

Soil and Land Use Capability classification assessment

SL1 Industrial



Prepared for:	SL1 Consortium (SL1C)
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Introductory statements

This assessment has been prepared as an expert report for a substantive application under the Fast-track Approvals Act 2024. Dr Reece Hill undertook the on-site soil and land use capability assessment on 4 October 2023 and 5 November 2025, comprising approximately 60 soil auger observations, and prepared this report, including the land use capability classification, the NPS-HPL clause 3.5(7) analysis, and the Waipā District Plan high class soil assessment. Dr Tanya O'Neill prepared the draft desktop assessment components. Both authors have reviewed this report in full. Each is responsible for the content within their area of expertise as set out in the statements below.

This report does not constitute a detailed highly productive land assessment. It provides the soil and LUC information that such an assessment relies on, including for the matters in clause 3.10 of the NPS-HPL: the productive capacity of the Industrial Site and the physical constraints on that capacity.

Dr Reece Hill

I am Dr Reece Hill, principal of BeatsonHill Limited trading as Landsystems, a soil science and land use capability consultancy based in Hamilton. I hold a PhD in Soil Science from Lincoln University (2000), a Master of Applied Science in Soil Science from Lincoln University (1994), and a Bachelor of Science from the University of Waikato (1988). I have 19 years' experience as a soil scientist at Waikato Regional Council and have practised as an independent soil consultant since March 2018. I am a current member and past President (2014 to 2016) of the New Zealand Society of Soil Science.

My work covers soil characterisation and mapping, land use capability assessment, highly productive land assessment under the National Policy Statement for Highly Productive Land 2022, and regional soil quality monitoring. I have undertaken property scale soil and LUC assessments in the Northland, Auckland, Waikato, Bay of Plenty, Hawke's Bay, Wellington, Tasman and Otago regions. I have prepared soil and land use capability reports supporting resource consent applications, plan changes and fast-track consenting applications, and have given expert evidence at council hearings and in the Environment Court.

Dr Tanya O'Neill

I am Dr Tanya O'Neill, soil and land consultant and director of Soil Synergy Limited, based in Hamilton. I am engaged by BeatsonHill Limited trading as Landsystems to undertake soil and land use capability assessment work, including the desktop assessment components described in this report. I hold a PhD in Earth Sciences from the University of Waikato (2013), a Master of Science with First Class Honours in Earth Sciences from Massey University (2006), and a Bachelor of Science with First Class Honours in Earth Sciences from Massey University (2003).

I am a qualified pedologist. I lectured and taught in soil science at the University of Waikato from 2015 to 2023, latterly as a Senior Lecturer in the School of Science, including courses in soil science, soil and water management, and soil resources and risks. I have undertaken consultancy work since 2016 alongside my academic role, including ongoing environmental consultancy for the Scott Base Redevelopment in Antarctica since 2018, and have practised full-time as an independent soil and land consultant since 2023. My work covers soil characterisation and mapping, soil quality monitoring, land use capability assessment, and geographic information system mapping. I have undertaken property scale soil and LUC assessments in the Waikato, Auckland, Wellington, South Canterbury and Otago regions. I have been a member of the New Zealand Society of Soil Science since 2008 and an Executive Council member since 2018.

Code of Conduct

Dr Reece Hill

I have read the Code of Conduct for Expert Witnesses contained in the Environment Court Practice Note 2023 and referred to in the Fast-track Approvals Act 2024: Panel Convenors' Practice and Procedure Guidance. This assessment has been prepared in compliance with that Code. The information I present is within my area of

expertise, except where I state that I am relying on information provided by another party. I have not knowingly omitted facts or information that might alter or detract from opinions I express.

Dr Tanya O'Neill

I have read the Code of Conduct for Expert Witnesses contained in the Environment Court Practice Note 2023 and referred to in the Fast-track Approvals Act 2024: Panel Convenors' Practice and Procedure Guidance. This assessment has been prepared in compliance with that Code. The information I present is within my area of expertise, except where I state that I am relying on information provided by another party. I have not knowingly omitted facts or information that might alter or detract from opinions I express.

1. Introduction

This report has been commissioned to understand the soil and Land Use Capability (LUC) classifications present on the site, the productive and non-productive capacity of the site and any modified soils present.

Landsystems undertook a soil and LUC classification assessment of a 55.3 ha area, being part of the wider SL1 Industrial area. That 55.3 ha area is referred to in this report as the 'Industrial Site', and comprises parts of Lot 2 DP 603134, Lot 1 DP 603134, Lot 1 DP 584573, Lot 1 DPS 59491 and Lot 1 DP 486522, at Wickham Street, Hamilton 3204. The Industrial Site comprises two areas, bisected by the Hamilton Southern Links designation (Figure 1). The purpose of the assessment was to confirm the soils and LUC units at property scale. The assessment included desktop and on-site assessment components. All areas and proportions reported in this report are of the Industrial Site.

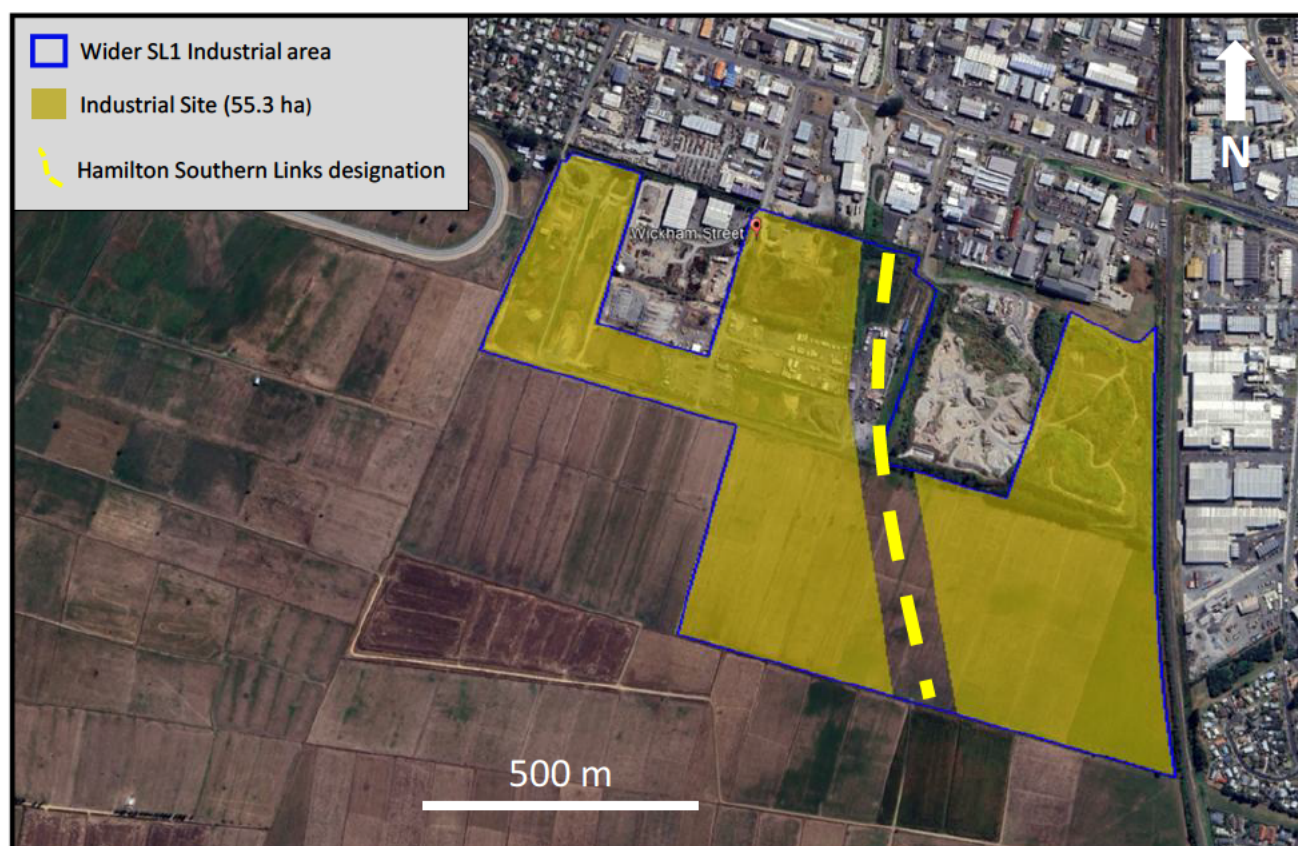


Figure 1. Industrial Site (55.3 ha) within the wider SL1 Industrial area.

Note: Two soil and Land Use Capability assessments have been prepared for the SL1 Consortium, one residential and one industrial. Sections 3 to 6 and Section 8 are common to both, and are repeated so that either report can be read on its own. Readers of the other report need not read them again.

2. The Industrial Site and Project

The wider SL1 Industrial area is a contiguous industrial extension to the south of Hamilton, and forms part of the wider Southern Links (SL1) Growth Cell, a circa 440 ha contiguous land area that stretches the south-western edge of Hamilton that includes the Hamilton Southern Links (RoNS) designation. The Industrial Development forms part of the listed project, which includes both residential and industrial components and together comprises circa 106 ha of the overall SL1 Growth Cell. The Industrial Development is in joint ownership and is currently used for a mix of land use activities. As noted below, much of the Industrial Site has been extensively modified, while the southern parts of site are subject to rural and related activities. The landholding includes four parcels Lot 2 Deposited Plan 603134, Lot 1 Deposited Plan 603134 both within Southpark Agri Development Limited landholdings (circa 50 ha), and Lot 1 Deposited Plan 584573 Industrie Property Tahī Limited and S&S Property Investments Limited (7.8 ha) and Lot 1 Deposited Plan 396081 and Lot 1 Deposited Plan 486522 within Industrie Property Tahī Limited landholding (2.1 ha).

The project seeks approval for a Substantive Application under the Fast-track Approvals Act 2024 for a comprehensively master planned and staged industrial and residential development. This includes all necessary resource consents under the Resource Management Act 1991, including regional, district approvals where required.

The industrial component provides for the establishment of 60 ha gross developable industrial land, together with associated infrastructure and services, including roading and associated stormwater ponds. The proposed industrial development is underpinned by a series of design principles, with a focus on creating a functional, efficient and contiguous industrial development that underscores the locational attributes of SL1 Growth Cell, the Hamilton Southern Links designation and future industrial growth. An integrated roading network which connects to both existing and planned infrastructure underpins this approach.

The proposal includes substantial enabling works to establish developable land, including bulk earthworks across the site and necessary pre-load to manage ground conditions. An integrated stormwater management system including wetlands, detention/attenuation devices and treatment ponds are designed with the intent to discharge to ground water as relevant.

Access and integration with the surrounding Hamilton area is provided through connected transport framework, including the establishment of intersections, roading, and walking and cycle networks, along with upgrades to existing transport infrastructure. The industrial development is proposed to be serviced via a coordinated strategy, including the extension of public networks, upgrades, and installation of appropriate infrastructure.

3. LUC background

LUC classification is the common method for assessing land in New Zealand; it uses the Land Use Capability System, which is part of the New Zealand Land Resource Inventory (NZLRI) as produced by the Water and Soil Division of the Ministry of Works and Development for the National Water and Soil Conservation Organisation during the 1970s. In 2021, the 3rd Edition (revised & reprinted) of the LUC Survey Handbook¹ (LUC Handbook) was published and has been used for this assessment. The LUC uses a systematic arrangement of different kinds of land according to those properties that determine its capacity for permanent sustained production, where the word “capability” is used in the sense of “suitability for productive use” after taking into account the physical limitations the land may have.

The LUC classification is specifically designed to provide an index of versatility. There are eight LUC classes (**Figure 2**) arranged in order of increasing degree of limitation or hazard to use; and a decreasing order of use, from Class 1 to 8.

¹ Lynn IH, Manderson AK, Page MJ, Harmsworth GR, Eyles GO, Douglas GB, Mackay AD, Newsome PJF 2021. Land Use Capability Survey Handbook – a New Zealand handbook for the classification of land, 3rd ed. (revised & reprinted). Hamilton, AgResearch; Lincoln, Manaaki Whenua – Landcare Research New Zealand Ltd; Lower Hutt, GNS Science. 163p.

↓ Increasing limitations to use ↓	LUC Class	Arable cropping suitability†	Pastoral grazing suitability	Production forestry suitability	General suitability	↓ Decreasing versatility of use ↓
	1	High ↓ Low	High ↓ Low	High ↓ Low	Multiple use land	
	2					
	3					
	4					
	5	Unsuitable	Low ↓ Unsuitable	Low ↓ Unsuitable	Pastoral or forestry land	
	6					
	7					
	8					
		Unsuitable	Unsuitable	Conservation land		

Figure 2. Increasing limitations to use and decreasing versatility of use from LUC Class 1-8.

Within each LUC Class the land is assigned a subclass according to the kind of limitation (e = Erodibility, w = Wetness, s = Soil limitations within the rooting zone, c = Climate). At the most detailed level LUC groups together those inventory units which respond similarly to the same management, and which are suitable for the same kinds of crops, pasture, or forest species with the same potential yield and which require the application of the same conservation measures.

The LUC worksheets were compiled from all relevant databases of land resource documents available at the time, consequently some sheets suffered from a lack of information that only detailed soil and geological surveys could have provided. Therefore, there are **scale limitations**, which need to be considered, especially when interpretation is required at the individual property scale.

The LUC units displayed on the 1970s worksheets remain reasonably robust but are subject to change. For example, the second edition (1993) Northland region worksheets were mapped at the more detailed scale of 1:50 000, replacing the earlier first edition 1:63,360 maps. In the first edition, 69 LUC units were defined compared with 91 LUC units in the second edition - about 60 of the first edition classification units changed.

The average area for a map unit is 125 ha, however, at the 1:50 000 scale of mapping it is theoretically possible to delineate an unhooked inventory map unit (no vinculum) area of 60 ha (60 ha = 600 m by 1000 m) provided the geology, soil, vegetation, erosion and slope are uniform.

The **purpose of this background information** is to illustrate and emphasise that the NZLRI information provides excellent physical base data for planners (a planning tool) but is not fit for purpose as a plan (map) unless undertaken at the correct scale. This assessment fulfils that purpose.

4. National Policy Statement for Highly Productive Land

The National Policy Statement for Highly Productive Land 2022 (NPS-HPL) came into force on the 17th of October 2022. The NPS-HPL was amended in December 2025, with amendments taking effect from 15 January 2026.²

“Highly productive land” is defined as:

land that has been mapped in accordance with clause 3.4 and is included in an operative regional policy statement as required by clause 3.5 (but see clause 3.5(7) for what is treated as highly productive land before the maps are

² Ministry for the Environment. 2022 (amended December 2025). National Policy Statement for Highly Productive Land 2022. New Zealand Government, Wellington.

included in an operative regional policy statement and clause 3.5(6) for when land is rezoned and therefore ceases to be highly productive land).

Landsystems' understanding is that NPS-HPL clause 3.5(7) applies because maps produced in accordance with clause 3.4 have not yet been included in an operative regional policy statement as required by clause 3.5. Under the December 2025 amendments to the NPS-HPL, regional councils are not required to undertake mapping of highly productive land in regional policy statements prior to 31 December 2027 (clause 4.1(2)).³ Clause 3.5(7) (as amended) states:

(7) Until a regional policy statement containing maps of highly productive land in the region is operative, each relevant territorial authority and consent authority must apply this National Policy Statement as if references to highly productive land were references to land that:

(a) is:

(i) zoned general rural or rural production at the commencement date; and

(ii) LUC 1, 2 or 3; but

(b) is not:

(i) identified for future urban development at the commencement date; or

(ii) subject to a council initiated, or an adopted, notified plan change to rezone it from general rural or rural production to urban or rural lifestyle at the commencement date; or

(iii) subject to a resource consent application for subdivision, use or development on LUC 3 land for any activity other than rural lifestyle, where that consent has been lodged at or after the commencement date.

The NPS-HPL includes the following definition of LUC 1, 2, or 3 land:

LUC 1, 2, or 3 land means land identified as Land Use Capability Class 1, 2, or 3, as mapped by the New Zealand Land Resource Inventory, or by any more detailed mapping in place at the commencement date that uses the Land Use Capability classification.

For the Industrial Site, no council-accepted "more detailed mapping" was in place at the NPS-HPL commencement date of 17 October 2022. The relevant NZLRI mapping is therefore the NZLRI Land Use Capability 2021 accessed via the LRIS Portal.

Clause 3.5(7)(b)(iii) applies only to LUC 3 land. The NZLRI maps the Industrial Site entirely as LUC unit 2s5, which is LUC class 2, so the mapping to which clause 3.5(7) is anchored identifies no LUC 3 land within the Industrial Site.

A Strategic Land Agreement dated 3 October 2022 was entered into between Hamilton City Council and Waipā District Council which identified the SL1 Growth Cell (including the Industrial Site) as an area of land that is intended to come within the Hamilton City Council boundary. On 26 January 2023, Hamilton City Council and landowners within the SL1 Growth Cell entered into a Memorandum of Understanding to work collaboratively to explore the urbanisation of the SL1 growth cell. The Strategic Land Agreement pre-dates the NPS-HPL coming into effect (17 October 2022). The Strategic Land Agreement outlines the agreed principles to support transfer and urbanisation of this land and demonstrates the strategic intent to bring this land into Hamilton City Council's jurisdiction for the purposes of urban development. This intent is further represented via the recent North Waipā – South Hamilton Spatial Study by Futureproof designed to inform the future development strategy and delivery framework. The Industrial Site and its boundaries are clearly identified in this document. Whether the Industrial Site was identified for future urban development at the commencement date, within the meaning of clause 1.3 and clause 3.5(7)(b)(i) of the NPS-HPL, is a planning matter outside the scope of this soil and LUC assessment. It is addressed in the planning evidence prepared for the application. This report

³ Clause 4.1(2), Ministry for the Environment. 2022 (amended December 2025). National Policy Statement for Highly Productive Land 2022. New Zealand Government, Wellington.

proceeds on the basis that the Industrial Site is treated as highly productive land under the clause 3.5(7) interim definition.

Importantly significant works have occurred over much of the Industrial Site including those authorised by resource consent LU/0263/10 for bulk earthworks of 517,000 m³ over the eastern portion of the Industrial Site (approved 12 February 2021, and given effect to) and resource consent LU/0279/22 for bulk earthworks of 101,900 m³ over the western portion of the Industrial Site (approved 1 June 2023, and given effect to). The approved consents authorise bulk earthworks over most of the SL1 Industrial area. Both consents have been given effect to, but at the date of this assessment the earthworks had not been undertaken across the whole of the consented extent. Plans showing the extent of the resource consents for bulk earthworks (LU/0263/10 and LU/0279/22) are provided in **Appendix 1**.

The on-site assessment described in Sections 9 to 11 of this report was undertaken after the NPS-HPL commencement date. It is not relied on to redefine the extent of highly productive land under clause 3.5(7), which remains anchored to the NZLRI mapping in place at the commencement date. The on-site assessment is, however, a more detailed and current characterisation of the actual soils, slopes, drainage and other physical limitations across the Industrial Site, and is used to support the Waipā District high class soil assessment and to inform the assessment of the Industrial Site's actual productive potential and limitations.

5. Waipā District Plan definition of high class soil

'High class soils' means those soils of Land Use Capability classes 1 and 2 (excluding Peat Soils), and soils of Land Use Capability classes 3e1 and 3e5 classified as Allophanic Soils using the New Zealand Soil Classification.

6. Non-productive land and modified areas

For an accurate assessment of LUC classification for a property, the assessment should be based on the current condition of the area (i.e. mapped in current state). This is important because land management practices (e.g. the placement of tracks, excavation of drains, and general earthworks) result in irreversible changes to the soil (i.e. changes other than those that can be remediated by management practices and return the soil to its intrinsic state). These areas are referred to as non-productive land. Examples of non-productive land include native vegetation, wetlands and riparian areas, tracks, and buildings and curtilage.

Non-productive land can include areas where the soil has been modified by truncation, placement of fill or extensive mixing. Where these areas do not resemble a functioning soil, the areas are not considered to be available for primary production (i.e. they are non-productive land). Where these areas do resemble a functioning soil (such as the reinstatement of a soil profile following gravel extraction) the land can be assigned a LUC classification.

For this assessment the productive area of the site (to which the LUC classification can be applied) is the site area excluding non-productive land.

7. Regional scale soil and LUC map information (1:50,000 scale)

An initial desktop LUC assessment was undertaken for the entire Site. Available map information, soil reports and geospatial data included:

- New Zealand Land Resource Inventory (NZLRI) Land Use Capability 2021.⁴
- New Zealand Fundamental Soil Layers (NZFSL): Soil Drainage Class layer⁵
- S-map Online (providing map units of Soil Siblings)⁶

⁴ <https://iris.scinfo.org.nz/layer/48076-nzlri-land-use-capability-2021/>

⁵ <https://iris.scinfo.org.nz/layer/48104-fsl-soil-drainage-class/>

⁶ <https://smap.landcareresearch.co.nz/maps-and-tools/app/>

Map information from S-map Online, the NZFSL and the NZLRI is presented at a regional scale (approximately 1:50,000).

NZLRI (1:50,000 scale) soil and LUC classification

Based on the available NZLRI and NZFSL map information the soils and LUC units for the Industrial Site are mapped as shown in Figure 3.

Based on the NZLRI and NZFSL map information, 100% of the Industrial Site is mapped as very poorly drained, weakly decomposed Rukuhia peat on flat to gently undulating slopes (slope class A) with an LUC classification of 2s5. The NZLRI maps the wider SL1 Industrial area as LUC unit 2s5 in its entirety, so the balance of the wider area has the same regional scale classification as the Industrial Site.

Based on the 1:50,000 scale NZLRI LUC information⁷ and applying the NPS-HPL, LUC unit 2s5 land is considered highly productive land, and as such the entire Site is highly productive land (Table 1, Figure 3) even though much of the Industrial Site has been heavily modified and this is addressed in further detail at a site level assessment below.

Table 1. Summary of NZLRI soil and LUC map unit characteristics for the Industrial Site.

Soil type (NZSC Soil Order)	Parent material	Soil drainage	Slope class	LUC unit (limitation)	Area of Site, ha (%)*
Rukuhia peat (Organic Soil)	Peat	Very poorly drained	A	2s5 (soil)	55.3 (100)

*% areas rounded to whole number.



Figure 3. Soil, LUC units and the distribution of NPS-HPL highly productive land for the Industrial Site, derived from available regional scale NZLRI and NZFSL map information.

S-map Online

The S-map soil map information is sourced from S-map Online and is mapped at 1:50,000 scale. S-map soil polygons are only available on the S-map Online website. The soil names for each map unit are “soil siblings”,

⁷ <https://iris.scinfo.org.nz/layer/48076-nzlri-land-use-capability-2021/>

with a probability of occurrence (%) and certainty rating provided for each soil sibling in a map unit. S-map Online identified the soils for the Industrial Site as 82% Organic Soil, 7% Brown Soil, 5% Granular Soil, 3% Gley Soil and 3% Allophanic Soil (Figure 4). The soil siblings identified indicate that 82% of the area is very poorly drained, 3% poorly drained, 4% imperfectly drained, 8% moderately well drained and 3% well drained (Figure 5).

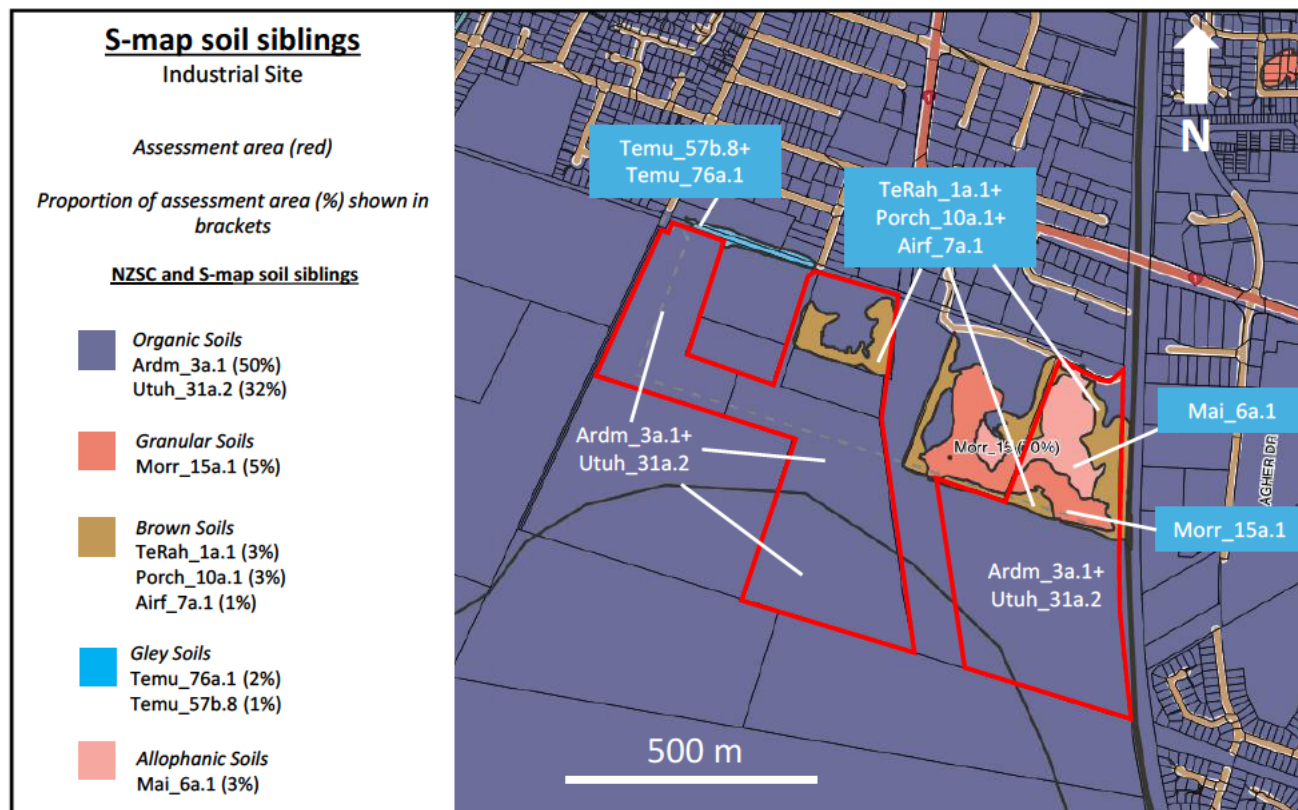


Figure 4. S-map soil classification for the Industrial Site.

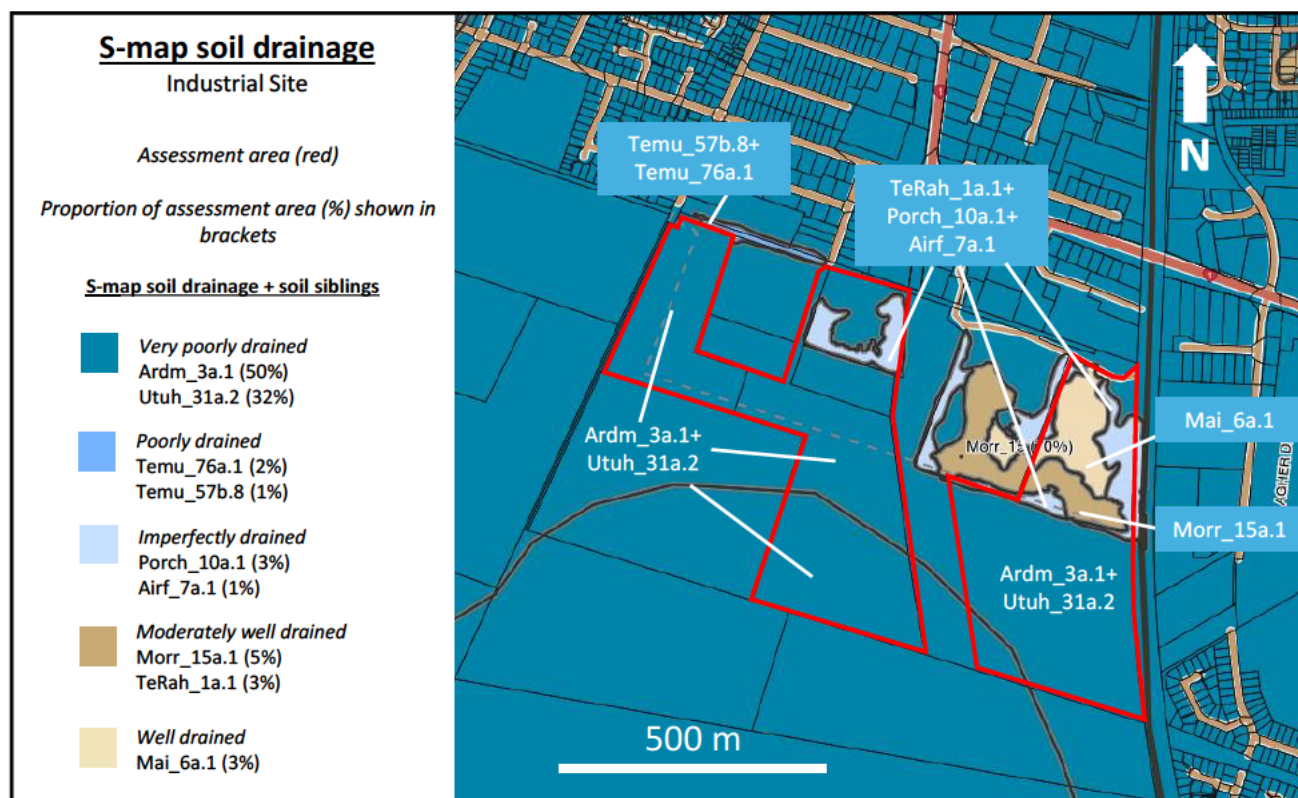


Figure 5. S-map derived soil drainage for the Industrial Site.

Table 2 provides a summary of the S-map soil sibling map unit characteristics for the Industrial Site, including parent material origin, soil material, soil texture, soil drainage, potential rooting depth and the approximate proportion of each sibling. All soils are deep (> 100 cm) and potential rooting depth is unlimited on seven of the nine siblings. On Ardm_3a.1 and Utuh_31a.2, which together account for approximately 82% of the Industrial Site, it is restricted to between 30 cm and 70 cm by anoxic conditions. This information is derived from S-map Online factsheets and can be sourced from the S-map Online website.⁸

Note: S-map Online does not accept an imported boundary file, so the Industrial Site extent was drawn on screen, and S-map statistics include non-dominant siblings. The Table 2 proportions are therefore indicative; the on-site mapping in Tables 3 to 5 is unaffected.

Table 2. S-map soil sibling map unit characteristics for the Industrial Site.

S-map soil sibling	Soil Order9 (Subgroup code)	Correlated soil series name ¹⁰	Parent material origin	Soil material	Soil texture	Soil drainage	Potential rooting depth	Proportion (%)
Ardm_3a.1	Organic (OFA)	Rukuhia	Peat	Not applicable	Peat	Very poorly drained	30–60 cm	50
Utuh_31a.2	Organic (OHM)	Te Rapa	Alluvium	Rhyolitic rock	Loamy peat over loam	Very poorly drained	50–70 cm	32
Morr_15a.1	Granular (NOT)	Hamilton	Tephra	Rhyolitic and andesitic rock	Clay	Moderately well drained	Unlimited	5
Mai_6a.1	Allophanic (LOT)	Ohaupo	Tephra	Rhyolitic and andesitic rock	Clay	Well drained	Unlimited	3
Terah_1a.1	Brown (BOT)	Ohaupo	Tephra	Rhyolitic and andesitic rock	Clay	Moderately well drained	Unlimited	3
Porch_10a.1	Brown (BOM)	Rotokauri	Colluvium	Rhyolitic and andesitic rock	Clay	Imperfectly drained	Unlimited	3
Temu_76a.1	Gley (GOT)	Rotokauri	Colluvium on alluvium	Rhyolitic and andesitic rock	Clay	Poorly drained	Unlimited	2
Airf_7a.1	Brown (BOM)	Whatawhata	Alluvium	Soft mudstone and soft sandstone rock	Clay	Imperfectly drained	Unlimited	1
Temu_57b.8	Gley (GOT)	Mangapiko	Alluvium	Soft mudstone and soft sandstone rock	Clay	Poorly drained	Unlimited	1

The S-map soil map information provides a more spatially detailed representation of the soils on the Industrial Site than the NZLRI 1:50,000 soil map information. However, because of the absence of land characteristics information (e.g. slope) for the soil map units, there is currently no direct correlation with LUC units. Some, but not all, of the S-map soil map units correlate to the soil series identified by the NZLRI map information. In this report, the DSIR's soil nomenclature (e.g. soil type and series names) has been retained in preference to the S-map soil sibling nomenclature to allow for direct correlation of the soils with the LUC units provided by the NZLRI map information and associated NZLRI Extended Legends.

⁸ <https://smap.landcareresearch.co.nz/maps-and-tools/app/>

⁹ NZSC – New Zealand Soil Classification: Hewitt AE (2010) New Zealand Soil Classification. 3rd ed. Landcare Research Science Series No. 1. Lincoln, Manaaki Whenua Press.

¹⁰ <https://smap.landcareresearch.co.nz/maps-and-tools/app/>

8. Regional scale map information limitations

The LUC classification can be applied (mapped) at any scale and regional scale LUC map units can differ from those identified at property scale. Property scale mapping is typically mapped at a scale of 1:10,000, while catchment and regional maps are mapped at 1:15,000 to 1:50,000 scale. The LUC Handbook sets out recommended mapping scales for inventory surveys and LUC mapping (p100).

Mapping LUC at a property scale can identify different LUC units (and map units) than depicted by regional scale LUC mapping. This is because property scale mapping includes more observations compared with regional scale mapping.

Soil and LUC maps are usually drawn at a specific scale depending on the smallest area of interest for a particular use and the density of field observations. For example, a 1:5,000 scale map requires on average four observations/ha while a 1:50,000 scale map requires 0.04 observations/ha (or four observations per 100 ha).

With GIS tools and geospatial databases, it has become easy to manipulate maps, creating the temptation to rescale a map beyond its original scale of collection. Enlarging maps from their original scale will not provide the same accuracy or contain more detail than a coarse scale map. This is because they are not based on sufficient field observations to delineate soil map units at the finer scales portrayed. For the regional scale LUC map information, map unit boundaries may not align with the topography (slope) and other geographic features (such as rivers or terraces). Therefore, to correctly identify and map the LUC units at property scale, on-site assessment using the LUC classification criteria described in Lynn et al. (2021) would be required.

The purpose of this background information is to illustrate and emphasise that the 1:50,000 scale NZLRI information provides excellent physical base data for planners (a planning tool) but is not fit for purpose as a plan (map) unless undertaken at the correct scale. Therefore, the on-site assessment in this report is considered more appropriate (and accurate) for providing soil and LUC information for the purpose of assessing the presence of high class soil and soil resources as a function of productive capacity and informing land productivity.

9. On-site LUC classification assessment

Method

Landsystems undertook an on-site property scale LUC assessment of the Industrial Site according to standard methods (Milne et al., 1995¹¹ and Lynn et al., 2021¹²). An initial on-site assessment covering part of the Industrial Site was undertaken on 4 October 2023, with an additional assessment of the full site on 5 November 2025.

The on-site mapping does not constitute a detailed soil survey rather the focus is on characterisation of soil and land properties to apply the LUC classification, in turn used to determine the extent of NPS-HPL highly productive land on the site. However, recorded soil properties are used to identify limitations that may affect the productivity of the site.

The on-site assessment included soil observations by hand auger across the site using a free survey approach. Approximately 60 soil auger observations (excluding additional observations for checking boundaries) were used to determine the LUC map units.

¹¹ Milne JDG, Clayden B, Singleton P.L, Wilson AD. 1995. Soil Description Handbook. Lincoln, New Zealand, Manaaki Whenua Press. 157p.

¹² Lynn IH, Manderson AK, Page MJ, Harmsworth GR, Eyles GO, Douglas GB, Mackay AD, Newsome PJF 2021. Land Use Capability Survey Handbook – a New Zealand handbook for the classification of land, 3rd ed. (revised & reprinted). Hamilton, AgResearch; Lincoln, Manaaki Whenua – Landcare Research New Zealand Ltd; Lower Hutt, GNS Science. 163p.

Observations of slope angle, topography and soil parent material were made over the relevant area. Soil augering up to 100 cm depth was used to assess soil properties such as soil horizons, drainage, plant root depths, depth to gravels, soil texture, structure, and colour.

All soils were assessed in current condition and areas with modified soils and areas considered to be non-productive land were identified and mapped. Soil series and types have been used for this report (as opposed to S-map soil siblings) to provide clearer correlation with LUC units provided by the regional NZLRI LUC map information. LUC classification was assigned based on the criteria provided in Lynn et al. (2021). LUC units were assigned based on the closest fitting LUC unit provided by the regional NZLRI LUC map information.

Mapping scale

The number of soil auger observations across the 55.3 ha Industrial Site equated to an approximate observation density of one observation per hectare (or one hectare per observation). Considering the site area as a whole, this density of observations (using conventional mapping techniques) is sufficient to support a map scale of 1:10,000.¹³

10. On-site LUC assessment

A summary of the soils and LUC units identified for the Industrial Site are provided in Table 3.

Table 3. Soils and dominant LUC units identified for the Industrial Site (in order of increasing limitations).

Soil type	Parent material	Soil drainage	Slope class	LUC unit	(LUC limitation) and comment
Kaipaki peaty loam	Peat over alluvium	Poorly drained	A+B (0 - 7°)	2w2	(wetness) Poor drainage with seasonally high water table
Rukuhia peat	Deep peat	Poorly drained	A (0 - 3°)	2s5	(soil) Poor drainage with seasonally high water table
Kaipaki peaty loam	Peat over alluvium	Poorly to very poorly drained	A+B (0 - 7°)	3w1	(wetness) Poor to very poor drainage despite drains, seasonal surface ponding and high water table
Rukuhia peat	Deep peat	Poorly to very poorly drained	A (0 - 3°)	3w1	(wetness) Poor to very poor drainage despite drains, seasonal surface ponding and high water table
Rukuhia peat	Deep peat	Very poorly drained with inundation	A (0 - 3°)	4w2	(wetness) Very poor drainage despite drains, prolonged surface ponding, prone to high water table and seepage from hills
Truncated and Fill Anthropogenic soils	Truncated subsoil or fill	Poor to imperfect	A - E (0 - 25°)	7s*	(soil) Either excavated soil into subsoil or placed fill greater than 30 cm, with minimal (0-5 cm) topsoil; variable topography and slopes. Not in productive use.
Non-productive land/modified	-	-	-	-	House and buildings with curtilage, excavated drains, tracks, mature tree areas, fill and earthworks.

*LUC class and limitation only as no corresponding LUC unit in NZLRI Extended Legend.

The detailed on-site mapping confirmed that the flat to undulating topography in pastoral use was entirely Organic soil (peat), with the larger farmed area Rukuhia peat and the smaller remnant areas in the western part of the Industrial Site, more mineralised Kaipaki peaty loam. Slightly lower areas with a higher water table

¹³ Page 12 - Grealish G. 2017. New Zealand soil mapping protocols and guidelines. Envirolink Grant: C09X1606. Manaaki Whenua –Landcare Research.

and very poor drainage were classified as LUC 3w1 or 4w2 if inundation was likely. On slightly higher topography with poor drainage, land with Rukuhia peat was classified as LUC 2s5, and Kaipaki peaty loam as 2w2.

Much of the remainder of Industrial Site has undergone modification, with a mix of excavation of the original soil, or placement of fill. On areas where some topsoil had developed (albeit variable in its presence), the land was classified as LUC 7s, to acknowledge the presence of the thin topsoil and its ability to support some vegetation. The 7s land although having some vegetation cover, has severe soil limitations, meaning it is unsuitable for cultivation, and other land uses such as pasture or forestry are marginal at best. Historic aerial imagery indicates that the larger two LUC 7s areas have undergone disturbance and modification and have not been in productive use since at least 2008 (Figure 6).

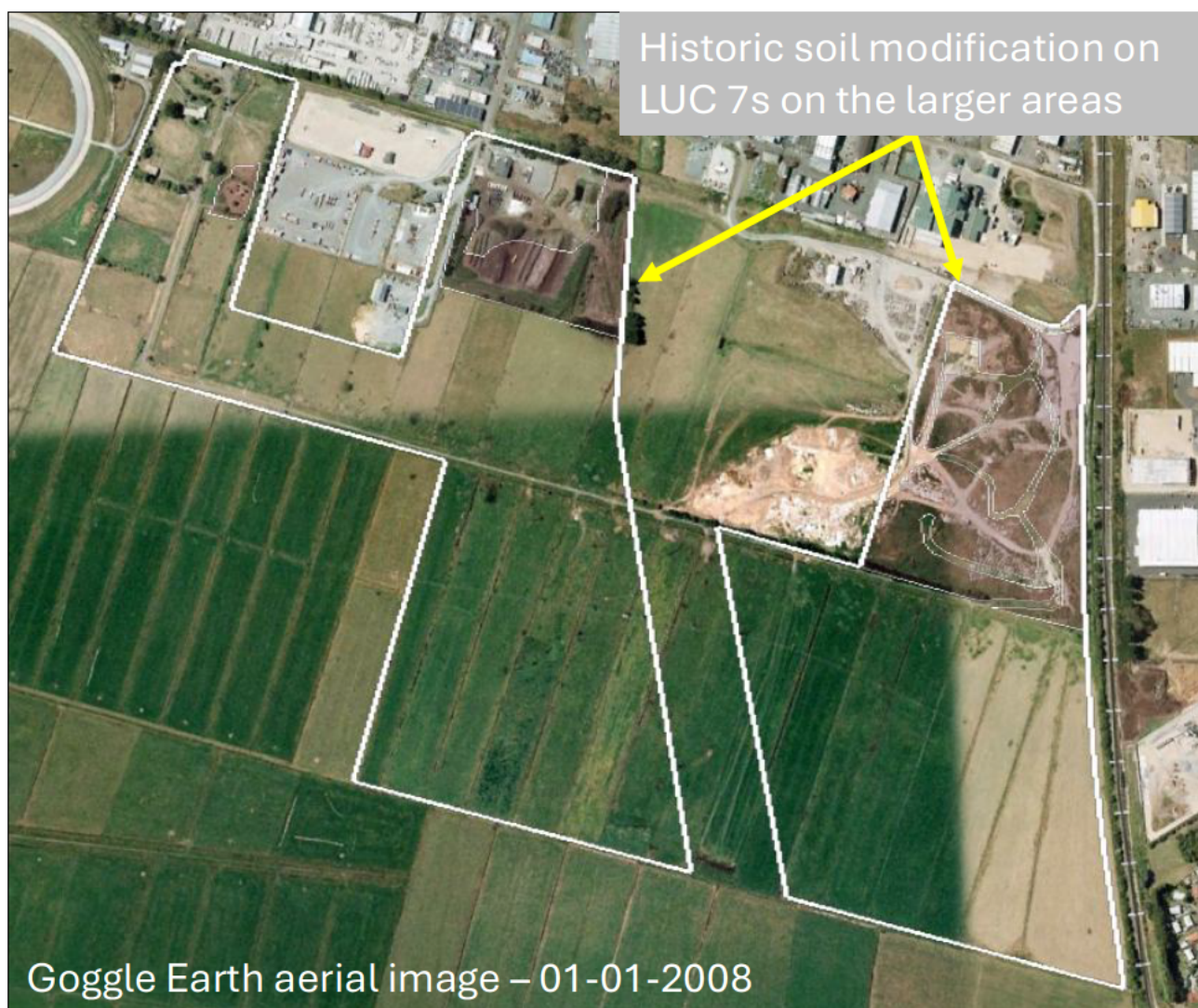


Figure 6. 2008 Google Earth aerial image showing soil modification and disturbance on LUC 7s areas.

The modified areas not classified as LUC 7s, have been classified as non-productive land, and are predominantly devoid of any soil and are not in productive use. Non-productive land on the Industrial Site includes an existing house and curtilage, buildings with curtilage, excavated drains, tracks, mature tree areas, fill and earthworks.

The soils for the dominant LUC units observed on the Industrial Site are shown in Figure 7. The soil profiles should be considered example soil profiles for each soil as the profile for actual soil observed in the field at any given point may differ slightly from the example shown. Examples of non-productive land, Anthropic soil with LUC 7s, and very poor soil drainage with ponding on LUC 3w1 land are shown in Figure 8.

The on-site mapped distribution of the dominant soils and dominant LUC units for the Industrial Site are shown in Figure 9 and Figure 10 respectively.

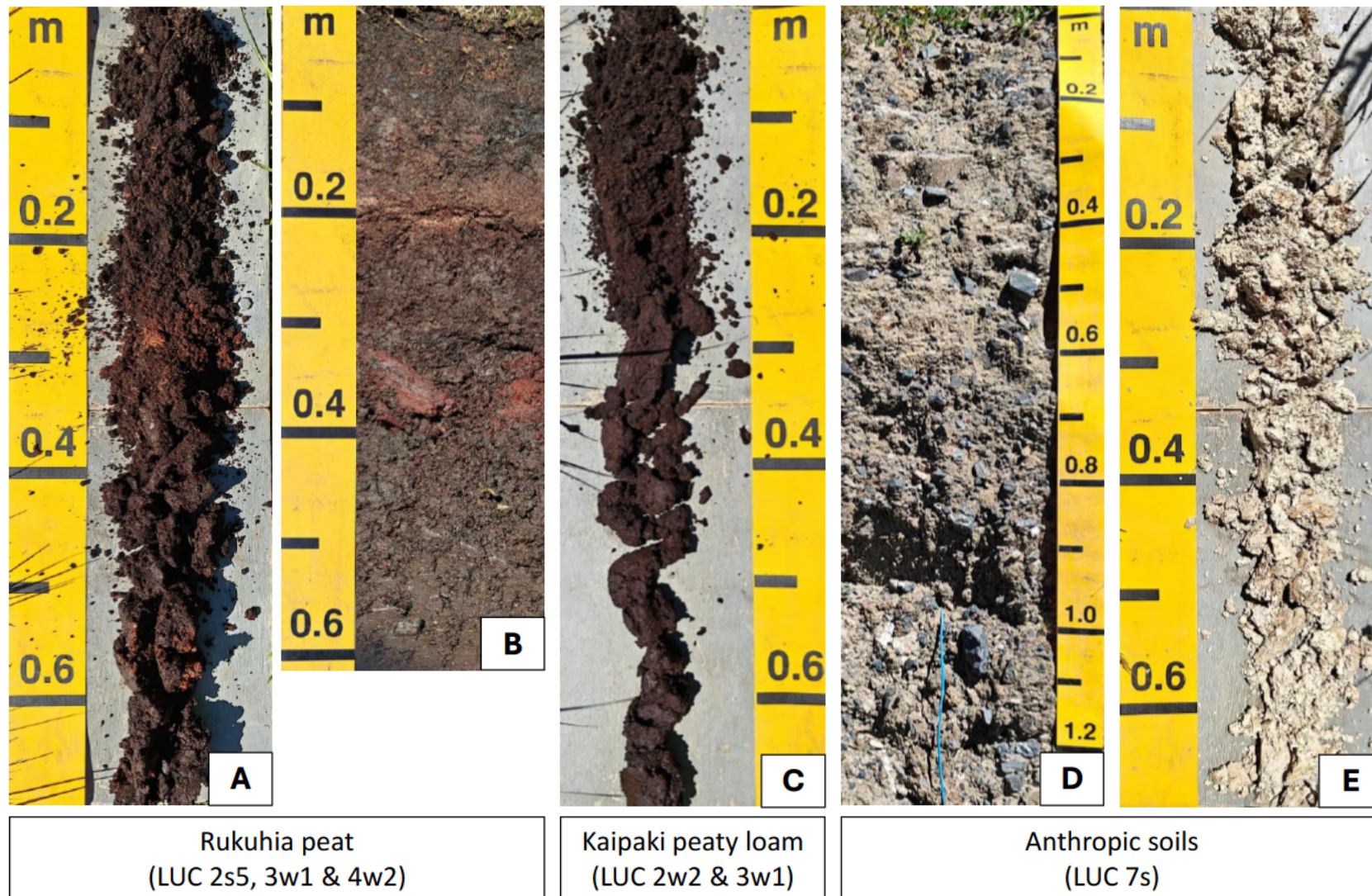


Figure 7. Example soil profiles for the dominant soils of the on-site mapped LUC units for the Industrial Site.

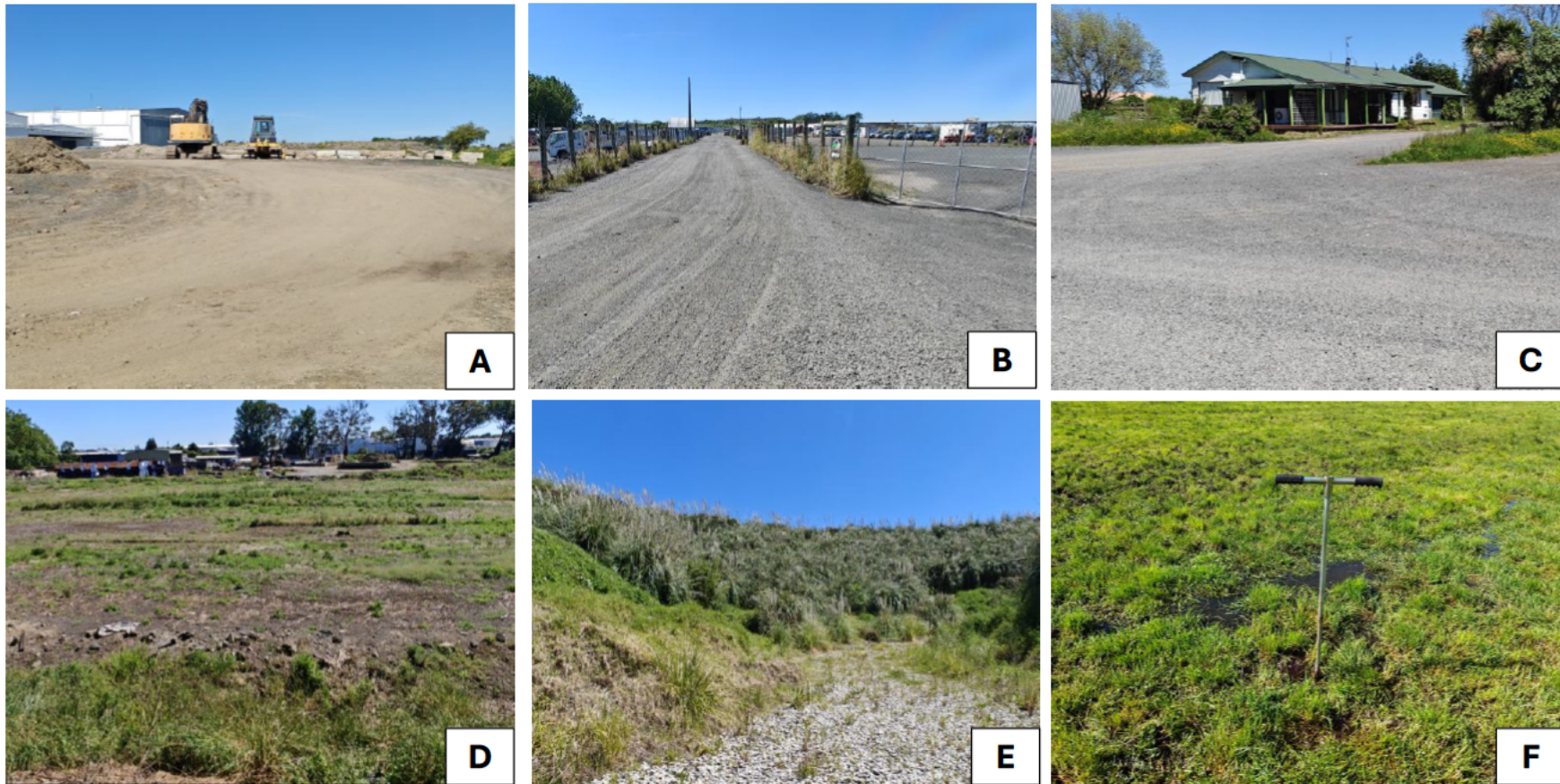


Figure 8. Examples of non-productive land (A, B and C), Anthropic soil with LUC 7s (D & E), and very poor soil drainage with ponding on LUC 3w1 land (F).

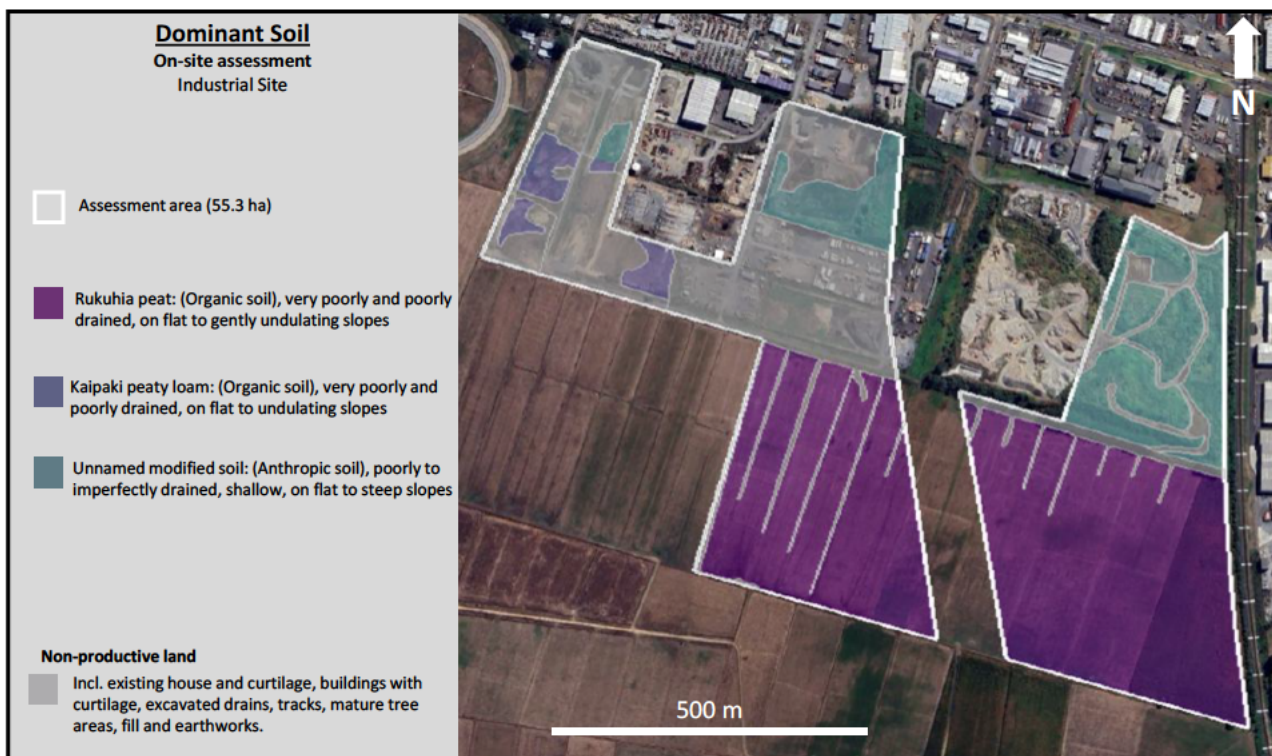


Figure 9. The distribution of dominant soils for the Industrial Site.¹⁴

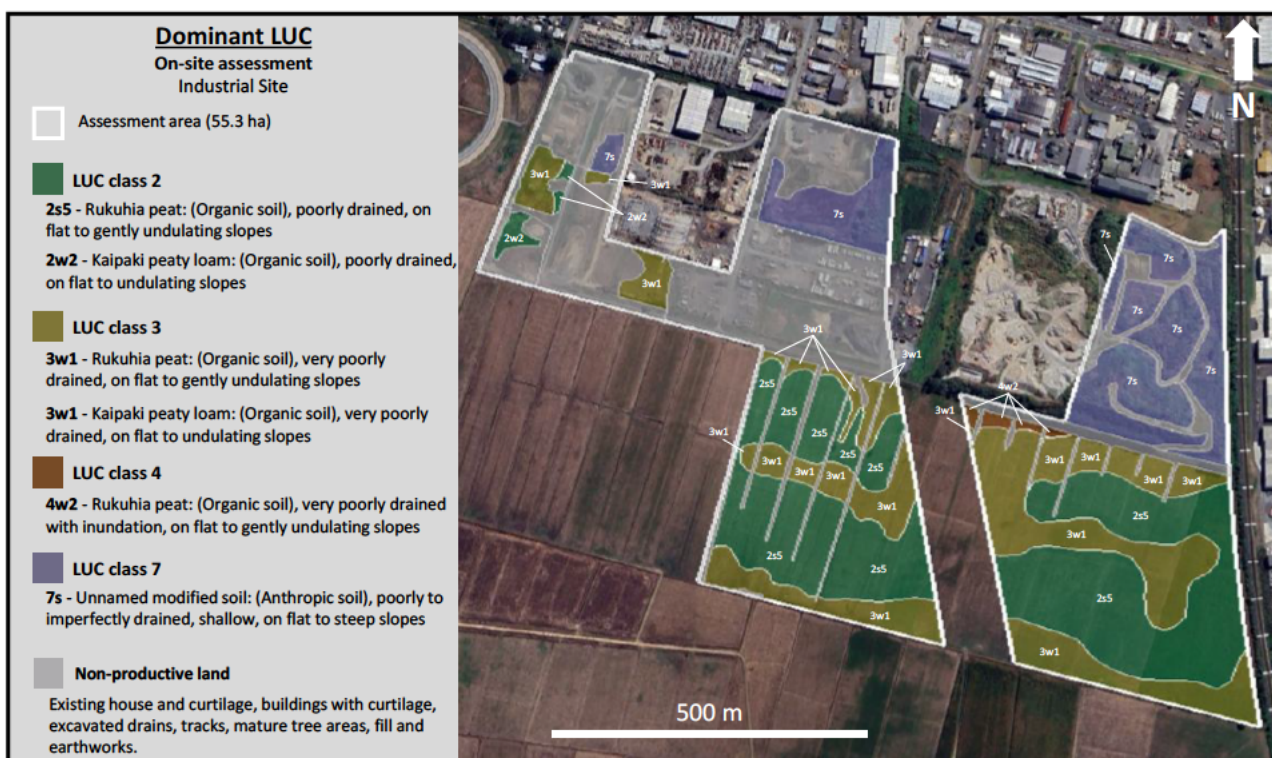


Figure 10. The distribution of dominant LUC units for the Industrial Site.¹⁵

¹⁴ A larger map image is provided in Appendix 2.

¹⁵ A larger map image is provided in Appendix 3.

11. Revised LUC classification

Based on the on-site assessment, aerial photographs of the Industrial Site and surrounding areas and soil auger observations, the original NZLRI delineated LUC map units differ from the LUC map units identified and mapped in the on-site assessment.

Based on the available NZLRI and NZFSL map information (Figure 3), 100% of the Industrial Site was mapped as very poorly drained Rukuhia peat on flat to gently undulating slopes (slope class A) with an LUC classification of 2s5.

A summary of the on-site mapped LUC unit areas for the Industrial Site is shown in Table 4.

Table 4. LUC classes, LUC units and dominant soil types for the Industrial Site, based on the LUC map units identified by the on-site assessment.

LUC class	Dominant LUC unit	Dominant soil type	LUC unit Area (ha)	LUC class area, ha, (%)*
2	2w2	Kaipaki peaty loam (poorly drained)	0.3	16.3 (29)
	2s5	Rukuhia peat (poorly drained)	16.0	
3	3w1	Rukuhia peat (very poorly drained)	11.4	12.5 (23)
	3w1	Kaipaki peaty loam (very poorly drained)	1.1	
4	4w2	Rukuhia peat (with inundation)	0.3	0.3 (1)
7	7s	Truncated and Fill Anthropic soils	8.5	8.5 (15)
Non-productive land			-	17.6 (32)

*Areas and % rounded; areas are rounded independently, so unit areas may not sum exactly to class totals or to the Industrial Site area.

On-site mapping revealed Organic soils occupied 53% of the Industrial Site area. The remainder of the Industrial Site was modified, mapped as either LUC 7s, where a thin topsoil was present (15% of the Industrial Site area), or non-productive land where there was no soil present (32% of the Industrial Site area).

For the areas with Organic soils (Rukuhia peat and Kaipaki peaty loam), on-site mapping showed a range of soil drainage, and resulting differences in LUC classifications based on wetness limitation. Poorly drained Organic soils were classified as LUC class 2 land (2s5 and 2w2) and occupied 29% of the Industrial Site area, very poorly drained Organic soils as LUC class 3 (3w1) occupying 23% of the Industrial Site area, and very poorly drained Organic soil as LUC class 4 (4w2), occupying 1% of the Industrial Site Area.

12. On-site Waipā District Plan high class soil classification

Applying the Waipā District Plan definition for high class soil, the on-site mapping showed that the current or potentially productive land area of the Industrial Site (LUC 2w2, 2s5, 3w1, 4w2 and 7s), was not high class soil (Table 5). The balance of the Industrial Site area (the non-productive land) is not high class soil. Therefore, applying the Waipā District Plan definition for high class soil, the Industrial Site does not have high class soil.

Table 5. Waipā District Plan high class soil for the Industrial Site based on the LUC map units identified by the on-site assessment.

LUC class	Dominant LUC unit	Soil (NZSC Soil order)	High class soil classification	Area ha, (%)*
2	2w2	Kaipaki peaty loam (Organic)	Not high class soil	16.3 (29)
	2s5	Rukuhia peat (Organic)	Not high class soil	
3	3w1	Rukuhia peat (Organic)	Not high class soil	12.5 (23)
	3w1	Kaipaki peaty loam (Organic)	Not high class soil	
4	4w2	Rukuhia peat (Organic)	Not high class soil	0.3 (1)
7	7s	Truncated and Fill (Anthropic) soils	Not high class soil	8.5 (15)
Non-productive land			Not high class soil	17.6 (32)

*Areas and % rounded; areas are rounded independently, so unit areas may not sum exactly to class totals or to the Industrial Site area.

Figure 11 shows the on-site mapped distribution of Waipā District Plan defined high class soil for the Industrial Site.

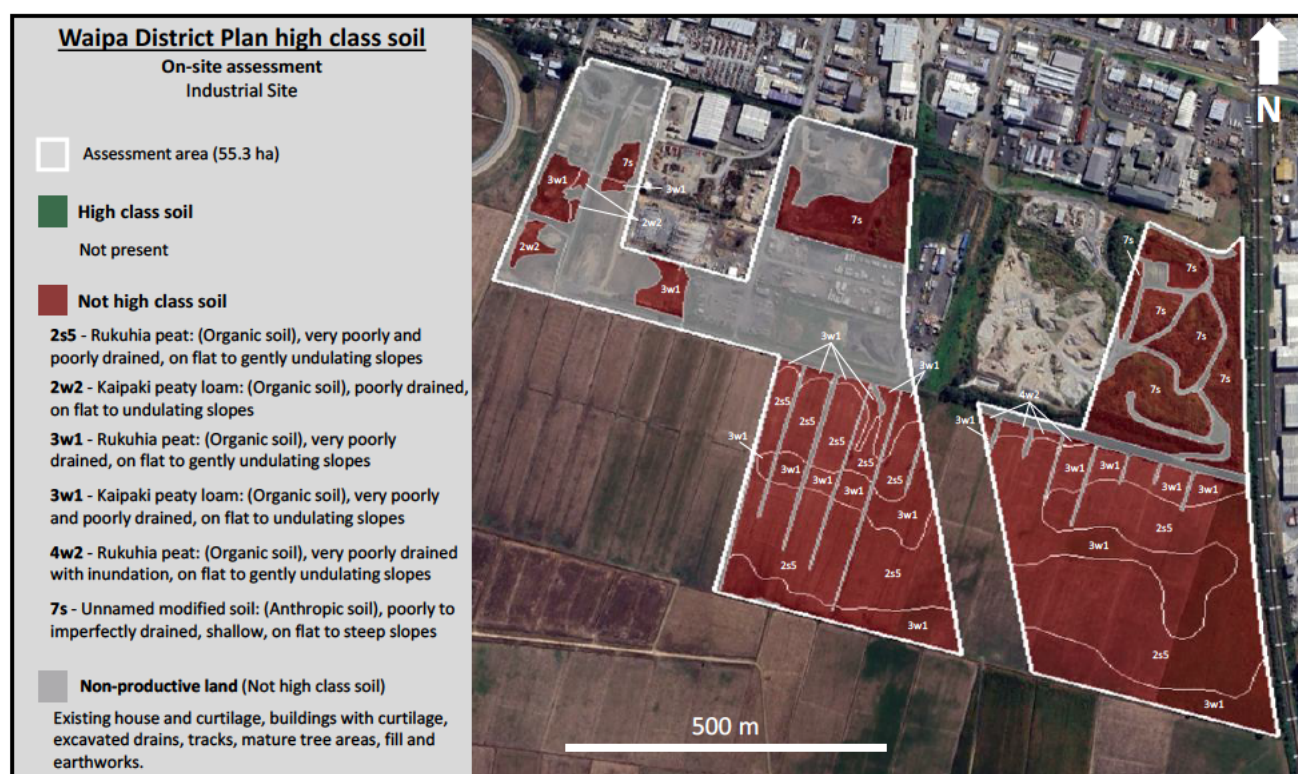


Figure 11. On-site mapped distribution of Waipā District Plan defined high class soil for the Industrial Site (includes grey shaded areas of non-productive land that are not high class soil).¹⁶

13. Soil and LUC constraints on productive capacity

The regional-scale NZLRI map information identifies 100% of the Industrial Site as LUC unit 2s5, comprising very poorly drained Rukuhia peat. Based on this regional data, the assumed area of productive land available for primary production is approximately 55 ha. However, detailed on-site mapping identified significant

¹⁶ A larger map image is provided in Appendix 4.

discrepancies in both the land use capability units and the actual area available for production. In addition, the approved resource consents and implementation of these bulk earthworks consents, further reinforces the appropriateness of the updated on-site classification.

On-site mapping confirms that the overall productive capacity of the Industrial Site is lower than suggested by regional data due to extensive non-productive areas and modified soil units with severe limitations. Non-productive land, including farm infrastructure, existing dwellings, buildings, tracks and drains, occupies 17.6 ha (32%) of the Industrial Site and is definitively excluded from the productive base. Furthermore, 8.5 ha (15%) of the Industrial Site consists of (truncated and fill) Anthropic soils classified as LUC 7s. These modified soils have severe limitations, including shallow to very shallow soil depth and a lack of developed topsoil. Historic aerial imagery indicates these larger LUC 7s areas have been disturbed and have not been in productive use since at least 2008.

Taking these exclusions into account, the realistic actual productive land currently available on the Industrial Site is estimated to be approximately 29.1 ha, or 53% of the total area, being LUC classes 2 to 4. While this land is currently utilised for dairy farming, its practical usability is significantly constrained. The remaining productive land is bisected by the Hamilton Southern Links designation. The presence of the Hamilton Southern Links designation limits the ability to use the two areas collectively for a single land use, such as a stand-alone dairy unit. This fragmentation splits the available productive area into two disconnected blocks: approximately 13.0 ha to the west and 16.1 ha to the east.

Approved resource consents authorise bulk earthworks across much of the Industrial Site, which have already reduced, and will continue to reduce, the available productive land.

The Industrial Site's productive potential is further limited by its surrounding environment. It is currently bounded to the north by existing industrial or residential development, and to the east by the main trunkline and adjoining industrial or residential development. The remaining boundaries of the Industrial Site adjoin rural pastoral land. Together with the internal fragmentation caused by the Hamilton Southern Links designation and the approved resource consents for bulk earthworks, this means the productive land cannot be used as a single unit for a land use such as a stand-alone dairy operation.

Productive potential by LUC unit

LUC 2s5 and 2w2 (Rukuhia peat and Kaipaki peaty loam): These Organic soils occupy 29% of the Industrial Site and are not considered high class soil under the Waipā District Plan. They are constrained by poor drainage and seasonally high water tables. While suitable for pastoral use or potentially seasonal arable cropping in dry months, they require intensive management of nutrients and drainage while balancing the risk of peat subsidence.

LUC 3w1 (Rukuhia peat and Kaipaki peaty loam): Occupying 23% of the Industrial Site, this land features very poor drainage and persistent seasonal surface ponding. Arable use is limited to only the driest months, and pastoral management requires restricted or light stocking during wet periods to prevent soil degradation.

LUC 4w2 (Rukuhia peat): This LUC unit occupies only a very small area (1%) of the Industrial Site and is characterised by very poor drainage and frequent inundation. Due to its limited size and severe wetness, this land has extremely low versatility. In reality, the area would either be incorporated into a wider pastoral grazing system with strict management or avoided entirely if the surrounding area were used for arable cropping.

LUC 7s (Modified Anthropic Soils): These areas occupy 15% of the Industrial Site and consist of Anthropic soils characterised by minimal soil development and severe soil limitations. The primary constraints are shallow to very shallow soil depth and a lack of developed topsoil. Additionally, the north-eastern portion includes some steep slopes. Overall, the soil limitations in this LUC unit make it unsuitable for cultivation and marginal for productive pasture or forestry. These areas have not been in productive use since at least 2008.

Non-Productive Land: Occupying 32% of the Industrial Site, this land includes infrastructure, dwellings, and areas of extensive earthworks. These areas are devoid of functioning soil and are not available for primary production.

Primary constraints on productive use

A significant portion of the Industrial Site is non-productive (32%) or, as identified in the LUC 7s areas (15%), possesses severe soil limitations that restrict land use. These areas have not been in productive use for a significant period. For the remaining land, the primary physical limitation is drainage. The Waikato NZLRI extended legend assigns LUC 2s5 a soil (s) subclass, reflecting the properties of the peat, but on-site assessment found that drainage remains poor to very poor across all mapped units even with artificial drainage in place. High water tables restrict trafficability and negatively affect the yield and survival of water-sensitive crops. While artificial drainage can improve versatility, long-term deepening of drains causes irreversible peat subsidence through oxidation and consolidation.

14. Summary

Under the NPS-HPL clause 3.5(7) interim definition, the whole of the Industrial Site is treated as highly productive land. Regional scale NZLRI map information maps 100% of the Industrial Site, and the wider SL1 Industrial area in its entirety, as LUC unit 2s5, very poorly drained Rukuhia peat on flat to gently undulating slopes. On that basis the assumed area available for primary production is 55.3 ha.

Detailed on-site mapping at property scale identified 28.8 ha (52%) of the Industrial Site as LUC class 2 and 3 land. The balance comprises 0.3 ha (1%) of LUC class 4 land, 8.5 ha (15%) of modified Anthropogenic soils classified as LUC 7s, and 17.6 ha (32%) of non-productive land. The on-site mapping showed significant discrepancies against the regional scale mapping in the extent of LUC classes and units, and identified extensive non-productive land that the NZLRI did not record.

- LUC class 2, 16.3 ha (29%): poorly drained Kaipaki peaty loam and Rukuhia peat
- LUC class 3, 12.5 ha (23%): very poorly drained Rukuhia peat and Kaipaki peaty loam
- LUC class 4, 0.3 ha (1%): Rukuhia peat prone to inundation
- LUC 7s, 8.5 ha (15%): truncated and fill Anthropogenic soils
- Non-productive land, 17.6 ha (32%): farm infrastructure, dwellings, buildings, tracks and extensive earthworks

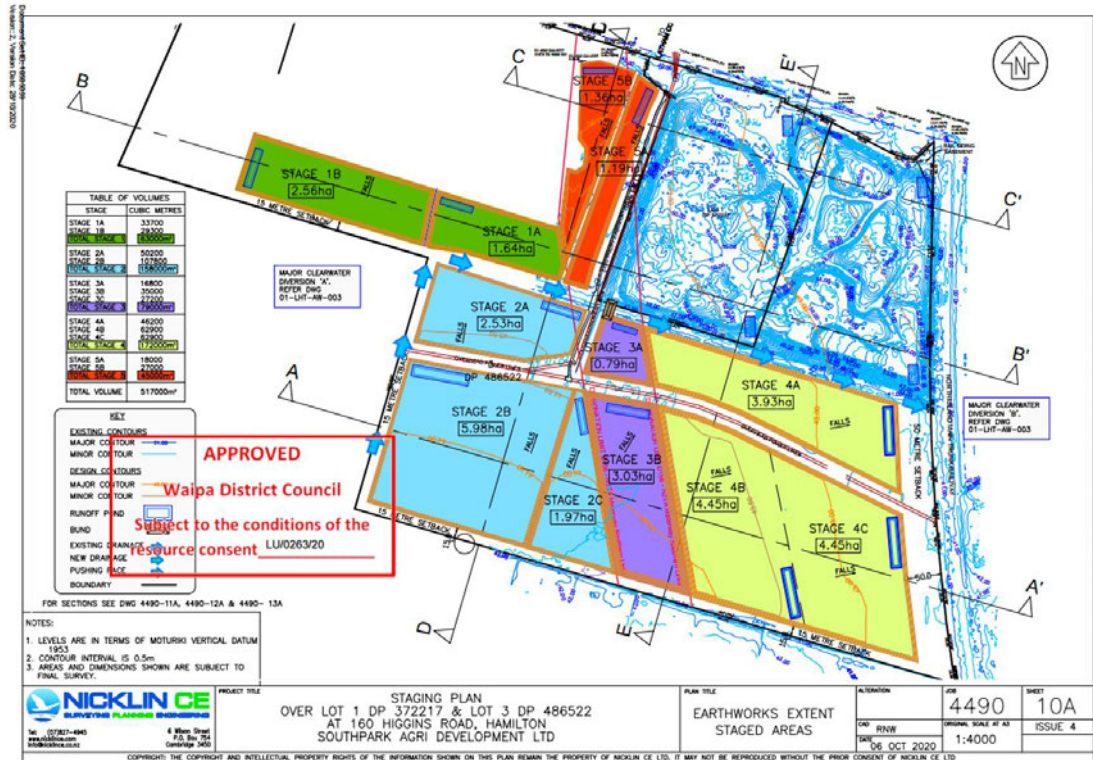
Non-productive land and LUC 7s together account for 26.1 ha (47%) of the Industrial Site. The LUC 7s land has shallow to very shallow soil depth and no developed topsoil, and historic aerial imagery indicates these areas have not been in productive use since at least 2008.

Applying the Waipā District Plan definition, the Industrial Site contains no high class soil. Every LUC unit mapped on site (2w2, 2s5, 3w1, 4w2 and 7s) is an Organic Soil or a modified Anthropogenic soil, and neither meets the definition.

The productive land currently available is 29.1 ha (53%), being LUC classes 2 to 4. The LUC 7s land is capable of a limited range of production under the LUC classification, but the absence of a developed topsoil means it is not realistically available for pastoral or forestry use, and it has not been in productive use since at least 2008. Poor to very poor drainage is the primary physical limitation across all of it, restricting trafficability and limiting use to pastoral farming or seasonal arable cropping in dry months. The productive land is bisected by the Hamilton Southern Links designation, and further bulk earthworks are authorised across much of the Industrial Site. With adjoining urban and industrial development to the north and east, the productive land cannot be used as a single unit for a land use such as a stand-alone dairy operation.

Appendix 1: Approved resource consent plans showing the extent of bulk earthworks.

LU026320 Staging Plan



LU027922 Earthworks and Site Layout Plan

This information is provided from Waipa District Council

