelling using HEC-HMS and TUFLOW will be further refined at the substantive design stage to confirm attenuation performance and downstream impacts. Development within flood-affected areas will be constrained to maintain storage volume and provide adequate freeboard for all habitable buildings.

Overall, this strategy provides a technically feasible and regulatory-aligned stormwater solution that enables development of the SL1 Houchens catchment while managing flood risk, protecting downstream environments, and ensuring long-term performance in sensitive peat soil areas.