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# SITE SUITABILITY TECHNICAL REVIEW TO SUPPORT REZONING APPLICATION


LAND OFF SETTLERS WAY,  
LOT 2 DP 336924, OKAIHAU

IAN RAY CARR

**C0697N-TR-01**  
**SEPTEMBER 2025**  
**REVISION 1**



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## 1 INTRODUCTION

This Site Suitability Technical Review has been prepared by Geologix Consulting Engineers Ltd (Geologix) for Ian Ray Carr as our Client in accordance with our standard short form agreement and general terms and conditions of engagement.

Our scope of works has been undertaken to assist with an application to rezone part of a property, Lot 2 DP336924 off Settlers Way, Okaihau, the 'site', from Rural Production to Settlement zone as set out in the Far North Proposed District Plan.

Specifically, this assessment addresses engineering elements of wastewater, stormwater, potable water and firefighting.

### 1.1 Proposal

A proposed scheme plan was presented to Geologix at the time of writing, prepared by Thomson Survey<sup>1</sup> and included within Appendix A. It is understood the Client proposes to subdivide the site to create three lots. Lot 1 is currently zoned Residential and Lots 2 and 3 are zoned Rural Production.

It is proposed to rezone the proposed Lot 3 to Settlement zone as set out in the Far North Proposed District Plan.

The above is outlined in Table 1. Amendments to the referenced scheme plan may require an update to the recommendations of this assessment which are based on conservative, typical rural residential development concepts.

*Table 1: Summary of Proposed Scheme*

Proposed Lots	Size Range	Purpose
Lot 1	1.435 ha	Residential zone
Lot 2	4.130 ha	Rural Production zone
Lot 3	4.001 ha	Proposed Settlement zone

## 2 DESKTOP APPRAISAL

The site is located to the northern side of Settlers Way on the outskirts of the town centre. Topographically, the proposed Lot 3 is relatively flat for approximately 100m from the road, gently sloping to the north for another approximately 50m into the site before becoming very steep on the side of a deep gully along the northern end of the proposed Lot.

The site contains an area of dense mature bush at the south-eastern corner of the proposed Lot 3 which extends approximately 100m into the site. This is proposed to be subject to a bush protection covenant upon subdivision.

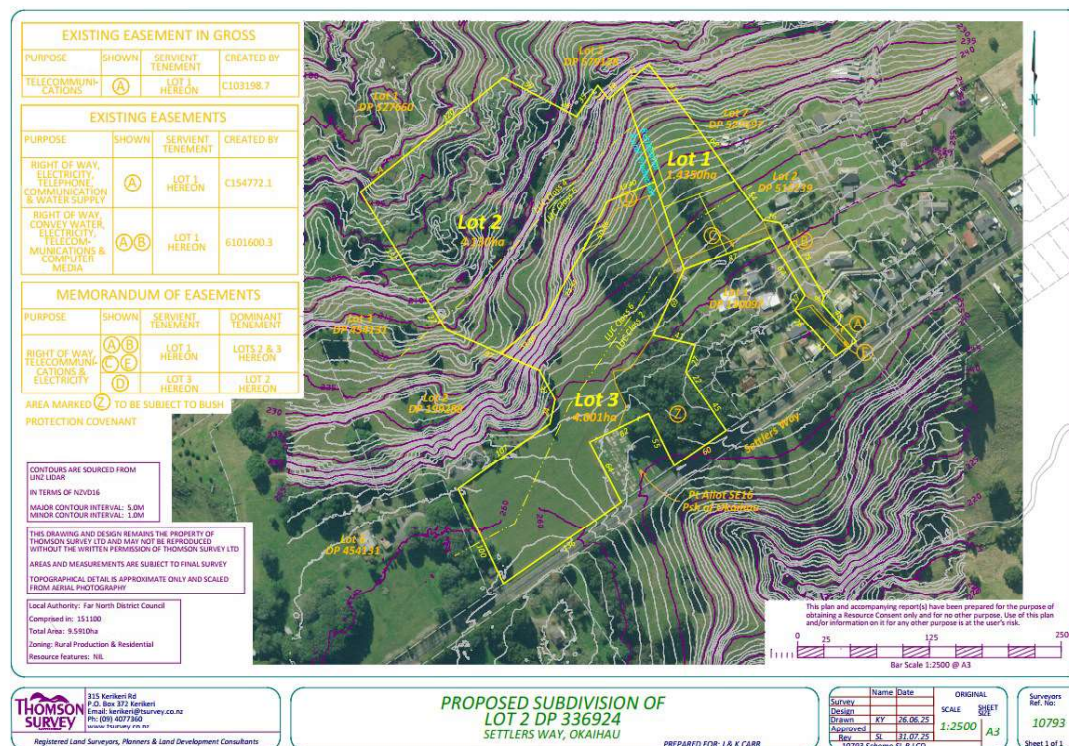
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<sup>1</sup> Proposed Subdivision of Lot 2 DP 336924 Ref. 10793, dated July 2025.

A line of trees extends north of the bush area while the remainder of the site is in pasture.

The proposed Scheme plan is shown in Figure 1 below.

Figure 1: Scheme Plan



## 2.1 Existing Reticulated Networks

Far North District Council (FNDC) GIS mapping indicates that no existing 3 water infrastructure or reticulated networks are present within Settlers Way outside of the proposed Lot 3.

There is an existing water main extending from the town centre to the south-eastern corner of the proposed Lot 3, by the bush area but it is not currently available for use for Lot 3.

It is not proposed to extend the water main, instead this assessment has been prepared with the goal of the subdivision being self-sufficient for the purpose of wastewater, stormwater, and potable water management.

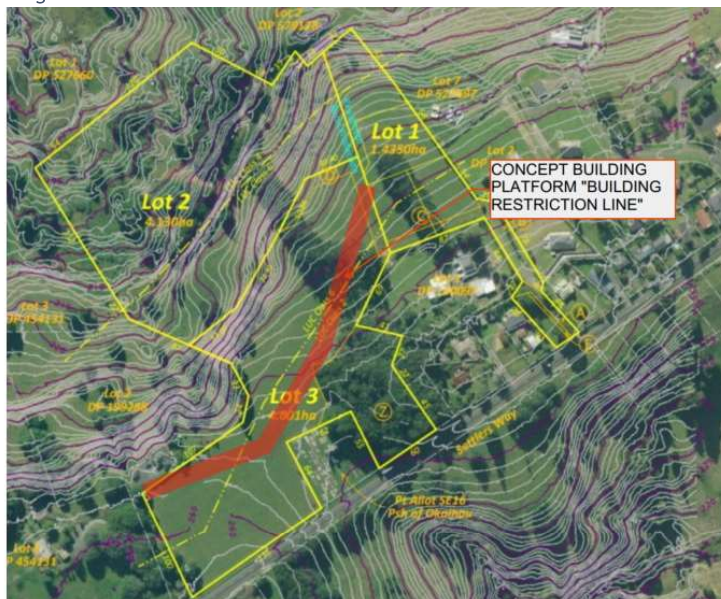
## 2.2 Geotechnical Suitability

Geotechnical investigations and assessment are required to be carried out as part of resource consent application to determine a building restriction to the east of the crest of the steeply sloped ground which falls to the northwest, to provide recommendations for foundations, and required to recommend areas not suitable for the proposed development.



Based on a desktop study of the geological units on the site and the available contours, the concept building restriction line would likely fall midway between the Lot 1 DP 130097 boundary, the cemetery boundary and the crest of the steep slope, at this stage it is considered reasonably placed at 3 Horizontal :1 Vertical grade back from the toe of the steeper sections of the site to where the projected grade daylights at ground level. The concept building restriction line is aligned generally in a southwest to northeast direction. See Figure 2 below:

Figure 2: Concept building restriction line



Once the geotechnical investigations are completed this set back is required to be refined according to the outcomes of a geotechnical stability assessment. Proposed building platforms to the south and east of this line will include minimal stabilisation recommendations to be considered suitable for the proposed development. If any building platforms to the west of this boundary will be coupled with recommendations for further assessment and stabilisation measures which may be considered for feasibility for the type of development proposed.

### 3 WASTEWATER ASSESSMENT

This wastewater assessment presents a concept design for wastewater disposal for a probable future rural residential development. Relevant design guideline documents adopted include:

- Auckland Council, Technical Publication 58, On-site Wastewater Systems: Design and Management Manual, 2004.
- NZS1547:2012, On-site Domestic Wastewater Management.

The concept rural residential development presented within this assessment assumes that proposed new developments may comprise up to a five-bedroom dwelling with a peak occupancy of eight people<sup>2</sup>. This considers the uncertainty of potential future Building Consent designs. The number of usable bedrooms within a residential dwelling must consider that proposed offices, studies, gyms or other similar spaces may be considered a potential bedroom by the Consent Authority.

### 3.1 Existing Wastewater Systems

No existing wastewater treatment or disposal systems have been identified or surveyed within the site boundaries.

### 3.2 Wastewater Generation Volume

In lieu of potable water infrastructure servicing the site, roof rainwater collection within on-lot tanks has been assumed for this assessment. The design water volume for roof water tank supply is estimated at 160 litres/ person/ day<sup>3</sup>. This assumes standard water saving fixtures<sup>4</sup> being installed within the proposed future developments. This should be reviewed for each proposed development at the Building Consent stage.

For the concept wastewater design this provides a total daily wastewater generation of 1,280litres/ day per proposed lot.

### 3.3 Treatment System

Selection of a wastewater treatment system will be provided by future developers at Building Consent stage. This will be a function of a refined design peak occupancy.

It is recommended within the concept solution provided that to meet suitable minimum treated effluent output, secondary treatment systems are accounted for across the site. The concept solution is detailed further in the following sections.

In the Building Consent design phase, a higher treated effluent output standard such as UV disinfection to tertiary quality may be required should specifically controlled zones be encroached upon. Moreover, a primary treatment solution may also be considered for the Lot development, provided that the system complies with the proposed Northland Regional Plan. Specifically, controlling rules include:

- Rule C.6.1.3 (6), discharge of wastewater from primary systems is to slopes less than 10°.
- Rule C.6.1.3 (9.a), 100 % reserve disposal area where the wastewater has received primary treatment.

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<sup>2</sup> TP58 Table 6.1.

<sup>3</sup> TP58 Table 6.2, AS/ NZS 1547:2012 Table H3.

<sup>4</sup> Low water consumption dishwashers and no garbage grinders.



- Table 9, exclusion areas and setback distances for primary treated domestic type wastewater.

No specific treatment system design restrictions and manufacturers are currently in place. However, the developer will be required to specify the treatment system proposed at Building Consent.

### 3.4 Land Disposal System

To provide even distribution, evapotranspiration assistance and to minimise effluent runoff it is recommended that treated effluent is conveyed to land disposal via Pressure Compensating Dripper Irrigation (PCDI) systems, a commonplace method of wastewater disposal.

The proposed PCDI systems may be surface laid and covered with minimum 150 mm mulch and planted with specific evapotranspiration species with a minimum of 80 % species canopy cover or subsurface laid to topsoil with minimum 200 mm thickness and planted with lawn grass. Site-won topsoil during development from building and/ or driveways footprints may be used in the area of land disposal systems to increase minimum thicknesses.

Specific requirements of the land disposal system include the following which have been considered for this assessment.

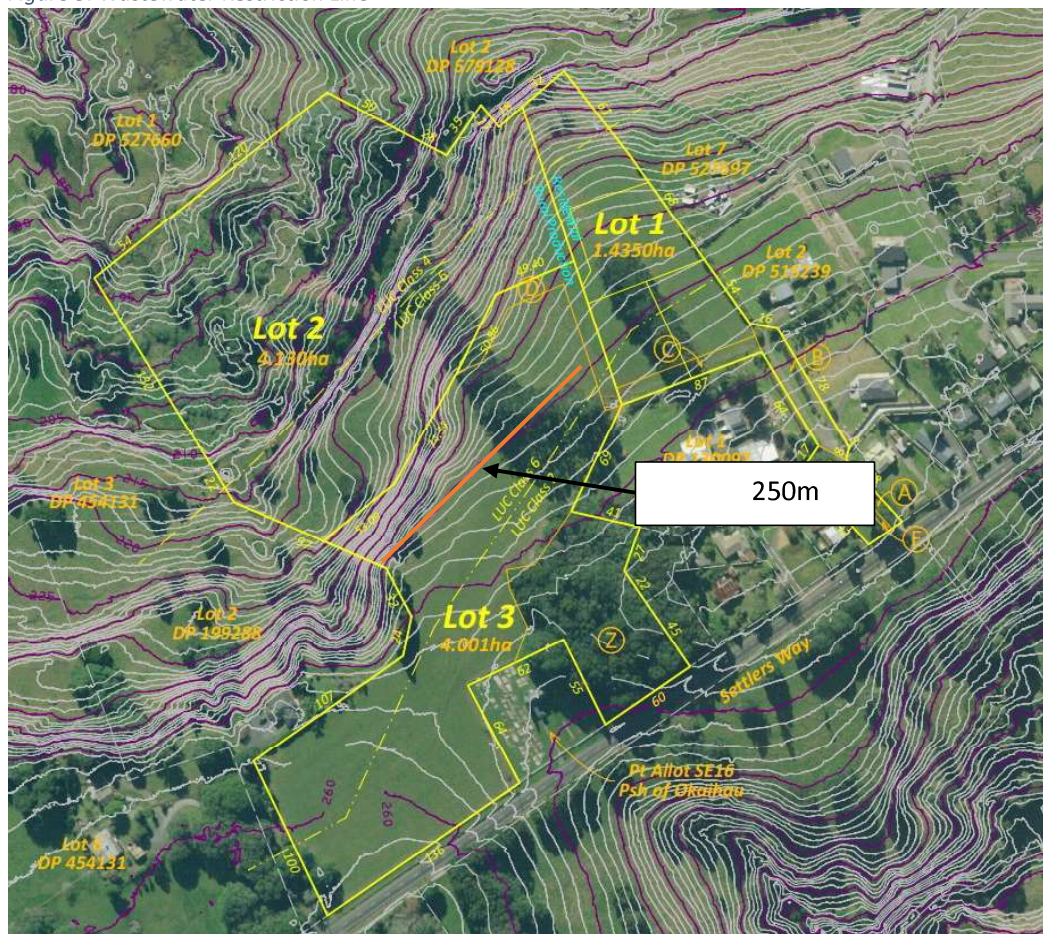
Topography at the disposal areas shall not exceed 25°. Exceedances will require a Discharge Consent.

On shallower slopes <25° and >10°, compliance with the Northland Regional Plan (NRP) rule C.6.1.3(6) is required, with wastewater receiving at least secondary treatment, a diversion system being installed and maintained to divert surface water runoff from the up-slope catchment away from the disposal area, and a minimum 10 metre buffer area down-slope of the lowest irrigation line being included as part of the disposal area.

From the available contour information, most of the proposed Lot 3 is flatter than 10° with the exception of the area of the steep gully along the north-western boundary with the proposed Lot 2. The 250m contour line approximately represents the transition to steeply sloping ground. This is indicated in the figure below.



Figure 3: Wastewater Restriction Line



### 3.4.1 Soil Loading Rate

Conservatively, the shallow soils are assumed to meet the drainage characteristics of TP58 Category 6, sandy clay, non-swelling clay and silty clay – slowly draining. This correlates to NZS1547 Category 5, poorly drained described as light clays. For a typical PCDI system, a soil loading rate of 3 mm/ day is recommended within NZS1547 Table 5.2 and TP58 Table 9.2.

To achieve the above SLR, technical guidance documents require the following compliance within the final design.

- 100 to 150 mm minimum depth of good quality topsoil (NZS1547 Table M1, note 1) to slow the soakage and assist with nutrient reduction.
- Minimum 30 % reserve disposal field area (NRP rule C.6.1.3(9)(b) for secondary or tertiary treatment systems). The proposed concept design adopts 3.0mm /day SLR, utilising a 30% reserve disposal field area.

### 3.4.2 Disposal Areas

The sizing of wastewater system disposal areas is a function of soil drainage, the loading rate and topographic relief. For future proposed developments a primary and reserve disposal field is required as follows.

- **Primary Disposal Field.** A minimum PCDI primary disposal field of 427 m<sup>2</sup> laid parallel to the natural contours.
- **Reserve Disposal Field.** A minimum reserve disposal field equivalent to 30 % of the primary disposal field is required under NRP rule C.6.1.3(9)(b) for secondary or tertiary treatment systems. This concept design therefore allows for a 129 m<sup>2</sup> reserve disposal area to be laid parallel to the natural contours.
- Disposal fields discharging secondary treated effluent are to be set above the 20-year ARI (5 % AEP) flood inundation height to comply with the above NRP rule. Flood hazard potential has only been identified outside of the site, as such the site/s can provide freeboard well above the 1 % AEP (and 5% AEP) flood height to comply with this rule.

From the available contour information, most of the proposed Lot 3 is flatter than 10°. Surface water cut-off drains are considered necessary for slopes >10 ° to meet the provisions of NRP rule C.6.1.3. to prevent overland stormwater flow flushing through the proposed wastewater field. In addition, a Discharge Consent is required for disposal fields on slopes that exceed 25°. These requirements should be reviewed at the Building Consent stage.

## 3.5 Summary of Concept Wastewater Design

Based on the above design assumptions a concept wastewater design is presented as Table 2 below. It is recommended that each future lot is subject to Building Consent specific review and design amendment according to final development plans.

*Table 2: Concept Wastewater Design Summary*

Design Element	Specification
Concept development	Five-bedroom, peak occupancy of 8 (per lot)
Design generation volume	160 litres/ person/ day
Water saving measures	Standard. Combined use of 11 litre flush cisterns, automatic washing machine & dishwasher, no garbage grinder <sup>1</sup>
Water meter required?	No
Min. Treatment Quality	Secondary
Soil Drainage Category	TP58 Category 6, NZS1547 Category 5
Soil Loading Rate	3 mm/ day
Primary disposal field	Surface/ subsurface laid PCDI, min. 427 m <sup>2</sup>



Reserve disposal field	Surface/ subsurface laid PCDI, min. 30 % or 129 m <sup>2</sup>
Dosing Method	Pump with high water level visual and audible alarm. Minimum 24-hour emergency storage volume.
Stormwater Control	Divert surface/ stormwater drains away from disposal fields for slopes >10°. Stormwater to discharge downslope of all disposal fields.

1. Unless further water saving measures are included.

## 4 STORMWATER ASSESSMENT

Considering the nature of rural subdivision and residential development, increased storm water runoff occurs as pervious surfaces such as pasture are converted to impervious features such as roads or future on-lot buildings and driveways.

### 4.1 Impervious Surfaces and Activity Status

A concept of impervious areas for future lots is provided as Table 3 below which has been based on a typical rural residential development on a 3,000m<sup>2</sup> lot.

According to the proposed District Plan, the Permitted Activity status allows a maximum proportion of the gross site area covered by buildings and other impermeable surfaces of 35% or 600m<sup>2</sup>, whichever is lesser.

The concept lot is assumed to have 300 m<sup>2</sup> of roof area and 200 m<sup>2</sup> of driveway and parking area.

Table 3: Summary of Impervious Surfaces

Surface	Concept Lot (3,000m <sup>2</sup> )	
Existing Condition		
Roof	0 m <sup>2</sup>	0 %
Driveway + Parking/ Right of Way	0 m <sup>2</sup>	0 %
Total impervious	0 m <sup>2</sup>	0 %
Proposed Condition		
Roof	300 m <sup>2</sup> (Concept)	10.0 %
Driveway + Parking/ Right of Way	200 m <sup>2</sup> (Concept)	6.7 %
Total impervious	500 m <sup>2</sup>	16.7 %
Activity Status	Permitted	

## 4.2 Stormwater Management Concept

The stormwater management concept considered in this assessment has been prepared to meet the requirements of the local and regional consent authorities considering the design storm event as follows:

- **Probable Future Development.** A conservative model of probable future on-lot development for proposed Lots has been developed for this assessment considering variation of scale in typical rural residential development. The probable future on-lot development concept includes up to 300 m<sup>2</sup> potential roof area and up to 200 m<sup>2</sup> potential driveway and parking areas per lot.

## 4.3 Design Storm Event

Relevant design rainfall intensity and depths have been ascertained for the site location from the NIWA HIRDS meteorological model<sup>5</sup>. The NIWA HIRDS rainfall data is presented in full within Appendix B. Provision for climate change has been adopted by means of applying a factor of 20 % to rainfall intensities, in accordance with FNDC Engineering Standards 2023.

Table 4-1 stipulates that flow attenuation controls reduce the post-development peak discharge to 80 % of the pre-development condition for the 50 % and 20 % AEP storm event.

This provides additional conservatism over the 10 % AEP pre-development requirement to comply with NRP Rule C6.4.2(2) and also with the Operative District Plan 13.7.3.4 (a). Attenuation modelling under this scenario avoids exacerbating downstream flooding and provides for sufficient flood control as presented in the FNDC Engineering Standards.

To be compliant with the above rules, the attenuation modelling within this assessment has been undertaken for all of the above storm events. The results are summarised in Table 5, with calculations provided in full in Appendix B.

## 4.4 Concept Stormwater Attenuation

Based on the design storm events indicated above and the corresponding modelling results, an attenuation concept to suit the maximum storage requirement has been provided. In this case the concept limits the post-development peak discharge to 80% of the pre-development condition for the 20% AEP storm event. This is achievable by installing specifically sized low-flow orifices into the attenuation devices.

The rational method has been adopted by Geologix with run-off coefficients as published by FNDC Engineering Standards<sup>6</sup> to provide a suitable concept attenuation design to limit post-development peak flows to 80% of pre-development conditions.

*Table 4: Summary of Concept Stormwater Attenuation*

<sup>5</sup> NIWA High Intensity Rainfall Data System, <https://hirds.niwa.co.nz>.

<sup>6</sup> FNDC Engineering Standards 2023, Version 0.6, Issued May 2023.



Item	Pre-development Impervious Area	Post-development Impervious Area	Proposed Concept Attenuation Method
<b>Future Concept Development</b>			
Potential buildings	0 m <sup>2</sup>	300 m <sup>2</sup>	Detention within roof water tanks
Potential driveways	0 m <sup>2</sup>	200 m <sup>2</sup>	Off-set detention in roof water tanks
<b>Total</b>	<b>0 m<sup>2</sup></b>	<b>500 m<sup>2</sup></b>	

Calculations to support the concept design are presented within Appendix B to this assessment.

As above, it is recommended that this concept design is refined at the Building Consent stage once final development plans are available.

*Table 5: Probable Future Development Attenuation Concept - Tanks*

Design Parameter	Flow Attenuation: 50 % AEP (80 % of pre dev)	Flow Attenuation: 20 % AEP (80 % of pre dev)	Flood Control: 10 % AEP
Regulatory Compliance	FNDC Engineering Standards Table 4-1	FNDC Engineering Standards Table 4-1	NRC Proposed Regional Plan
Pre-development peak flow	5.28 l/s	6.82 l/s	7.963 l/s
80 % pre-development peak flow	4.22 l/s	5.45 l/s	NA
Post-development peak flow	9.12 l/s	11.79 l/s	13.76 l/s
Total Storage Volume Required	6,650 litres	8,690 litres	3,905 litres
Concept Summary:	<ul style="list-style-type: none"> <li>- Attenuation storage calculation accounts for offset flow from 200 m<sup>2</sup> driveway (not indicated explicitly indicated in summary above. Refer Appendix B for calcs in full)</li> <li>- Attenuation to 80 % of pre-development condition for 20 % AEP storm represents maximum storage requirement and is adopted for the concept design tank storage.</li> <li>- 2 x 25,000 litre tanks are sufficient for attenuation (8,690 l) + domestic water storage (41,310 l)</li> <li>- 20 % AEP attenuation (in isolation) requires a 27 mm orifice 0.41 m below overflow. However regulatory requirements are to consider an additional orifice/s to control the 50 %, 20 % and 10 % AEP events specifically. We note this may vary the concept orifice indicated above. This should be provided with detailed design for building consent approval.</li> </ul>		

#### 4.4.1 On-Lot Discharge

The direct discharge of water tank overflow in a concentrated manner can cause scour and erosion in addition to excessive saturation of shallow soils. Roof water will be captured in





detention tanks and used for drinking supply needs. It is recommended that overflow from rainwater detention tanks is conveyed in sealed pipes to a designated discharge point downslope of proposed building footprints and wastewater disposal fields.

## 5 POTABLE WATER & FIRE FIGHTING

In the absence of potable water infrastructure within Settlers Way outside the site it is recommended that roof runoff water tanks are adopted for potable water supply with appropriate filtration and UV disinfection at point of use. The volume of potable water supply on each lot should consider the required stormwater detention volume identified within Table 5 for proposed Lots.

Furthermore, the absence of potable water infrastructure and fire hydrants within Settlers Way require provision of the on-lot roof water supply tanks to be used for firefighting purposes, if required. Specific analysis and calculation for firefighting is outside the scope of this assessment and may require specialist input. Supply for firefighting should be made in accordance with SNZ PAS4509:2008.

## 6 LIMITATIONS

This assessment has been prepared for Ian Ray Carr as our Client. It may be relied upon by our Client and their appointed Consultants, Contractors and for the purpose of Rezoning Submission as outlined by the specific objectives in this assessment. This assessment and associated recommendations, conclusions or intellectual property is not to be relied upon by any other party for any purpose unless agreed in writing by Geologix Consulting Engineers Ltd and our Client. In any case the reliance by any other party for any other purpose shall be at such parties' sole risk and no reliability is provided by Geologix Consulting Engineers Ltd.

The opinions and recommendations of this assessment are based on plans, specifications and assessments provided to us at the time of writing, as referenced. Any changes, additions or amendments to the project scope and referenced documents may require an amendment to this assessment and Geologix Consulting Engineers should be consulted. Geologix Consulting Engineers Ltd reserve the right to review this assessment and accompanying plans.



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## APPENDIX A

### Scheme Plan



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## APPENDIX B

### Stormwater Calculations