

## **ONSITE WASTEWATER TREATMENT AND DISPOSAL SUBDIVISION REPORT**

**787 Kaipara Coast Highway  
Kaukapakapa**

**RIVERVIEW PROPERTIES LTD**  
July 2021 | V2



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## 1 INTRODUCTION

This assessment report was prepared by GWE Consulting Ltd (GWE) for Riverview Properties Ltd as our client in accordance with our letter of engagement dated 14 May 2021.

This is Stage 2 of the Riverview Development to subdivide the property at 787 Kaipara Coast Highway into 16 residential Lots. This report provides a general assessment of each residential lot to determine the suitability for onsite wastewater treatment and disposal. This assessment provides support to the application for subdivision consent.

The recommendations in this report are based on the information received from the client and the assessment is in accordance with Auckland Regional Council Technical Publication No. 58: On-site Wastewater Systems: Design and Management Manual (TP58) 2004.

## 2 PROPERTY/SITE DETAILS

The subject site is located at 787 Kaipara Coast Highway and is legally described as

- Lot 1 DP 523159 with a gross lot area of 13,417 m<sup>2</sup>.
- Lot 2 DP 523159 with a gross lot area of 30,287 m<sup>2</sup>.

The large rural property is irregular in shape. Access to the site is provided directly from State Highway 16. The properties directly to the north are large residential lots developed as part of Stage 1 of the Riverview development, while to the east of the development there are existing residential houses. State Highway 16 borders the southern boundary and there is predominantly farmland south of this.

The property contains an existing dwelling located on Lot 6. Wastewater from the dwelling is treated to a secondary standard and discharged to land using. Lot 3 contains a number of farm buildings. There is no wastewater discharge from this lot.



Figure 1: Site Location Plan – 787 Kaipara Coast Highway, Kaukapakapa

### 3 PROPOSAL

GWE has been provided with a scheme plan prepared by C & R Surveyors Ltd titled 'Lots 1 to 18 Being Proposed Subdivision of Lots 1 and 2 DP 523159' dated 11 May 2021. The draft plan indicates that Lot 6 is an existing dwelling, Lot 3 contains farm buildings and Lots 17 and 18 are the right of way providing common access. The proposed lot sizes are summarised in Table 1 below.

Table 1: Summary of Gross Lot Sizes

RESIDENTIAL LOT	GROSS AREA
Lot 1	2,505 m <sup>2</sup>
Lot 2	2,670 m <sup>2</sup>
Lot 3 (existing farm buildings)	2,824 m <sup>2</sup>
Lot 4	2,500 m <sup>2</sup>
Lot 5	2,586 m <sup>2</sup>
Lot 6 (existing dwelling)	2,501 m <sup>2</sup>
Lot 7	2,500 m <sup>2</sup>
Lot 8	2,500 m <sup>2</sup>
Lot 9	2,558 m <sup>2</sup>
Lot 10	2,500 m <sup>2</sup>
Lot 11	2,696 m <sup>2</sup>

RESIDENTIAL LOT	GROSS AREA
Lot 12	2,505 m <sup>2</sup>
Lot 13	2,504 m <sup>2</sup>
Lot 14	2,515 m <sup>2</sup>
Lot 15	2,502 m <sup>2</sup>
Lot 16	2,504 m <sup>2</sup>
Lot 17 (common access lot)	2,504 m <sup>2</sup>
Lot 18 (common access lot)	332 m <sup>2</sup>

GWE has not been provided with indicative architectural plans indicating the location and construction nature of future residential dwellings to be constructed on the proposed lots following subdivision.

The property is located outside of the Auckland area serviced by the Watercare Services Ltd. wastewater collection network. As such the wastewater from each lot will need to be treated and disposed of appropriately on site. Water supply to each lot will be provided by roof water supply.

For the purpose of the wastewater design, we have allowed for a 5-bedroom dwelling on each of the bare residential lots. Based on Table 6.1 and 6.2 of TP58 a total occupancy allowance of 8 people and a flow allowance of 180 litres/person/day (based on roof water supply and standard water fixtures) is proposed. Wastewater generated per Lot is anticipated to be a peak flow of up to 1,440 litres/day.

For Lot 6 the existing dwelling will be maintained in place and the treatment system on Lot 6 will be retained. This will be assessed as a 3-bedroom dwelling with a per capita flow allowance of 180 litres/day for a total daily discharge of 900 litres/day. We have assumed that for Lot 3 the farm buildings can be removed and a dwelling placed on the lot.

It is important to note that specific investigation and design of onsite wastewater for any future development on each Lot will be required at Building Consent stage, once final development (architectural) plans are available for each dwelling.

## 4 SITE ASSESSMENT

A site investigation was undertaken at the site on 02 June 2021 and 11 June by a GWE Engineer. The site inspection and recorded site evaluation information was prepared in accordance with the Site Evaluation Investigation Checklist (Appendix E, TP58).

The site is largely flat, with the western third sloping west at approximately 3 to 4 degrees. It is covered in pasture, with only proposed Lots 3 and 6 containing any buildings.

Council GIS shows indicative overland flowpaths across the site. Following the site visit it was clear that these were not there. However, an overland flowpath had been formed along the western boundary and this is shown on the site plan in Appendix B. The nearest other overland flowpaths are roadside drains.

## 4.1 Subsoil Investigation

A detailed subsoil assessment was undertaken to determine soils underlying the proposed/potential land disposal areas for proposed Lots 1-5 and 7 to 16. Hand augered boreholes (AH1–AH25) were completed to 1.2 mbgl.

A summary description of soils encountered in the boreholes (AH1–AH25), including relevant soil structure, textural features and horizontal depths are summarised below with borelogs appended in APPENDIX A. No percolation testing was undertaken.

**Table 2: Soil Descriptions**

HORIZON	DESCRIPTION	DRAINAGE	CATEGORY
<b>AH-1</b>			
0-0.15 m	Dark Brown TOPSOIL with minor grey clay, moist. Inferred fill	Medium slow drainage	5/6
0.15-0.5 m	Medium dark brown silty CLAY, mottled red and grey, moist, high stiffness, medium plasticity. Inferred fill.	Slow drainage	6
0.5–1.2 m	Medium brown/tan/grey CLAY, moist, high stiffness, medium/high plasticity. Increasing grey colour with depth, becoming tan/orange/grey at 800mmm depth	Slow drainage	6
1.2 m	Target depth. No groundwater encountered		
<b>AH-2</b>			
0-0.15 m	Dark brown moist TOPSOIL, minor gravels and clay, rootlets	Medium drainage	5
0.15-0.4 m	Medium brown/orang/tan moist-wet silty CLAY, high stiffness, medium/high plasticity. Inferred fill.	Slow drainage	6
0.4-1.2m	Orange-tan/grey CLAY, moist, high stiffness, high plasticity. Increasing grey with depth	Slow drainage	6
1.20 m	Target depth. No groundwater encountered		
<b>AH-3</b>			
0-0.1m	TOPSOIL, dark brown, moist/wet mixed with clay. Inferred fill	Medium slow drainage	5/6
0.1-0.3 m	Medium brown silty CLAY with topsoil, moist, medium stiffness, high plasticity.	Slow drainage	6
0.3-1.2m	Orange-tan/grey CLAY, high stiffness, medium/high plasticity, moist. Increasing grey with depth, moist wet at 1,100mm.	Slow drainage	6
1.20 m	Target depth. No groundwater encountered		
<b>AH-4</b>			
0-0.05 m	Dark brown moist/wet TOPSOIL with clay. Inferred fill.	Medium slow drainage	6
0.5-1.2 m	Orange-tan/grey CLAY, high stiffness, high plasticity, moist. Red/orange mottling at 500mm onwards. Moist/wet at 1,000mm	Slow drainage	6
1.2 m	Target depth. No groundwater encountered		

HORIZON	DESCRIPTION	DRAINAGE	CATEGORY
<b>AH-5</b>			
0-0.05m	Dark brown moist wet TOPSOIL mixed with grey/white clay. Inferred fill.	Medium slow drainage	5/6
0.05-0.3 m	Medium brown moist-wet silty CLAY, medium stiffness, high plasticity. Inferred fill.	Slow drainage	6
0.3-1.2m	Grey/orange-tan CLAY with rusty mottling, high stiffness, high plasticity, moist-wet.	Slow drainage	6
1.20 m	Target depth. No groundwater encountered		
<b>AH-6</b>			
0-0.1 m	Dark brown moist/wet TOPSOIL with orange/brown silty clay	Medium slow drainage	5/6
0.1-0.4 m	Tan/grey silty CLAY with red mottling, minor topsoil, moist/wet, medium stiffness, medium plasticity.	Slow drainage	6
0.4-0.8 m	Medium brown/tan silty CLAY with minor gravels, minor white streaks, high stiffness, medium plasticity, moist.	Slow drainage	6
0.8-1.2 m	Medium brown/tan/grey with red/orange mottling, silty CLAY, moist, high stiffness, medium plasticity, increasingly brown with depth.	Slow drainage	6
1.20 m	Target depth. No groundwater encountered		
<b>AH-7</b>			
0-0.2 m	Dark brown TOPSOIL, mottled orange, moist/wet. Inferred fill	Medium slow drainage	5/6
0.2-0.8 m	Tan/orange/medium brown silty CLAY mixed with topsoil, low-medium stiffness, medium plasticity, moist/wet. Inferred fill.	Slow drainage	5/6
0.8-1.2 m	Orange/tan-grey CLAY, high stiffness, moderate plasticity, minor red mottling, moist.	Slow drainage	6
1.2 m	Terminated. Groundwater encountered		
<b>AH-8</b>			
0-0.2 m	Dark brown wet TOPSOIL with bark, mottled orange clay. Inferred fill.	Medium slow drainage	5/6
0.2-0.6 m	Dark brown clayey SILT, friable, medium plasticity, low-medium stiffness, minor white patches, moist. Inferred fill	Medium slow drainage	5/6
0.6-1.2 m	Orange brown clayey SILT, moist, medium plasticity, friable, low-medium stiffness.	Medium slow drainage	5/6
1.20 m	Target depth. No groundwater encountered		
<b>AH-9</b>			
0-0.2 m	Dark brown moist TOPSOIL	Medium good drainage	4/5
0.2-0.7 m	Light-m to medium brown/orange silty CLAY, medium plasticity, moist	Moderate to slow drainage	5/6

HORIZON	DESCRIPTION	DRAINAGE	CATEGORY
0.7-1.2 m	Light brown./grey silty CLAY, trace sand, high stiffness, medium high plasticity, moist.	Slow drainage	6
1.20 m	Target depth. No groundwater encountered		
<b>AH-10</b>			
0-1.0 m	TOPSOIL, top 50mm moist, mixed with clayey silt, friable, tan/light brown, getting drier. Bark till 200mm with rootlets till 400mm and angular gravels (5-10mm) 700mm onwards	Medium slow drainage	5/6
1.0 m	Terminated. No groundwater encountered		
<b>AH-11</b>			
0-0.3 m	Dark brown TOPSOIL, moist	Medium drainage	4/5
0.3-0.8 m	Light – medium brown silty CLAY, orange mottling at 600mm, low/medium stiffness, medium plasticity	Moderate to slow drainage	5/6
0.8-1.2 m	Orange/brown clayey SILT, friable, low-medium stiffness, low plasticity	Moderate to slow drainage	5/6
1.20 m	Target depth. No groundwater encountered		
<b>AH-12</b>			
0-0.2 m	Medium-dark brown TOPSOIL, moist	Medium drainage	4/5
0.2-0.6 m	Light brown/tan silty CLAY, moist, low-medium plasticity, medium stiffness.	Moderate to slow drainage	5/6
0.6-1.2 m	Tan silty CLAY, moist, medium stiffness, ow-medium plasticity.	Slow drainage	6
1.20 m	Target depth. No groundwater encountered		
<b>AH-13</b>			
0-0.2 m	Dark brown moist TOPSOIL	Medium drainage	4/5
0.2-0.7 m	Medium brown with orange streaks, silty CLAY, medium-high stiffness, medium plasticity, moist	Moderate to slow drainage	5/6
0.7-1.2 m	Tan/orange/grey silty CLAY, medium-high stiffness, medium-high plasticity, moist. Increasingly grey with depth	Slow drainage	6
1.2 m	Terminated. Groundwater encountered		
<b>AH-14</b>			
0-1.2 m	Topsoil and silty clay, friable, dry – moist, very inconsistent, rootlets till 300mm, intermittent bark, patches of silt, minor aggregate throughout. Fill.	Slow drainage	6
1.20 m	Target depth. No groundwater encountered		
<b>AH-15</b>			
0-1.2 m	Silty clay, dry, mottled orange, minor topsoil, medium-dark brown, friable, rootlets till 300-	Slow drainage	6



HORIZON	DESCRIPTION	DRAINAGE	CATEGORY
	400mm. Minor aggregate from 500mm, inconsistent throughout. Fill.		
1.20 m	Target depth. No groundwater encountered		
<b>AH-16</b>			
0-0.7 m	Clayey SILT, light brown, mottled orange/blue, minor topsoil, friable, some angular aggregate, dry, rootlets till 200mm. Fill.	Medium drainage	5
0.7-1.2 m	Dark blue/black and yellow/tan/brown silty clay, medium stiffness, some topsoil, mottled grey/orange, minor angular aggregates, medium-high stiffness, low-medium moist. Fill.	Moderate to slow drainage	5/6
1.2 m	Target depth. No groundwater encountered		
<b>AH-17</b>			
0-0.6 m	Silty clay, mottled orange/grey, medium-dark brown, dry, friable, minor angular aggregates. Fill.	Slow drainage	6
0.6-1.2 m	Silty clay, orange brown mixed with medium brown, mottles orange, minor aggregates, medium-high stiffness, medium-high plasticity, becoming wet at 1,200mm. Fill.	Slow drainage	6
1.20 m	Target depth. No groundwater encountered		
<b>AH-18</b>			
0-0.5 m	Silty clay, dark brown with orange mottling, moist, friable, minor topsoil, minor aggregates.	Slow drainage	6
0.5-1.20 m	Silty clay, yellow/tan mixed with orange brown, mottled, medium-high stiffness, white patches, moist, minor aggregates, low-medium plasticity.	Slow drainage	6
1.20 m	Target depth. No groundwater encountered		
<b>AH-19</b>			
0-0.7 m	Silty clay, orange/tan and light brown, dry, friable, minor topsoil and aggregates, mottled orange and grey. Some white/dark blue clay (medium stiffness and plasticity). Fill	Slow drainage	6
0.7-1.2 m	Silty clay, tan/light brown/orange, moist, plastic, medium stiffness, mottled orange, minor topsoil. Fill.	Slow drainage	6
1.2 m	Target depth. No groundwater encountered		
<b>AH-20</b>			
0-0.2 m	Dark brown TOPSOIL, moist	Medium drainage	4/5
0.2-0.6 m	Silty CLAY with minor angular aggregates (<5mm) mixed with topsoil, mottled orange, trace sand, moist	Moderate to slow drainage	5/6

HORIZON	DESCRIPTION	DRAINAGE	CATEGORY
0.6-1.2 m	Silty CLAY, brown/orange-tan, medium-high stiffness, medium plasticity, moist	Slow drainage	6
1.20 m	Target depth. No groundwater encountered		
<b>AH-21</b>			
0-0.25 m	Dark Brown moist TOPSOIL	Medium drainage	4/5
0.25-0.7 m	Light brown/grey moist silty CLAY, friable, low-medium stiffness, low-medium plasticity, minor orange streaks.	Moderate to slow drainage	5/6
0.7-1.2 m	Light brown/tan/orange silty CLAY, medium-high stiffness, mottled orange at 900mm onwards, becoming grey/orange/tan at 1,100 mm.	Slow drainage	6
1.20 m	Target depth. No groundwater encountered		
<b>AH-22</b>			
0-0.1 m	TOPSOIL, medium brown, moist	Medium drainage	4/5
0.1-1.2 m	Orange, medium plastic silty CLAY, not moist, getting yellow/grey at 1,000 mm.	Slow drainage	6
1.2 m	Target depth. No groundwater encountered.		
<b>AH-23</b>			
0-0.1 m	TOPSOIL, medium brown, moist.	Medium drainage	4/5
0.1-1.2 m	Orange, medium plastic silty CLAY, not moist, getting yellow/grey at 1,000 mm.	Slow drainage	6
1.2 m	Target depth. No groundwater encountered		
<b>AH-24</b>			
0-0.1 m	TOPSOIL, brown, silty	Medium drainage	4/5
0.2-0.6 m	Clayey SILT, orange, friable, not sticky, crumbly, low plasticity and stiffness	Moderate to slow drainage	5
0.6-1.2 m	Orange, medium plastic silty CLAY, not moist, getting yellow/grey at 1,000 mm	Slow drainage	6
1.20 m	Target depth. No groundwater encountered		
<b>AH-25</b>			
0-0.1 m	TOPSOIL, medium brown, moist	Medium drainage	4/5
0.1-1.2 m	Orange, medium plastic silty CLAY, not moist, getting yellow/grey at 1,000 mm.	Slow drainage	6
1.20 m	Target depth. No groundwater encountered		

The results of the site investigation can therefore be summarised as follows:

- Soils at the site are predominantly comprised of clay with some minor silts, with a corresponding ARC Soil Category of 6.
- Boreholes 14 – 19 were drilled on the bund along the southern boundary adjacent to State Highway 16. The bund was comprised of fill like material comprising a mixture of clays with some topsoil and gravel (as well as other material), but was not heavily compacted and has been given a rating of Soil Category 6.
- Loading rates for the wastewater disposal system design shall be based upon an ARC Category 6 soil.
- The water table was not encountered at the maximum exploratory depth of 1.2 metres below ground level (mbgl).

## 5 DISCHARGE DETAILS FOR LOTS 1-5 AND 7-16

### 5.1 Proposed Buildings/Dwelling

For the purpose of estimating wastewater generated onsite, we have allowed for a 5-bedroom dwelling on each of the lots. It should be noted that any study, office, gym or similar maybe considered to be a 'potential bedroom' by the Council.

### 5.2 Design Wastewater Volumes

The water supply for the 16-Lot subdivision will be sourced from roof water. We have proposed a flow allowance of 180 Litres/person/day (as per Table 6.2 of TP58) on the assumption that standard water saving fixtures will be installed. However, to promote the water conservation on each lot, we recommend full water reduction fixtures. Table 3 outlines the design considerations for the wastewater flows.

**Table 3: Design Flows for Proposed Subdivision**

<b>DEVELOPMENT</b>	16 Lot Subdivision
<b>NO. OF PERSONS</b>	5-bedroom dwelling: 8 persons <b>Total occupancy: 8 people (per lot)</b>
<b>DAILY FLOW ALLOWANCE</b> (TABLE 6.1 OF TP58)	<b>180 Litres/person/day</b>
<b>WATER FIXTURES</b> (TABLE 6.2 OF TP58)	Standard Fixtures include combined use of: <ul style="list-style-type: none"> <li>• 11 litre flush water cisterns</li> <li>• Automatic washing machine and dishwasher</li> <li>• No garbage grinder unless other water saving devices (e.g. low flush 6/3litre toilet cisterns) are used.</li> </ul>
<b>DESIGN FLOW RATE</b>	<b>1,440 Litres/day (per Lot)</b>
<b>WATER METER</b>	A water meter is not required.
<b>OTHER NOTES</b>	No grey-water reuse recycling proposed

## 6 DISCHARGE DETAILS FOR LOT 6

The existing dwelling on the proposed Lot 6 has been assessed as a 3-bedroom dwelling suitable for occupancy of up to 5 people. This was legally established under a building consent in 1955 and was moved to the current location in 1992. Alterations to the dwelling were made in 1994, and it retained 3 bedrooms.

The design flow volume is summarised in Table 4 below. Treatment is currently undertaken using a secondary system (Hynds Lifestyle Advanced) with pressure compensating drip irrigation (PCDI) to an area around the southern and western boundary. During the GWE Engineer’s site visit it was observed that some of the disposal line had been cut and it is recommended it be re-laid.

**Table 4: Design Flows for Existing Dwelling on Proposed Lot 6**

<b>DEVELOPMENT</b>	Existing 3-bedroom dwelling
<b>NO. OF PERSONS</b>	3-bedroom dwelling: 5 persons <b>Total occupancy: 5 people (per lot)</b>
<b>DAILY FLOW ALLOWANCE</b> (TABLE 6.1 OF TP58)	<b>180 Litres/person/day</b>
<b>WATER FIXTURES</b> (TABLE 6.2 OF TP58)	Standard Fixtures include combined use of: <ul style="list-style-type: none"> <li>• Dual flush 6/3 litre flush water cisterns</li> <li>• Automatic washing machine and dishwasher</li> <li>• No garbage grinder unless other water saving devices are used.</li> </ul>
<b>DESIGN FLOW RATE</b>	<b>900 Litres/day</b>
<b>WATER METER</b>	A water meter is not required given the proposed flow allowance is over 145litres/day/person.
<b>OTHER NOTES</b>	No grey-water reuse recycling proposed

The existing dwelling will be maintained in place as will the existing wastewater treatment and disposal system.

## 7 WASTEWATER TREATMENT FOR LOTS 1-5 AND 7-16

Several proprietary systems are available that are considered suitable for the site conditions and will provide the necessary quality of wastewater effluent.

In Table 4, we have presented several manufacturers of on-site wastewater treatment systems that are able to treat raw wastewater to secondary quality effluent. If the disposal fields are less than 15m to any overland flowpaths, tertiary treatment will be required. All of these suppliers are based or have approved agents in the Auckland Region.

**Table 5: Wastewater Treatment System Suppliers**

<b>WASTEWATER TREATMENT TECHNOLOGIES</b>	<ul style="list-style-type: none"> <li>• Innoflow Technologies Ltd</li> <li>• Reflections Treatment Systems</li> <li>• Oasis Clearwater Ltd</li> <li>• Hynds Lifestyle</li> <li>• Jet Water and Waste Ltd</li> </ul>
<b>TERTIARY TREATMENT</b>	Site specific and will depend on a full site evaluation. <i>UV disinfection may be required to meet separation distances requirements to surface water including roadside drains.</i>
<b>ESTIMATED COST</b>	\$25-30 k +GST fully installed (does not include design report costs, building consent application fees, etc.)
<b>ALARM SYSTEM</b>	Minimum requirement - visual and audible alarm located at plant

The type and capacity of treatment plant for each site shall be based on the level of treatment required and peak flows it can handle.

At this stage, it can be demonstrated that, at a minimum, a treatment plant providing secondary level treatment can be installed based on the proposed effluent disposal locations, given compliance to minimum separation from groundwater (minimum 0.6m) and surface water (minimum 10m). The type and capacity of the treatment plant shall be determined at the detailed design stage once architectural drawings have confirmed potential occupancy.

## 8 LAND DISPOSAL METHOD

It is proposed that effluent dispersal be undertaken via pressure compensating dripper (PCDI) system. Whilst there are no major design constraints with regards to the type of wastewater plant that can be installed (based on the list of system suppliers in Table 4), the location and extent of disposal area requires consideration of the following:

**i. Loading Rate:**

Based on the site investigations undertaken, the underlying soils (up to 1.2 m) are inferred to be Category 6 with poor drainage capabilities. A loading rate of 3 mm/day is proposed (Table 9.2 of TP58). Where the disposal field is proposed to be on steep slopes, a conservative loading rate (<3 mm/day) is recommended. Disposal areas for the concept site plan (Drawing No.500) is based on a conservative 3 mm/day loading rate.

**ii. Overland Flow Paths:**

Several overland flow paths are indicated to traverse the property according to the ARC geomaps. For the proposal to be considered a Permitted Activity, a minimum separation distance of 15 m (disposal field from the overland flow path/surface water) is required if the treatment plant is of secondary level and 10 m if tertiary level is installed. Separation distances less than this (minimum of 5 m) will require a discharge consent. Drawing No. 500 shows separation distance of 10m.

iii. **Disposal System:**

The PCDI driplines are proposed to be surface laid on the steep slopes (pinned to the ground with ample planting where vegetation is thin or absent) and/or laid subsurface (100-150 m below ground) on flat or gentle slopes.

iv. **Disposal Field Location:**

The disposal field is required to be setback no closer than 3.0m from the habitable dwellings, 1.5 m from property boundaries, 3.0 m from retaining walls and 15 m (minimum secondary level effluent quality) or 10m (if tertiary treatment is provided) from any overland flow paths (including roadside drains) and outside a 1 in 100 or 1 in 20 year flood plain (depending on the level of treatment). The aforementioned separation distances can be reduced, however a discharge consent will be required and likewise for disposal fields on steep slopes (greater than 20°) and areas of fill. Effluent disposal fields should not be placed on areas of fill and where possible, the entire primary disposal field for each site shall be located on undisturbed ground.

v. **Groundwater:**

A minimum separation of 0.6-1.2 m is to be maintained from groundwater (depending on the level of treatment).

vi. **Scarps:**

During the site walkover, no scarps were identified within the proposed disposal field areas.

## 8.1 Land Application Area for Proposed Lot 6

The land application area is located around the western and northern boundaries, as shown drawing No. 500. There is more than 50% reserve area available in the garden and lawn at Lot 6.

**Table 6: Proposed Land Disposal Design for Lot 6**

<b>TYPE LAND DISPOSAL SYSTEM</b>	PCDI
<b>DRIPPER LINES</b>	Surface laid PCDI: dripper lines to be at 1.0m spacing
<b>SOIL CATEGORY</b>	6
<b>LOADING RATE</b>	3.0 mm/day
<b>LOADING METHOD</b>	Pump
<b>PUMP</b>	High water level alarm shall be installed in pump chamber with audible/visual alarm Pump Chamber Volume – system specific Emergency Storage volume – min. 24 hours storage
<b>PRIMARY DISPOSAL AREAS</b>	300 m <sup>2</sup>
<b>RESERVE DISPOSAL AREA</b>	50% or 150 m <sup>2</sup>
<b>LOCATION</b>	Refer to Drawing No.500 (Appendix B)
<b>STORMWATER CONTROLS</b>	All surface water/ stormwater drains shall be diverted away from the disposal fields. Discharge location of stormwater management devices shall be located downslope of all wastewater disposal fields.



<b>SEPARATION DISTANCE</b>	Site boundaries: >1.5m Buildings: >1.5m Groundwater: >1.2m Retaining walls: >3.0m Bores: >20m
----------------------------	---

## 8.2 Land Application Area for Proposed Lots 1-5 and 7 to 16

The proposed land application areas for Lots 1-5 and 7-16 is a 3.0 mm/day loading rate based on category 6 soils. The design flow volume is 1,440 L/day based on a 5-bedroom dwelling. The indicative primary disposal field is therefore 480 m<sup>2</sup> with a further 240 m<sup>2</sup> (50%) allocated for reserve. Indicative areas available for wastewater disposal are given on Drawing No. 500. Building platforms of 400 m<sup>2</sup> are also indicated.

A summary of the proposed land disposal considerations is as per Table 7 below.

**Table 7: Proposed Land Disposal Design for Lot 1-2, 4-5 and 7 to 16**

<b>TYPE LAND DISPOSAL SYSTEM</b>	PCDI
<b>DRIPPER LINES</b>	Surface laid PCDI: dripper lines to be at 1.0m spacing Subsurface PCDI: dripper lines to be at 0.5m spacing
<b>SOIL CATEGORY</b>	6
<b>LOADING RATE</b>	3 mm/day
<b>LOADING METHOD</b>	Pump
<b>PUMP</b>	High water level alarm shall be installed in pump chamber with audible/visual alarm Pump Chamber Volume – system specific Emergency Storage volume – min. 24 hours storage
<b>PRIMARY DISPOSAL AREAS</b>	Lot 1-5 and 7-16: 480 m <sup>2</sup>
<b>RESERVE DISPOSAL AREA</b>	240m <sup>2</sup> - 50%
<b>LOCATION</b>	Refer to Drawing No.500 (APPENDIX B)
<b>STORMWATER CONTROLS</b>	All surface water/ stormwater drains shall be diverted away from the disposal fields. Discharge location of stormwater management devices shall be located downslope of all wastewater disposal fields.

## 9 LOT SPECIFIC DESIGN

Based on the aforementioned design parameters and conservative design assumptions (reiterated below) a lot specific design can be summarised as per Table 5.

**Table 8: Proposed Lot Specific Design**

LOT	GROSS AREA	PEAK DESIGN FLOW LITRES/DAY	SOIL CATEGORY	LOADING RATE	MIN. PRIMARY DISPOSAL AREA	MIN. RESERVE DISPOSAL AREA	MIN. LEVEL OF TREATMENT
1	2,505 m <sup>2</sup>	1,440	6	3 mm/day	480 m <sup>2</sup>	50%	Secondary
2	2,670 m <sup>2</sup>	1,440	6	3 mm/day	480 m <sup>2</sup>	50%	Secondary
3	2,824 m <sup>2</sup>	1,440	6	3 mm/day	480 m <sup>2</sup>	50%	Secondary
4	2,500 m <sup>2</sup>	1,440	6	3 mm/day	480 m <sup>2</sup>	50%	Secondary
5	2,586 m <sup>2</sup>	1,440	6	3 mm/day	480 m <sup>2</sup>	50%	Secondary
6	2,501 m <sup>2</sup>	900	6	3 mm/day	300 m <sup>2</sup>	50%	Secondary
7	2,500 m <sup>2</sup>	1,440	6	3 mm/day	480 m <sup>2</sup>	50%	Secondary
8	2,500 m <sup>2</sup>	1,440	6	3 mm/day	480 m <sup>2</sup>	50%	Secondary
9	2,558 m <sup>2</sup>	1,440	6	3 mm/day	480 m <sup>2</sup>	50%	Secondary
10	2,500 m <sup>2</sup>	1,440	6	3 mm/day	480 m <sup>2</sup>	50%	Secondary
11	2,696 m <sup>2</sup>	1,440	6	3 mm/day	480 m <sup>2</sup>	50%	Secondary
12	2,505 m <sup>2</sup>	1,440	6	3 mm/day	480 m <sup>2</sup>	50%	Secondary
13	2,504 m <sup>2</sup>	1,440	6	3 mm/day	480 m <sup>2</sup>	50%	Secondary
14	2,515 m <sup>2</sup>	1,440	6	3 mm/day	480 m <sup>2</sup>	50%	Secondary
15	2,502 m <sup>2</sup>	1,440	6	3 mm/day	480 m <sup>2</sup>	50%	Secondary
16	2,504 m <sup>2</sup>	1,440	6	3 mm/day	480 m <sup>2</sup>	50%	Secondary

We note that development of Lot 10 is restricted due to the presence of the overland flowpath inside the western boundary. Where Drawing No. 500 shows that each of the lots have sufficient area to dispose of treated wastewater from a 5 bedroom dwelling, it is unlikely that this will be possible on Lot 10 without a resource consent and/or reducing the number of bedrooms to 3-4.

**At the building consent stage (once final architectural plans are available), a specific design is required to reflect and confirm the wastewater volumes anticipated, level of treatment, the extent of the disposal fields and how the minimum separation distances can be complied with.**

## 10 STATUTORY ASSESSMENT

In accordance with Rules E5.4 (Activity Table), E5.6.1 (General Standards for Activities) and E5.6.2.1 (Permitted Activity Standards) of the Auckland Unitary Plan Operative in Part, the following proposal to discharge domestic wastewater on each proposed residential Lot via a land disposal system, is considered a **Permitted Activity** given that the lot area (m<sup>2</sup>) to wastewater volume (L/d) ratio (A:V) and the requirements of TP58 (2004) can be met. The concept site plan (Drawing No. 500) demonstrates how the requirements pertaining to separation distances (from surface water, boundaries and indicative building platform) are met. All the lots comply with the A:V (greater than 1.5) as outlined in Table 6.

**Table 9: Area to Volume Ratio**

RESIDENTIAL LOT	GROSS AREA	WASTEWATER VOLUME	A:V RATION (L/m <sup>2</sup> /d)
Lot 1	2,505 m <sup>2</sup>	1,440 L/d	1.74
Lot 2	2,670 m <sup>2</sup>	1,440 L/d	1.85
Lot 3 (existing farm buildings)	2,824 m <sup>2</sup>	1,440 L/d	1.96
Lot 4	2,500 m <sup>2</sup>	1,440 L/d	1.74
Lot 5	2,586 m <sup>2</sup>	1,440 L/d	1.80
Lot 6 (existing dwelling)	2,501 m <sup>2</sup>	900 L/d	2.78
Lot 7	2,500 m <sup>2</sup>	1,440 L/d	1.74
Lot 8	2,500 m <sup>2</sup>	1,440 L/d	1.74
Lot 9	2,558 m <sup>2</sup>	1,440 L/d	1.78
Lot 10	2,500 m <sup>2</sup>	1,440 L/d	1.74
Lot 11	2,696 m <sup>2</sup>	1,440 L/d	1.87
Lot 12	2,505 m <sup>2</sup>	1,440 L/d	1.74
Lot 13	2,504 m <sup>2</sup>	1,440 L/d	1.74
Lot 14	2,515 m <sup>2</sup>	1,440 L/d	1.75
Lot 15	2,502 m <sup>2</sup>	1,440 L/d	1.74
Lot 16	2,504 m <sup>2</sup>	1,440 L/d	1.74
Lot 17 (common access lot)	2,462 m <sup>2</sup>	-	-
Lot 18 (common access lot)	332 m <sup>2</sup>	-	-

## 11 ASSESSMENT OF ENVIRONMENTAL EFFECTS

It is anticipated that the recommendations proposed will have a less than minor effect on the environment. The following general assessment applies across the 16 proposed residential lots, based on the information inferred from the site walkover, subsoil assessment and proposed design.

**A review of the assessment (environmental effects) is required at the building consent stage relative to the final location of the disposal field and proposed treatment plant.**

### 11.1 Impact on Surface Water

With reference to the site plan (Drawing No. 500), the areas proposed for primary disposal and reserve demonstrates that a minimum separation of 10 m can be achieved to any overland flowpaths, provided a tertiary level of treatment is provided. Furthermore, as a high level of treatment is proposed and disposal will be predominantly to flat land or gentle sloped covered in high evapotranspiration species, the effects on surface water is expected to be less than minor. The highly treated effluent disposed on gentle slopes within vegetated areas, will assist with the retention, breakdown and uptake of effluent and prevent effluent being washed off-site.

No natural wetlands were observed by GWE within 100 m of the development.

### 11.2 Impact on Groundwater

The groundwater table is a minimum of 1.2 m below ground level. Secondary effluent quality and subsequent percolation through topsoil and clay soils will ensure groundwater is not contaminated as a result of the discharge of treated effluent to the surface soil. It is also accepted that pathogen removal and significant nitrogen and phosphorus removal takes place within the topsoil.

### 11.3 Impact on Soils

The soils are conservatively categorised as soil category 6 with slow draining characteristics. A conservative loading rate of 3 mm/day has been proposed for the subdivision and PCDI disposal has been specified to ensure an even loading of treated effluent over the whole disposal area. The vegetated areas on the disposal field site will promote the uptake of nitrogen and phosphorus and mitigate the accumulation of these compounds in the topsoil zone.

The treated wastewater will have very low total suspended solids and BOD concentration reducing the impact on the receiving soils by reducing the level of biological breakdown of organic compounds which soils would normally expect to complete. The aerobic nature of the wastewater minimises any impact on receiving soils and can enhance the long-term acceptance rate (LTAR). Reduction in soakage capacity as a result of application of the high-level treated wastewater into the soil would not be expected to occur.

## 11.4 Impact on Amenity Values

Given the high level of wastewater treatment proposed, odours are not anticipated at the plant or the disposal field. Moreover, the volume of treated effluent produced is proposed to be dispersed over a large area. The treatment plants will be located a minimum of 1.5 m from all habitable buildings and the disposal fields at a minimum of 1.5 m from the lot boundaries. As such, indiscernible adverse odour effects are not anticipated. The treatment plant is not expected to result in any discernible adverse noise effects to the owners or neighbours.

## 11.5 Summary

Wastewater treatment and disposal for the proposed subdivision has been designed in accordance with relevant guidelines and is consistent with the Resource Management Act and the Auckland Unitary Plan Operative in Part.

For the reasons outlined above, and throughout the application, insignificant adverse environmental effects are anticipated. Groundwater, surface water, public health, and amenity are all adequately protected. Overall, the proposal to discharge domestic wastewater from the proposed lots via a land disposal system, is considered to have less than minor adverse effects that can be contained within the boundaries of the site. Ongoing maintenance and management of the proposed treatment system in accordance with the supplier's specifications will be required to ensure that no minor adverse effects arise.

# 12 CONCLUSIONS AND RECOMMENDATIONS

GWE consider the proposal to subdivide the existing property at 787 Kaipara Coast Highway, Kaukapakapa into 16 separate lots to be feasible based on the requirements for onsite wastewater treatment and disposal on each lot.

For the purposes of this report we have used conservative estimates for per capita flow rate from each dwelling of 180 litres/day and the land disposal rate of 3 mm/day to demonstrate that the subdivision of the section is feasible. The per capita flow rate from each dwelling may vary depending on the final design of the dwellings and the fixtures installed in the properties.

Using these conservative parameters, the disposal of effluent from a 5-bedroom main dwelling has been shown to be feasible as a **permitted activity**, compliant with E5.6.1 and E5.6.2.1 of the Auckland Unitary Plan. Detailed design will take place at the building consent phase for each of the lots.

Wastewater from the existing dwelling on Lot 6 is treated and disposed of in line with the standards set out in the Auckland Unitary Plan and TP58. It is recommended the disposal lines be replaced due to damage.

## 13 LIMITATIONS

This report has been prepared for the sole benefit of **Riverview Properties Ltd** as our client, and their appointed representatives, according to their instructions, for the specific objectives described herein. It is not to be relied upon or used out of context by any other party for any other objective without reference to GWE Consulting Ltd. The reliance by other parties on the information or opinions contained in the report shall, without prior review and agreement in writing, be at such parties' sole risk.



**APPENDIX A**  
**BORELOGS**

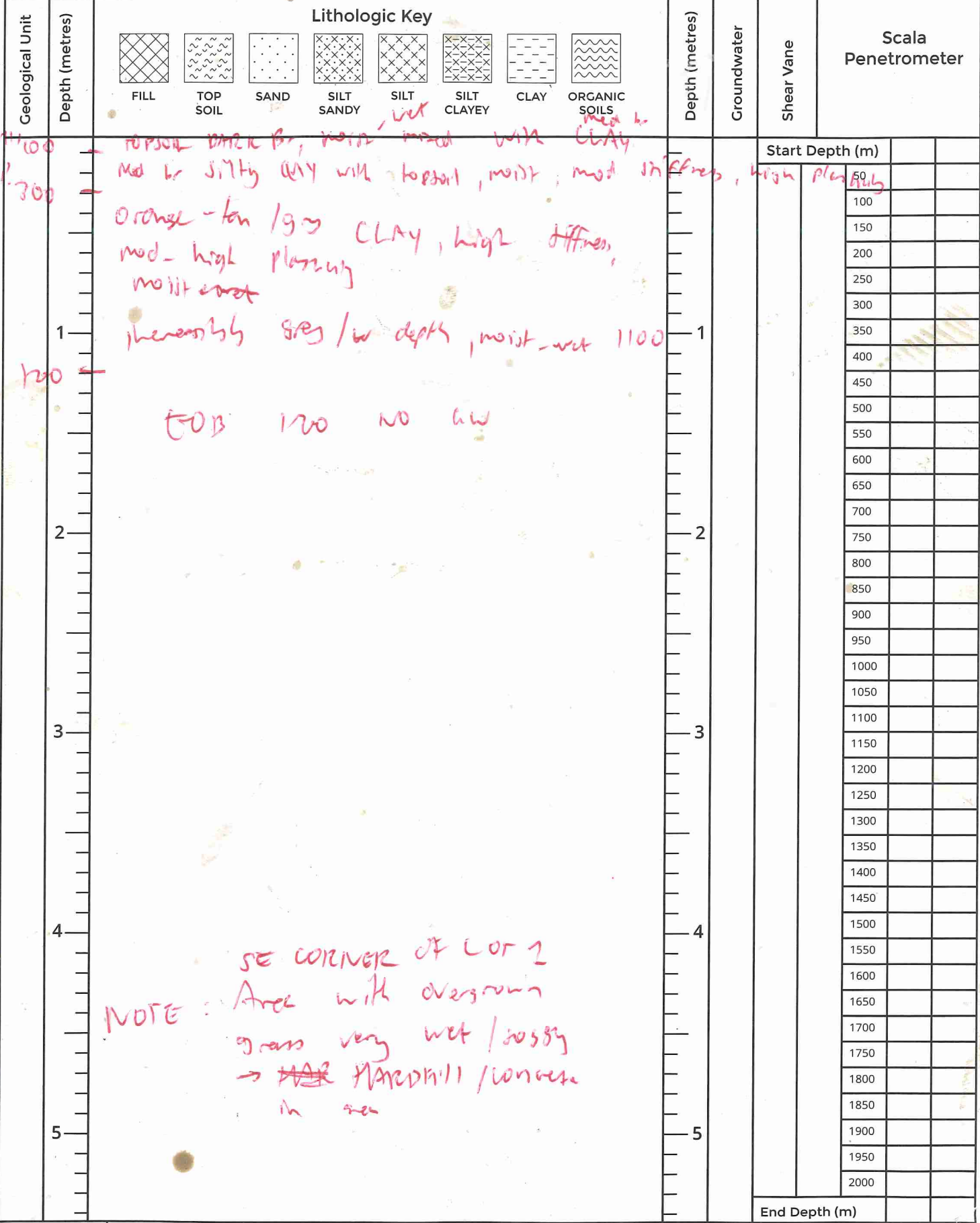
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CLIENT: \_\_\_\_\_ Borehole/Test Pit **787 KWA 4**  
 PROJECT: \_\_\_\_\_ **AH3 LOT2**  
 LOCATION: \_\_\_\_\_

Surface Conditions: \_\_\_\_\_ Sheet 1 of \_\_\_\_\_



Fill 100  
300

TOPSOIL DARK BR, moist, med with CLAY  
 med to silty clay with topsoil, moist, med stiffness, high plasticity  
 orange-tan / grey CLAY, high stiffness, mod-high plasticity, moist med  
 increasingly grey / w depth, moist-wet 1100

EOB 120 NO GW

NOTE: SE CORNER OF LOT 2  
 Area with overgrown grass very wet / soggy  
 → ~~ARE~~ HARDHILL / concrete in area

Drill Method \_\_\_\_\_  
 Date Drilled \_\_\_\_\_  
 Drilled By \_\_\_\_\_  
 Shear Vane No. \_\_\_\_\_

Observations \_\_\_\_\_





CLIENT: \_\_\_\_\_ Borehole/Test Pit 707 KH  
 PROJECT: \_\_\_\_\_ LOT 5  
 LOCATION: \_\_\_\_\_ AH7

Surface Conditions: \_\_\_\_\_ Sheet 1 of \_\_\_\_\_

Geological Unit	Depth (metres)	Lithologic Key								Depth (metres)	Groundwater	Shear Vane	Scala Penetrometer		
		FILL	TOP SOIL	SAND	SILT SANDY	SILT	SILT CLAYEY	CLAY	ORGANIC SOILS				Start Depth (m)		

200	Dark br. basalt mottled orange, moist-wet	1	Fill?	50		
				100		
300	tan loam/med br silty CLAY mixed with topsoil low-mod stiffness, mod plasticity, moist-wet	1	Fill?	150		
				200		
400	orange/tan-grey CLAY, high stiffness mod plasticity, minor red mottling moist	1	Fill?	250		
				300		
500	EOB 1200 NO GW	1	Fill?	350		
				400		
600	EOB 1200 NO GW	2	Fill?	450		
				500		
700	AH8 LOT 5	2	Fill?	550		
				600		
800	200 DARK BR. WET TOPSOIL WITH DARK mottled orange - clay mottling?	2	Fill?	650		
				700		
900	DARK BR. CLAYEY SILT, friable, mod plasticity low-mod stiffness, minor white patches, moist	2	Fill?	750		
				800		
1000	ORANGE-BROWN CLAYEY SILT, moist monotonous, mod plasticity, friable, low-mod stiffness	3	Fill?	850		
				900		
1100	EOB 1200 NO GW	3	Fill?	950		
				1000		
1200	AH9 LOT 5	3	Fill?	1050		
				1100		
1300	DARK BR. MOIST TO SOIL	4	Fill?	1150		
				1200		
1400	LIGHT-MOD BR. CLAYEY SILTY CLAY, mod stiffness, mod plasticity, moist	4	Fill?	1250		
				1300		
1500	LIGHT BR. / GREY SILTY CLAY, trace sand high stiffness, mod-high plasticity, moist	5	Fill?	1350		
				1400		
1600	EOB 1200 NO GW	5	Fill?	1450		
				1500		
1700		5	Fill?	1550		
				1600		
1800		5	Fill?	1650		
				1700		
1900		5	Fill?	1750		
				1800		
2000		5	Fill?	1850		
				1900		
			Fill?	1950		
				2000		
				End Depth (m)		

Drill Method	Observations	 Ground Floor, Oceanbridge House, 25 Anzac Street, Takapuna Auckland 0622 09 445 8338 www.gwe.co.nz
Date Drilled		
Drilled By		
Shear Vane No.		





LOCATION:

APR LOT 10

Surface Conditions:

Sheet 1 of

Geological Unit

Depth (metres)

Lithologic Key



FILL



TOP SOIL



SAND



SILT SANDY



SILT



SILT CLAYEY



CLAY



ORGANIC SOILS

Depth (metres)

Groundwater

Shear Vane

Scala Penetrometer

200 Med - Dark w/ topsoil mat  
 600 light brown (tan) silty CLAY, moist, low-moist  
 plasticity, mod stiffness  
 TAN silty CLAY, moist, mod. stiffness, low-moist  
 plasticity  
 1000 - EOB 1000 NO GW

Start Depth (m)

- 50
- 100
- 150
- 200
- 250
- 300
- 350
- 400
- 450
- 500
- 550
- 600
- 650
- 700
- 750
- 800
- 850
- 900
- 950
- 1000
- 1050
- 1100
- 1150
- 1200
- 1250
- 1300
- 1350
- 1400
- 1450
- 1500
- 1550
- 1600
- 1650
- 1700
- 1750
- 1800
- 1850
- 1900
- 1950
- 2000

End Depth (m)

Drill Method

Date Drilled

Drilled By

Phone No.

Observations



Ground Floor, Oceanbridge House,  
 25 Anzac Street, Takapuna  
 Auckland 0622  
 09 445 8338  
 www.gwe.co.nz

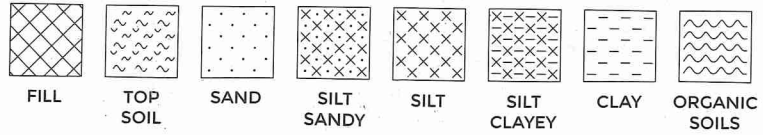


Surface Conditions:

Sheet 1 of

Geological Unit  
Depth (metres)

Lithologic Key



Depth (metres)

Groundwater

Shear Vane

Scala Penetrometer

Start Depth (m)

50		
100		
150		
200		
250		
300		
350		
400		
450		
500		
550		
600		
650		
700		
750		
800		
850		
900		
950		
1000		
1050		
1100		
1150		
1200		
1250		
1300		
1350		
1400		
1450		
1500		
1550		
1600		
1650		
1700		
1750		
1800		
1850		
1900		
1950		
2000		

200 Dark Dr. med. brown  
Med. br. loam with orange brown silt  
CLAY, med-high stiffness, med plasticity, moist

700  
1  
TAN loam (grey) silt CLAY, med-high stiffness  
med-high plasticity, moist  
increasing grey with depth

EOB now no GW

~~AH~~

AH 14 LOT 11 - Sand

3  
4  
Optical and silty, class, friable, dry-moist  
Very inconsistent, roots hill top  
intermittent brick, patches of silt  
minor aggregate throughout

now - EOB no GW

End Depth (m)

Drill Method	
Date Drilled	
Drilled By	
Shear Vane No.	

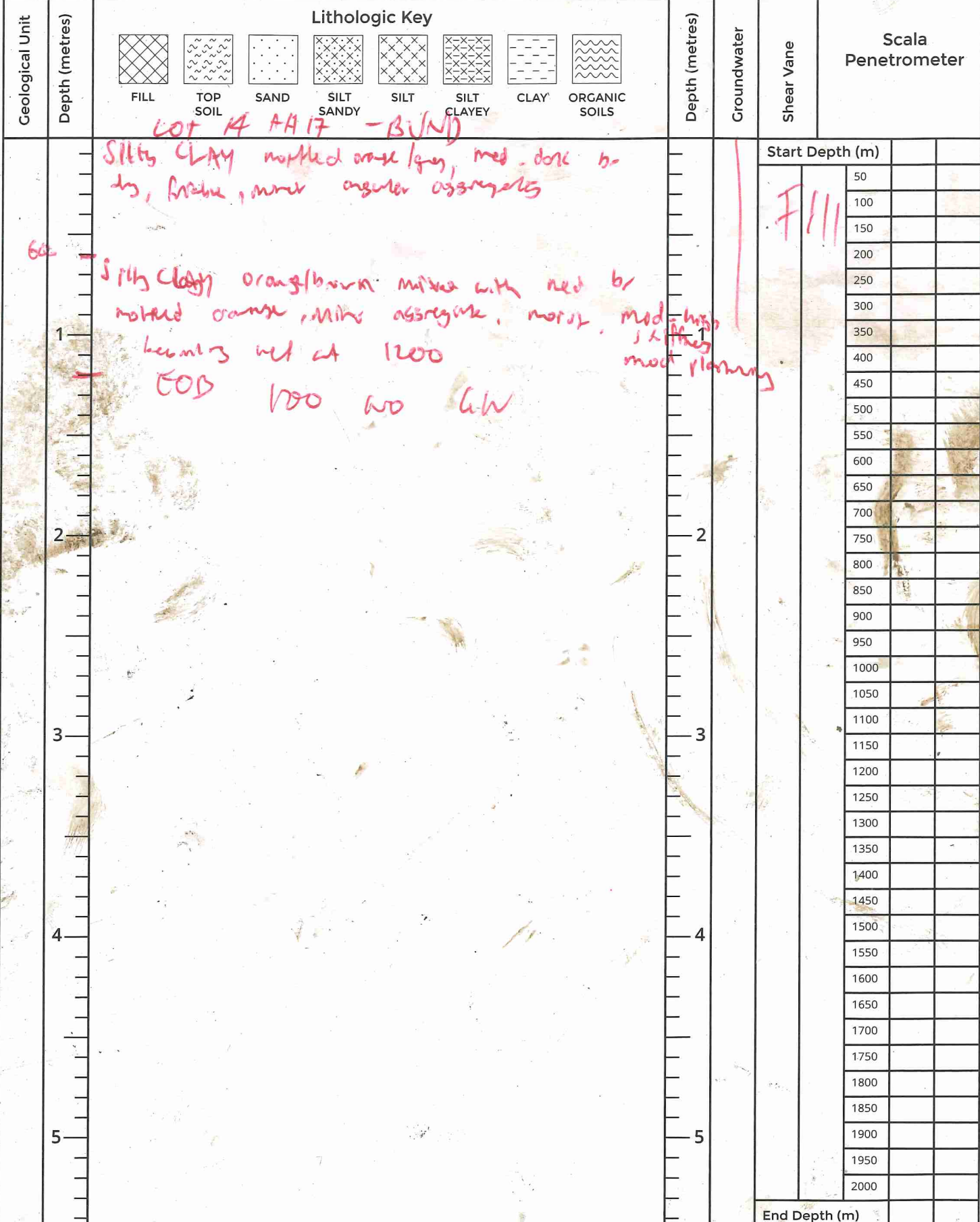
Observations



Ground Floor, Oceanbridge House,  
25 Anzac Street, Takapuna  
Auckland 0622  
09 445 8338  
www.gwe.co.nz

CLIENT:		Borehole/Test Pit
PROJECT:		LOT 14 AH 17
LOCATION:		

Surface Conditions: \_\_\_\_\_ Sheet 1 of \_\_\_\_\_



Drill Method	
Date Drilled	
Drilled By	
Shear Vane No.	

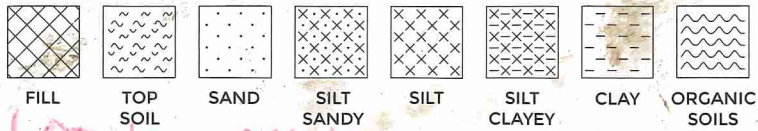
**Observations**



Geological Unit

Depth (metres)

Lithologic Key



Depth (metres)

Groundwater

Shear Vane

Scala Penetrometer

LOT 12 AH IT

SILTY CLAY, dry mottled mass, med-dark brown, friable, rootlets  
 hill 300-400  
 Ass wither molar aggregate from 500 onwards  
 very non-well-sorted

1200 : 50S 1200 NO GW

Start Depth (m)

50		
100		
150		
200		
250		
300		
350		
400		
450		
500		
550		
600		
650		
700		
750		
800		
850		
900		
950		
1000		
1050		
1100		
1150		
1200		
1250		
1300		
1350		
1400		
1450		
1500		
1550		
1600		
1650		
1700		
1750		
1800		
1850		
1900		
1950		
2000		

End Depth (m)

Drill Method	
Date Drilled	
Drilled By	
Shear Vane No.	

Observations

CLIENT: \_\_\_\_\_ Borehole/Test Pit  
 PROJECT: \_\_\_\_\_  
 LOCATION: \_\_\_\_\_

LOT 13 TILB

Surface Conditions: \_\_\_\_\_ Sheet 1 of \_\_\_\_\_

Geological Unit	Depth (metres)	Lithologic Key							Depth (metres)	Groundwater	Shear Vane	Scala Penetrometer		
		FILL	TOP SOIL	SAND	SILT SANDY	SILT	SILT CLAYEY	CLAY				ORGANIC SOILS	Start Depth (m)	
Fill	0 - 700	LOT 13 ATILB - BUND							0			50		
	700 - 1000	Clayey SILT light brown (red) mottled orange blue, mod. to soil, friable angular aggregates, some iron concretions, dry, rootlets all over										100		
Fill	1000 - 1000	Dark blue bluish mixed with yellow/brown silty clay, moderate stiffness, minor topsoil							1			150		
	1000 - 1000	mottled grey loamy angular aggregates, mod - high stiffness low - mod plasticity										200		
	1000 - 1000	EOB 1000 NO GW										250		
	1000 - 1000											300		
	1000 - 1000											350		
	1000 - 1000											400		
	1000 - 1000											450		
	1000 - 1000											500		
	1000 - 1000											550		
	1000 - 1000											600		
	1000 - 1000											650		
	1000 - 1000											700		
	1000 - 1000											750		
	1000 - 1000											800		
	1000 - 1000											850		
	1000 - 1000											900		
	1000 - 1000											950		
	1000 - 1000											1000		
	1000 - 1000											1050		
	1000 - 1000											1100		
	1000 - 1000											1150		
	1000 - 1000											1200		
	1000 - 1000											1250		
	1000 - 1000											1300		
	1000 - 1000											1350		
	1000 - 1000											1400		
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	1000 - 1000											1550		
	1000 - 1000											1600		
	1000 - 1000											1650		
	1000 - 1000											1700		
	1000 - 1000											1750		
	1000 - 1000											1800		
	1000 - 1000											1850		
	1000 - 1000											1900		
	1000 - 1000											1950		
	1000 - 1000											2000		
	1000 - 1000											End Depth (m)		

Drill Method		Observations
Date Drilled		
Drilled By		
Shear Vane No.		



CLIENT:		Borehole/Test Pit	
PROJECT:		LOT 15	AM 11 POND
LOCATION:			
Surface Conditions:		Sheet 1 of	

Geological Unit	Depth (metres)	Lithologic Key						Depth (metres)	Groundwater	Shear Vane	Scala Penetrometer
		FILL	TOP SOIL	SAND	SILT SANDY	SILT	SILT CLAYEY				

Geological Unit	Depth (metres)	<p>LOT 15 AM 11 POND</p> <p>SILTY CLAY, dark brown w/ orange mottling moist, friable, minor to pebbles, minor aggregate</p> <p>→ SILTY CLAY, yellow/ tan mixed with orange brown, mottled, mod sh<sup>high</sup> pebbles, white pebbles, moist minor aggregate, low-mod plasticity</p> <p>→ ZOB R00 K00 L CW</p> <p>NOTE: Next to irrigation line</p>	Depth (metres)	Groundwater	Shear Vane	Start Depth (m)			
						50			
							100		
							150		
							200		
							250		
							300		
							350		
							400		
							450		
							500		
							550		
							600		
							650		
							700		
							750		
							800		
							850		
							900		
							950		
							1000		
							1050		
							1100		
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							1650		
							1700		
							1750		
							1800		
							1850		
							1900		
							1950		
							2000		
							End Depth (m)		

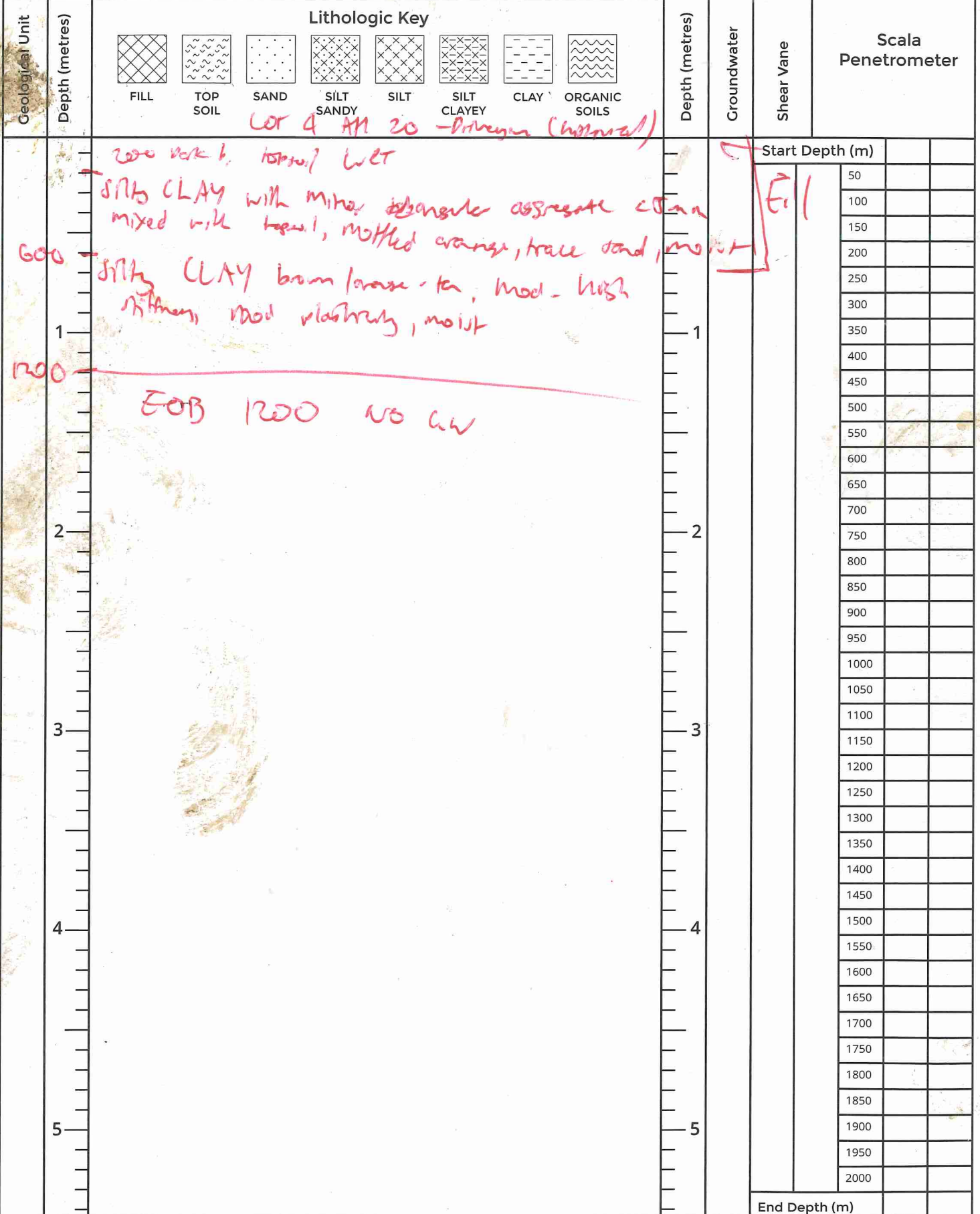
Drill Method		Observations
Date Drilled		
Drilled By		
Shear Vane No.		





CLIENT:		Borehole/Test Pit
PROJECT:		
LOCATION:		LOT 4 AH20 - DRIVEWAY <sup>OLD</sup>

Surface Conditions: \_\_\_\_\_ Sheet 1 of \_\_\_\_\_



200 work to topsoil wet  
 silty CLAY with minor angular aggregate clay  
 mixed with gravel, mottled orange, trace sand, moist  
 600 silty CLAY brown loose to mod - high  
 stiffness, mod plasticity, moist  
 1200 EOB 1200 no GW

Start Depth (m)		
50		
100		
150		
200		
250		
300		
350		
400		
450		
500		
550		
600		
650		
700		
750		
800		
850		
900		
950		
1000		
1050		
1100		
1150		
1200		
1250		
1300		
1350		
1400		
1450		
1500		
1550		
1600		
1650		
1700		
1750		
1800		
1850		
1900		
1950		
2000		

Drill Method	
Date Drilled	
Drilled By	
Shear Vane No.	

Observations



787 Karpas Coast Hwy, 11 Tue

AH22 0-100 - TS, brown  
 100-1,200 - orange sticky clay,  
 some silt, not moist - a  
 bit plastic, getting lighter  
 (yellow/grey) at 1,000mm

AH23 same as AH22

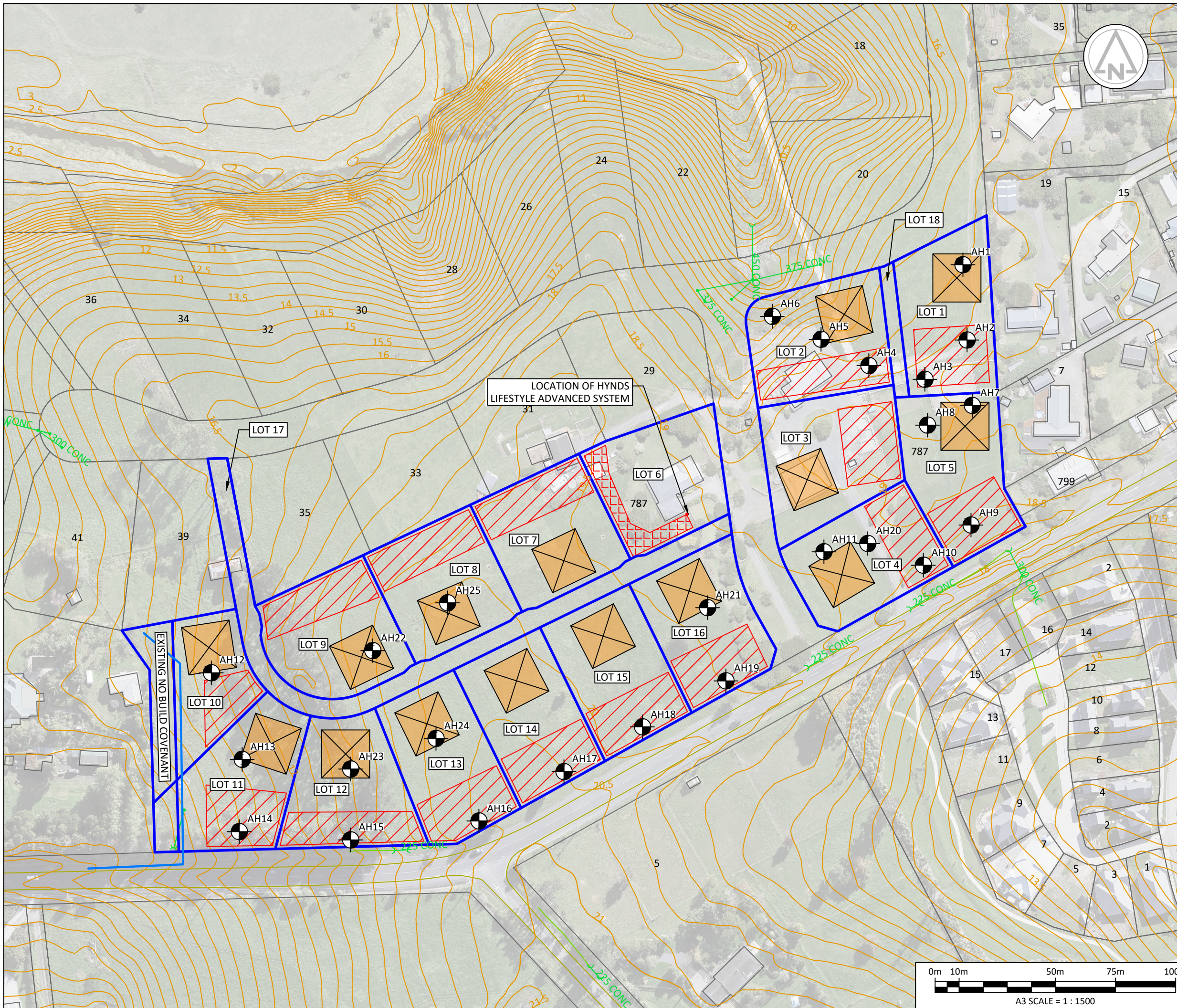
AH24 0-150 - TS, brown, silty  
 150-600 - clayey silt orange,  
 friable, not sticky, not  
 moist, crumbly  
 600-1,200 - orange sticky clay,  
 some silt, not moist,  
 a bit plastic, getting  
 lighter (yellow/grey)  
 at 1,000mm

AH25 same as AH22.

**APPENDIX B**  
**CONCEPT WASTEWATER SITE PLAN**

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- NOTES:**
1. DRAWING IS BASED ON SITE PLAN PREPARED BY C&R SURVEYORS LIMITED (JOB NO. 5177-SP STAGE 2, DATED 11/05/2021)
  2. ADDITIONAL DATA FROM AUCKLAND COUNCIL GEOMAPS (CAPTURED 21/06/2020).
  3. FINAL LOCATION OF WASTEWATER TREATMENT PLANT AND IRRIGATION AREA TO BE CONFIRMED ON-SITE.
  4. PROPOSED IRRIGATION AREA = 720m<sup>2</sup> (INCLUDES 50% RESERVE AREA).
  5. LOT 10 DISPOSAL AREA MAY BE REDUCED DUE TO OVERLAND FLOWPATH
  6. MINIMUM SEPARATION DISTANCES  
1.5m FROM PROPERTY BOUNDARIES  
3.0m FROM DWELLINGS  
10m FROM WATERCOURSES
  7. DO NOT SCALE FROM THIS DRAWING

**LEGEND**

PROPOSED BUILDING PLATFORM (400m <sup>2</sup> )	
OVERLAND FLOW PATH	
TOTAL INDICATIVE WASTEWATER FIELD AREA (720m <sup>2</sup> )	
EXISTING WASTEWATER FIELD ON LOT 6 (300m <sup>2</sup> ) 100% RESERVE AVAILABLE	
LOCATION OF AUGER HOLES	

**PLOT STATUS: FOR CONSENT**

REV	AMENDMENT	AY	DW	GW	APPD	DATE
0	FIRST ISSUE					05/07/21

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**PROJECT:**  
 787 KAIPARA COAST HIGHWAY  
 KAUKAPAKAPA  
 LOT 1 DP 523159, LOT 2 DP 52315

**TITLE:**  
 WASTEWATER SITE PLAN

**CLIENT NAME:**  
 RIVERVIEW PROPERTIES LIMITED

<b>SCALE:</b> 1:1500	A3
<b>PROJECT No:</b> J3086	<b>DRAWING No:</b> 500
	<b>REV</b> 0

