www.beca.com

AEE Report

James Hardie NZ Sand Extraction. Kaukapakapa
Assessment of Environmental Effects

Prepared for James Hardie NZ

Prepared by Beca Limited (Beca)

10 August 2017

Revision History

Revision Nº	Prepared By	Description	Date
1	Leon Keefer	Draft for internal review.	
2	Leon Keefer	Draft for client review.	3 April 2017
3			
4			
5	Ceri Bain	Final Review from CT	10 August 2017

Document Acceptance

Action	Name	Signed	Date
Prepared by	Leon Keefer		
Reviewed by	Nicky Sedgley		
Approved by	Bryce Julyan		
on behalf of	Beca Limited		

Contents

Appendices

Appendix 1

Certificates of Title

Appendix 2

Extraction Plan and Methodology Report (Beca)

Appendix 3

Geotechnical Report (Beca)

Appendix 4

Traffic Assessment (Beca)

Appendix 5

Ecological Assessment (Kessels Ecology)

Appendix 6

Archaeological Assessment (Clough and Associates)

Appendix 7

Erosion and Sediment Control Plan (Beca)

Appendix 8

Landscape and Land Rehabilitation Report (Littoralis Landscape Architecture)

Appendix 9

Hydrological Assessment (Beca)

Appendix 10

Air Discharge Effects Assessment and Dust Management Plan (Beca)

Appendix 11

Acoustic Assessment (Marshall Day Acoustics)

Appendix 12

Subdivision Plan (Beca)

Appendix 13

Stakeholder Consultation Documents (PPR)

Appendix 14

AUP Objective and Policy for Mineral Extraction

Appendix 15

Conceptual Site Plan (Beca)

1 Introduction

This Assessment of Environmental Effects (AEE) report has been prepared for James Hardie New Zealand (JHNZ) (the Applicant) to support an application for resource consents to enable the establishment of a greenfield sand extraction and washing facility on a property northwest of Kaukapakapa on the Kaipara Harbour. The application also includes consent to relocate the boundaries between three adjoining sites so that the land to be excavated lies within one title. This application is for all resource consents required to establish and operate the activity as described in this document and its appendices.

1.1 Background

JHNZ manufactures fibre-cement building products used in residential and commercial structures throughout New Zealand. The products are manufactured using cellulose fibre, Portland cement, water, and sand. Sand used in manufacturing the fibre-cement products must be of a high purity – i.e. at least 95% SiO_2 (silica). This quality of sand is not commonly found within New Zealand, and overseas supply is unreliable.

JHNZ currently sources this sand from an existing operating sand quarry near Glorit, in the north of the Auckland Region. This site is nearing the end of its resource availability, with approximately 4 years of resource available under the existing license.

Once quarried, the raw sand is transported to a washing plant located in Kumeu, where the 95% silica sand is separated from spoil, such as clay and soil. Spoil is trucked back to Glorit to be replaced as fill and the washed sand is delivered to the manufacturing plant in Penrose. The Kumeu plant was established in the 1970's and is in need of replacing. Finding an alternative source of resource has become a priority for JHNZ.

To enable the continued operation of the manufacturing plant, JHNZ have identified and investigated a new sand resource at the project site at 353 McLachlan Road, and propose to develop the site into a new sand extraction and washing facility. The proposed extraction and washing facility will supersede JHNZ's existing extraction facility in Glorit, as well as the wash plant operations in Kumeu.

The estimated resource is approximately 1,000,000m^3 of raw sand. Extraction is planned to be 30,000T of washed sand per year giving a resource life in excess of 40 years.

The proposed works will secure an economically viable source of silica sand for the operation of the plant that meets the process quality and quantity requirements before existing sources are depleted. This involves the following:

- Extraction of raw sand;
- Modification of an ephemeral stream;
- Construction of site plant and a water storage pond;
- Groundwater extraction;
- Bulk earthworks and vegetation removal;
- Road works along McLachlan Road, the intersection with SH 16 and the site access road; and
- Adjustment of property boundaries subsequent to the land purchase.

1.2 Summary of Consents Required

The proposal is subject to the statutory requirements of the RMA and the Auckland Unitary Plan (Operative in Part). Resource consents are being sought in accordance with s9(2), s9(3), s11, s13(1), and s14(2) of the RMA for:

- Mineral extraction;
- Subdivision (boundary adjustment);
- Surface water diversion;
- Groundwater take;
- Earthworks and vegetation removal; and
- Dust generation.

1.3 Structure of Report

This AEE report has been prepared in accordance with the RMA and specifically the requirements set out in Schedule 4. The report sets out:

- A description of the receiving environment within which the works are to take place (Section 2);
- A description of the proposed activities (Section 3);
- An assessment of the activity against the matters set out in Part 2 of the RMA (Section 4);
- The potential and actual environmental effects and proposed mitigation measures (Section 5);
- Consultation undertaken to date (Section 6);
- The statutory framework relevant to the assessment of effects (Section 7);
- Draft conditions of consent (Section 8); and
- Concluding statements (Section 9).

2 Description of the Existing Environment

2.1 Location

The project site comprises three lots located at 353 McLachlan Road, Kaukapakapa. These are legally described as:

- Lot 3 DP 470614
- Lot 4 DP 470614
- Lot 5 DP 470614

The combined 64.5ha site is inland from the Kaipara Harbour. Access to the site is via McLachlan Road from State Highway 16 and then via a 1.4km long private right of way easement that serves nine lots (shown in Figure 2.1). The subject site is located in an area of pastoral farming with some rural residential lots. The western boundary of the site is the Kaipara Harbour.

The site is located approximately 6km from Kaukapakapa Township.

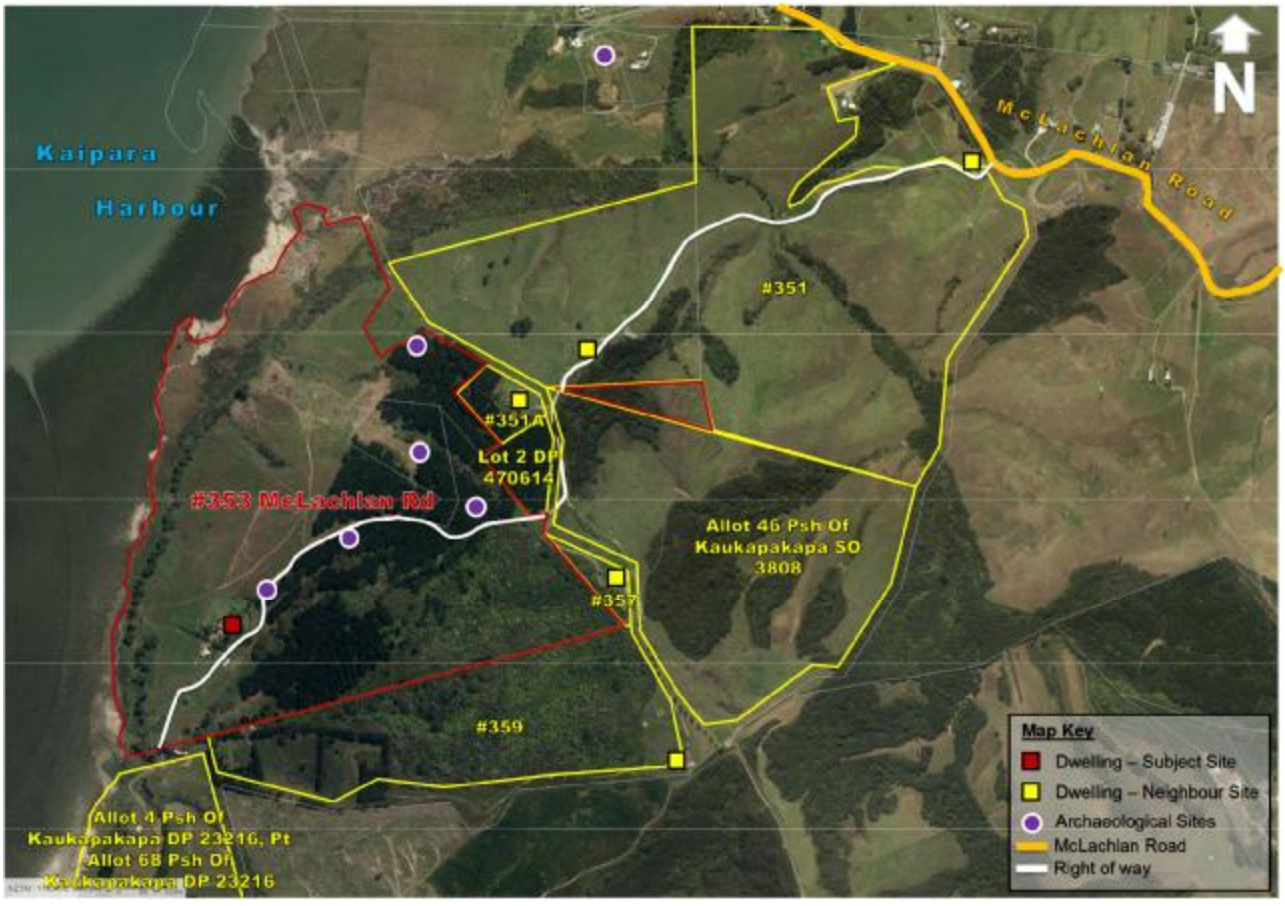


Figure 2.1. Location plan showing the project site (outlined in red) and surrounding area. Neighbouring allotments are outlined in yellow.

2.2 Land Uses

The site's primary land use is low intensity grazing associated with a rural-residential lifestyle maintained by the current owners. A large family homestead located roughly 200m from the coast is surrounded by a landscaped area of approximately 11,500m^2. Water to the house is provided via an existing groundwater bore and stored in a round concrete tank located above the homestead.

Additional land uses on site include:

- Stock grazing (approximately 140,000m^2);
- Disused land and structures associated with former dairying and sheep farming (~17,000m^2);
- Vacant land cleared for development no longer going forward (~3,000m^2);
- Covenanted land (119,274m^2 of coastal wetland and 125,402m^2 of regenerating bush); and
- Scrubland overrun by gorse, wildling pines, and other invasive vegetation species that have colonised land previously used for forestry (remainder of the site).

Beehives are also kept on the property and are maintained by a local apiarist.

The site was largely covered in pine plantation until its harvest around 2005. Where this was removed, colonising invasive weed species, predominantly gorse and woolly nightshade, have grown in its place.

Neighbouring land uses include:

- 3 adjacent rural-residential lifestyle blocks to the east;
- Open pasture and stock finishing yards to the north;
- A horticultural operation to the south;
- Pine forest plantations to the east and south;
- Regenerating bush to the south and east; and
- Mangrove vegetated margins of the Kaipara Harbour to the west

The appearance of the general area is of low intensity pastoral activity with large amounts of weed species present, with scatterings of mature exotic shelter belt plantings and some remnant areas of native vegetation particularly around stream gullies.

2.3 Landowners

The project site, which includes Lots 3, 4, and 5 DP470614, is currently subject to sale and purchase agreements between the Applicant and the current land owners.

These lots are also subject to two easements allowing occupants of the dominant tenements to traverse along a formed access within a right-of-way easement across Lot 5 DP 470614 and the neighbouring 351 McLachlan Road (Allot SM45 Psh of Kaukapakapa SO 3808) owned by Mr A McLachlan. This right of way is shown in Figure 2.1 above. The Certificates of Title and schedule of easements for these properties are provided in Appendix A.

2.4 Zoning and Overlays

The project site, 353 McLachlan Road is identified in the AUP:OP as Rural Coastal Zone. No environmental or historic heritage overlays apply to the site. Parts of the Kaipara Harbour adjacent to site are labelled as a Significant Ecological Area (Marine 1) under the AUP:OP and as a Coastal Protection Area 1 (CPA 1) under the Auckland Regional Plan: Coastal (ARP:C). Refer Figure 2.2 below for the relevant zonings and overlays relevant to the site in the AUP:OP.

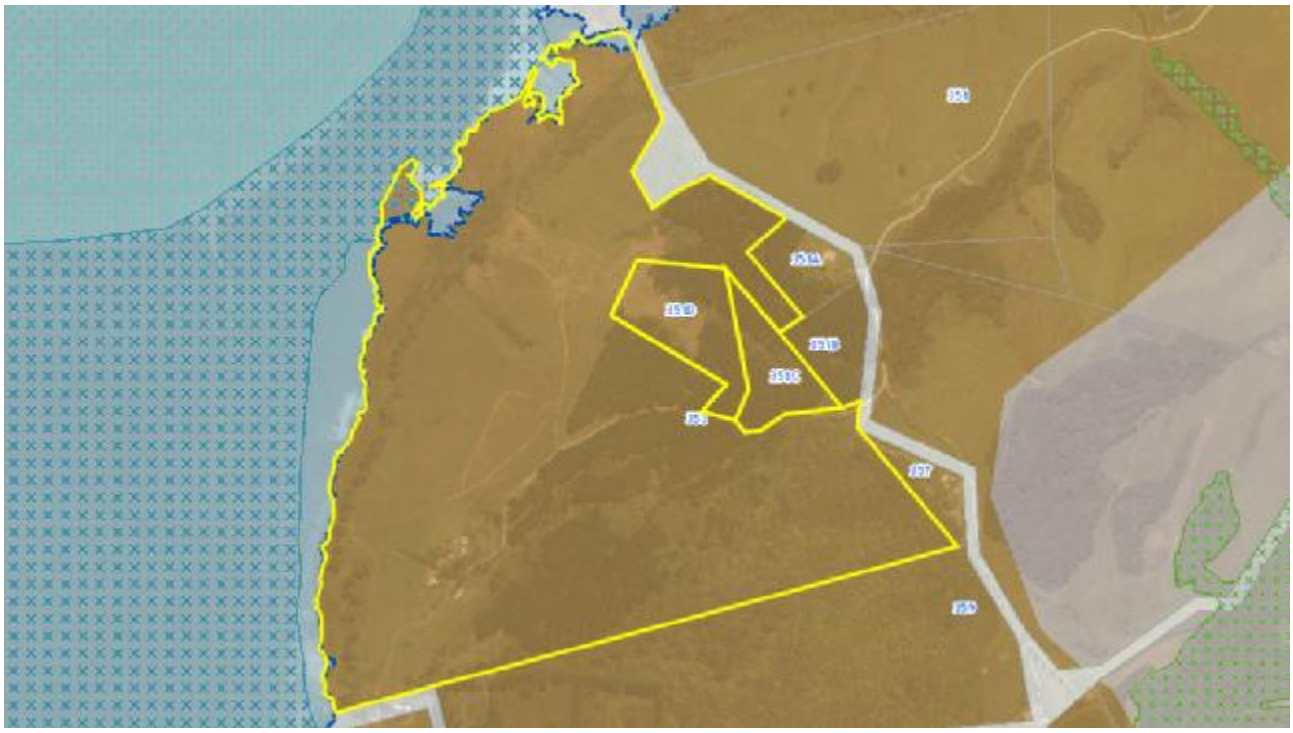


Figure 2.2. Excerpt from AUP:OP planning maps showing the site zoning and overlays. The extent of the Kaipara Harbour identified as SEA_M1_7b is shown as the dark blue crosses.

The ARP:C and the AUP:OP identify the following ecological values within this section of the harbour:

- The largest single block of dense mangrove in region – noted to be in good condition and spreading;
- Habitat for threatened secretive coastal fringe birds; and
- Areas of adjacent terrestrial vegetation provide shelter for birds and potential nesting sites.

The site is not identified in the AUP:OP or ARP:C as having an Outstanding Natural Landscape or Outstanding Natural Character.

2.5 Topography

The site topography is a gentle to moderately sloping landform consisting of two distinct hills sloping from the east to the west. These are described as:

- A gently sloping buried foredune from 5 – 25m above sea level; and
- Steeply sloping buried dunes forming distinct ridges separated by gullies.

The proposed works will take place within an area consisting of two ridges that stretch from the east to the west and slope steeply on all sides. The highest point is approximately 86m above sea level.

Three stream systems flow through the site. Two are ephemeral and one, the southern- most stream has four branches of which one is permanent. The other branches are intermittent and ephemeral. The permanently flowing portion is location primarily outside of the site. These are shown in Figure 2.3.

Figure 2.3. Aerial photo showing contours of the site and locations of streams and overland flow paths (>3ha catchments).

2.6 Roading Environment

2.6.1 McLachlan Road

McLachlan Road is a two-way rural road that is formed with chip seal along the first 500m from the intersection with State Highway 16 (SH16). The remainder of the road is gravel with a formed width varying between 5m and 7m. A significant part of the gravel portion of the road is constructed on a cut along a slope, with one side of the road bounded by steep uphill slopes and the other side bounded by ditches used for drainage. Additional rural roads that connect to SH16 via McLachlan Road include Oyster Point Road, Alpine Road, Hafton Road, and Onewhero Road. At 2.4km from SH16, McLachlan Road crosses a stream (1731124 E, 5947783 N) running through a 3000mmØ corrugated steel culvert. The road here forms a hairpin bend. In numerous other locations along McLachlan Road there are bends with poor visibility and places where it is not possible for a truck and car to pass each other safely. The details of the road are more fully described in the Traffic Assessment attached as Appendix 4.

Traffic counts were undertaken on McLachlan Road in 2016. The results of the traffic counts are shown in Table 2.1. The counts indicate that the majority of vehicle movements are from cars and light trucks, likely from local residents living along the road or on side roads; however, there was an average of 11 heavy vehicle movements per weekday and 9 if taken over the full week.

Table 2.1. Traffic counts undertaken on McLachlan Road.

ADT Count	Motorcycles	Cars & LCVs*	MCV**	HCV1***	HCV2****	Misc
Monday	0	549	55	4	2	0
Tuesday	0	554	42	7	2	0
Wednesday	1	590	50	13	4	1
Thursday	2	576	44	6	5	0
Friday	1	576	52	11	0	0
Saturday	2	558	23	4	2	0
Sunday	1	470	30	2	2	0
ADT Mon-Fri	1	569	49	8	3	0
ADT Sat-Sun	2	514	27	3	2	0
ADT Full Week	1	553	42	7	2	0

*LCV: Light Commercial Vehicle:

**MCV: Medium Commercial Vehicle:

***HCV1: Heavy Commercial Vehicle 1: (>3.5t gross laden weight) a rigid truck with or without a trailer, or an articulated vehicle with 3 or 4 axles in total.

****HCV2: Heavy Commercial Vehicle 2: (>3.5t gross laden weight) a truck and trailer, or articulated vehicle with or without a trailer, with 5 or more axles in total.

2.6.2 Site Access

Access to the site from McLachlan Road is via a shared right of way access that is utilised by 8 owners plus the subject site. Two adjoining owners are located on the ROW, however, they do not have legal access to use the ROW. The ROW has been constructed with a formed carriageway width of 5m and with surface water channels on each side in cuttings. The formed access follows a ROW easement from McLachlan Road for approximately 1.2 km where it joins to a section of paper road for a short distance before moving east off the road reserve back onto the ROW and on to Allotment 46 SO 3808 for a length of approximately 200m. The formed ROW then moves back across the paper road and continues approximately a further 1km through to the subject property continuing south to the Fox property. Shallow surface water runoff channels line the ROW on both sides, draining to a small creek located within 351 McLachlan Road. A small culvert conveys the creek under the easement.

SH16 is a sealed two lane road from the McLachlan Road intersection to where it connects to the North Western Motorway at Brigham Creek, south of Kumeu. The sealed carriageway width is approximately 9m wide at McLachlan Road and 11m wide at Brigham Creek with a standard 3.5m wide lane width between the edge line and centreline. SH16 carries approximately 2,500vpd at McLachlan Road increasing to 30,000vpd at Brigham Creek.

Currently, JHNZ trucks transport unwashed sand and clay content from the extraction facility in Glorit to the wash plant in Kumeu. Truck and trailer units travel between Glorit and Kumeu along SH16 past the McLachlan Road intersection.

At peak transport hours, the McLachlan Road and SH16 intersection currently experiences approximately 60 turning movements. The existing basic intersection treatment was designed for approximately 18 turning movements per hour in this traffic environment, and is considered to be subpar based on the Austroads Road Engineering Guidelines used by the NZ Transport Agency.

2.7 Network Utilities

The site is connected to the national grid via an existing power line running from the site through 351 McLachlan Road.

No stormwater or wastewater reticulation is located within the site nor the surrounding area. No additional network utilities are present within the wider vicinity.

2.8 Hydrology

Groundwater investigations were undertaken for this project to ascertain the nature and availability of groundwater to utilise for sand washing. These investigations showed that the groundwater is located between 20m and 45m below ground level (bgl) within the Helensville conglomerate. No perched water tables were identified during the groundwater and geotechnical investigations, indicating that ephemeral portions of streams on-site only flow following rainfall events.

2.9 Coastal Environment

The western boundary of the site borders the Kaipara Harbour, and all overland flows and streams on the site discharge to the harbour. As noted in Section 2.4, the harbour is identified as a SEA_M1 and CPA1 under the AUP:OP and ARP:C, respectively. The coastal margin of the site is largely between 2 and 5m above sea level (asl), and is bounded by a 21 degree slope rising to approximately 10m asl. The margin is approximately 50m in width and is protected by a covenant that was placed on the Title as part of a previous subdivision. The description and area of this covenant is shown on the Certificates of Title in Appendix 1.

Vegetation within the coastal margin varies. The steep slope forming the landward boundary of the margin is lined with a shelter belt comprised of macrocarpa and pockets of kānuka. The flatter areas between the slope and Mean High Water Springs (MHWS) consists of a mixture of saline grass and herb vegetation. Mangrove forests dominate the foreshore below MHWS.

2.10 Visual Amenity

The visual amenity of the site is described in the Assessment of Landscape Effects (Appendix 8). The site forms part of the visual landscape when viewed from the Kaipara Harbour, with a rolling topography consisting of numerous ridges broken up by irregular patters of indigenous vegetation and watercourses. The visual landscape of the site, summarised in Figure 2.4, is contained within three prominent ridgelines to the north, east, and south. The eastern ridge is topped with spaced pines which are distinctly visible from the Kaipara Harbour.

Visual remnants of the previous pine plantation land uses on site are still present, including wildling pines rising above the cover of colonising weed species (see section 2.12) and the cut face of the previous forestry haul road. Sand is visible on the surface in areas throughout the site.

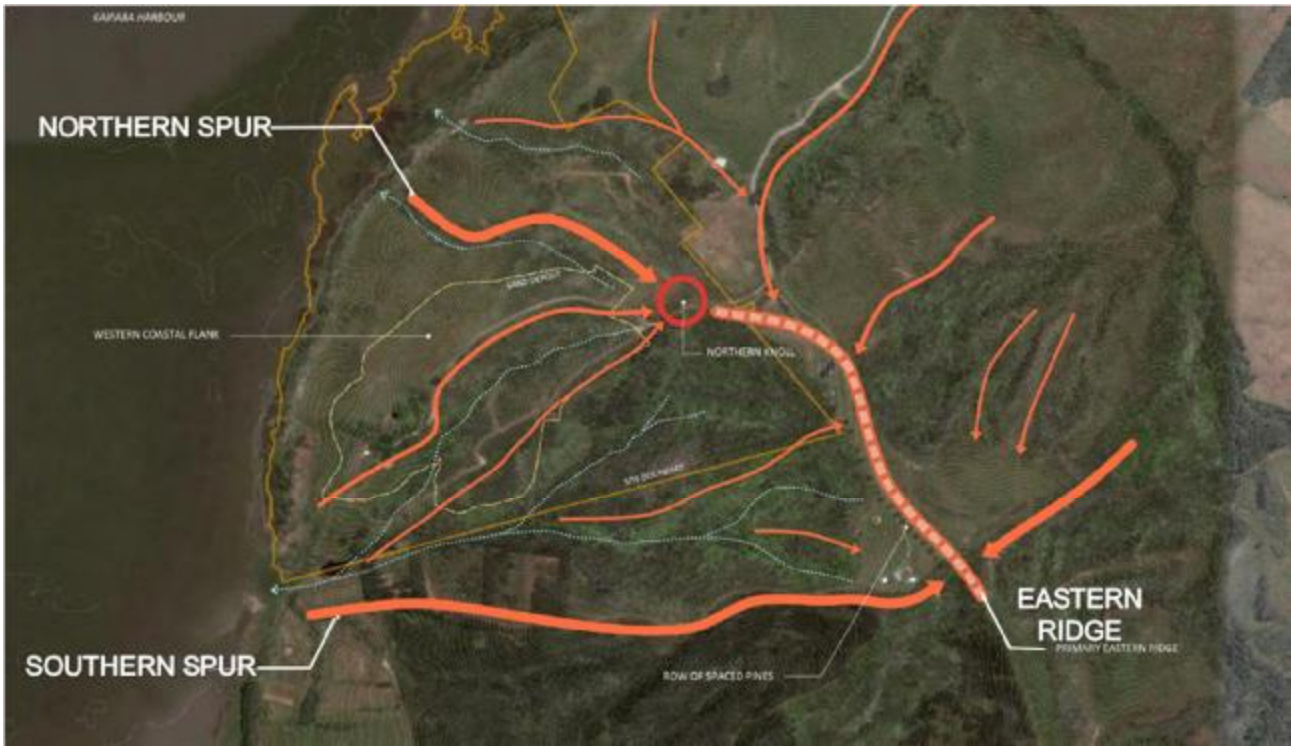


Figure 2.4. Excerpt from the Assessment of Landscape Effects (Littoralis, 2017) showing the prominent landscape features (in orange) of the site.

2.11 Geology

The published geological map (Edbrooke, 2001) of the area indicates that:

- The lower, relatively flat slopes on the site adjacent to the coastline are Walton subgroup sand; and
- The dune sands in this area are part of the Pliocene to Early Pleistocene Awhitu Group (age equivalent of Tauranga Group alluvium).

The dune sands overlie early Miocene age East Coast Bays Formation mudstone/sandstone/siltstone, and occasional lenses of Helensville Conglomerate (both of the Waitemata Group).

The Awhitu Group mainly consists of large scale cross-bedded quartzofeldspathic to quartzose dune sand. Mafic-rich sands, conglomerate, rhyolitic ignimbrite and rhyolitic tephra are also present locally. The Awhitu Group unconformably overlies the Waitemata Group rocks (Edbrooke, 2001).

2.11.1 Sand Resource Description

The sand resource and geology of the site was determined through the extensive analysis of borehole investigations undertaken for the purposes of this project in 2016. The full geological report and borehole logs are attached in the Geotechnical Report (Appendix 3). The investigations determined that the silica sand located on the site met the very specific chemical and physical requirements so that it can be utilised in the manufacture of building products. Silica sand of suitable composition is only found in three other known locations throughout New Zealand and most of these are located in remote locations. The investigations also showed the site's soil composition varied across the site, but that it generally comprises of:

- Topsoil (between 0.5 and 1.0m thick);
- Clayey sands (varies up to 16m thick);

- Silica sand layer;
- Relatively continuous layer of black sand is present, and
- Overlying weathered East Coast Bays Formation (Waitemata Group) siltstone.

At the southern end of the site, at the base of the end of the main ridgeline there appears to be no sand present, and a breccia of the Helensville Conglomerate (another part of the Waitemata Group) is encountered between 3m and 5m bgl. This unit appears to extend to a thickness of at least 9.8m.

The topsoil ranges up to 1.0m thick, however over half of the boreholes show a topsoil thickness of <0.5m. Additional overburden is discontinuous, and, when present, generally averages around 1m thick within the proposed extraction area. In the north of the site, outside the proposed extraction area, a lens with up to 16m of clayey/silty sand is present overlying the silica sand.

Beneath the Awhitu Group silica sand unit, an average of 1.75m of black sand (non-silica) is present although this is not consistent across the site. In boreholes near the top of the hill, to the north, this unit occurs at approximately RL47m, whereas lower down the slope, the black sand occurs at approximately RL28m. This overlies a variable thickness of weathered East Coast Bays Formation siltstone, the basement rock in this area. This siltstone is generally interbedded with sandstone, however investigations did not penetrate far enough into this unit to encounter sandstone beds. Figure 2.15 shows the estimated volume and therefore approximate depths of the silica sand encountered in various identified grids over the site, including the depth of overburden.

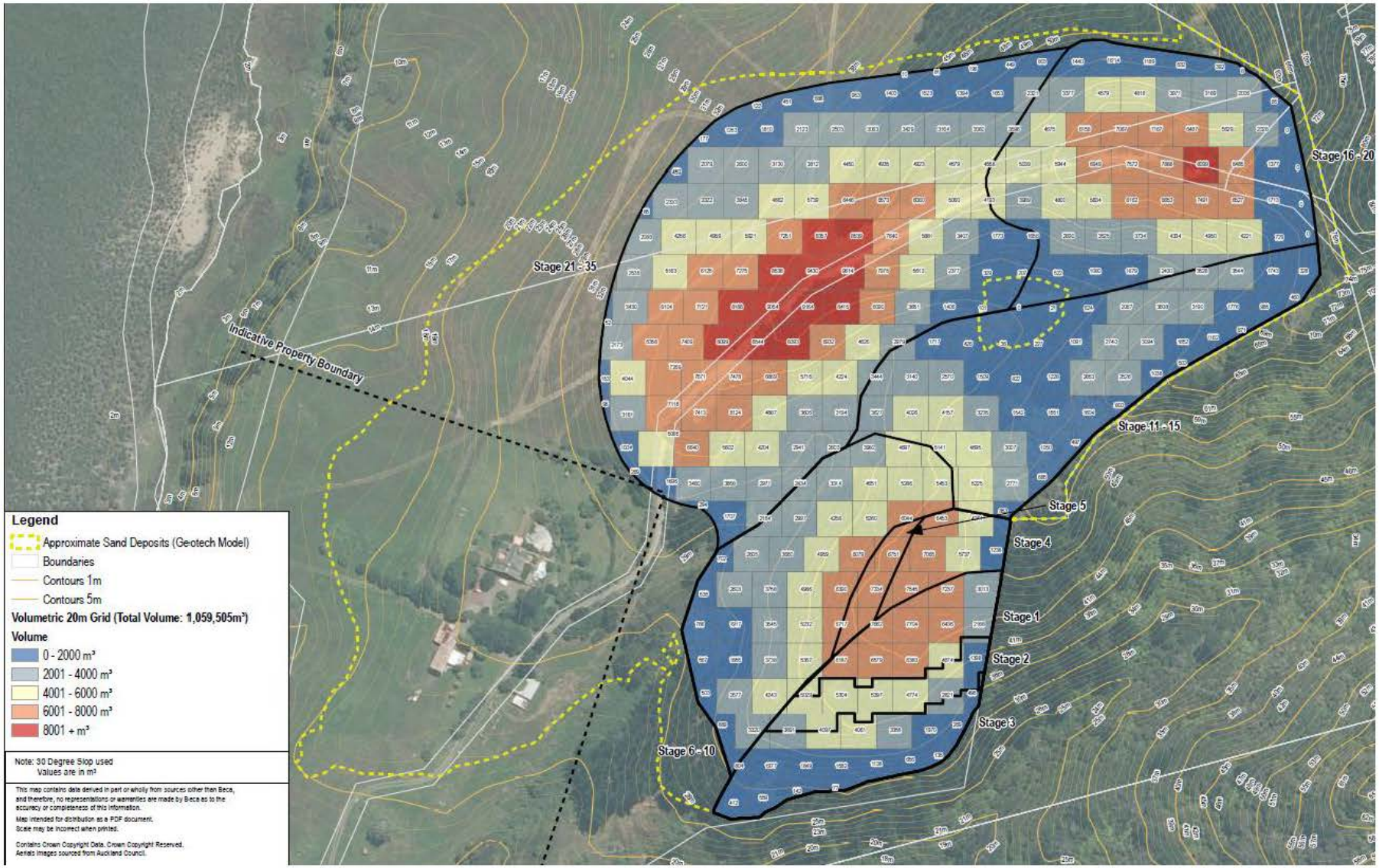


Figure 2.5. Estimated sand volumes across the site in each grid square.

2.12 Ecological Values

The site from which sand is to be extracted is a degraded pastoral site comprising of a mosaic of pasture, scrub and indigenous scrub intersected by streams that lead directly to the Kaipara Harbour. Two areas of land within Lot 5 are protected from development by way of covenants on the property title (Lot 5 DP 470614). These covenants were placed as a result of subdivision (RMA 59935) to create three additional lots through the protection of native bush and wetland areas. These covenanted areas are shown on the new subdivision plan Figure 3.6 in Section 3.8 and are described as:

- Area D, a 11.9ha area of contiguous wetland-type vegetation; and
- Area C, a 12.5ha area of mature gully vegetation with a mixture of native bush species, pest plants and remnant pine forest.

The following section describes the ecological values that exist on the site by breaking these down into stream and riparian values, terrestrial vegetation, and terrestrial fauna.

2.12.1 Stream and Riparian Values

Three stream systems flow from east to west through the proposed JHNZ property, listed here from north to south:

- Northern stream: an ephemeral soft-bottomed natural watercourse flowing through a gully vegetated with exotic vegetation. Flows to the Kaipara Harbour;
- Middle stream: an ephemeral soft-bottomed natural watercourse flowing through a gully vegetated with exotic vegetation. Flows to the Kaipara Harbour;
- Southern stream: a system consisting of four branches, one permanently flowing and the rest consisting of intermittent and ephemeral sections. These are soft-bottomed natural watercourses that flow through areas of exotic and indigenous vegetation. These streams flow into an artificially created pond that is located just outside the southern boundary of the site, before discharging into the Kaipara Harbour. The northernmost intermittent/ephemeral tributary in this system (southern tributary) is partly within the sand extraction area, and ephemeral sections will be removed as part of the sand extraction process.

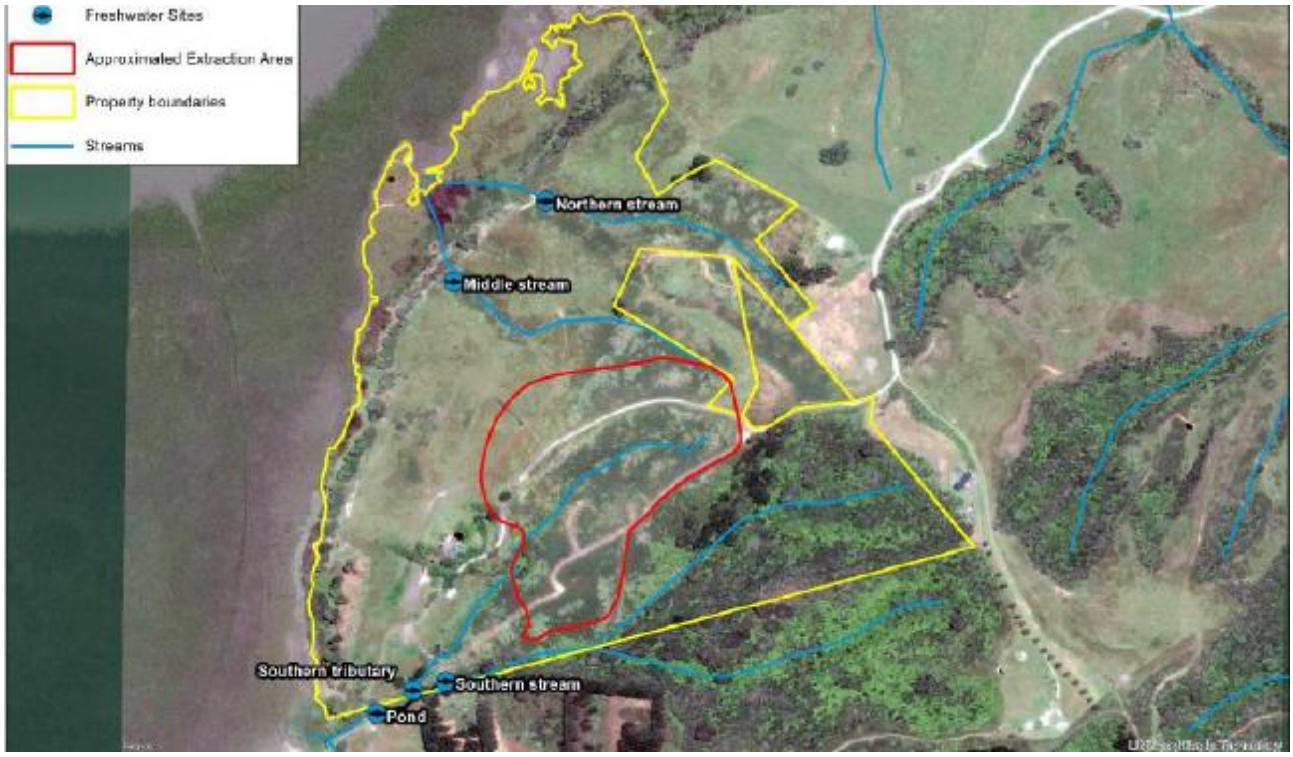


Figure 2.6. Streams identified within the project site (Figure 2 of the Ecological Assessment, Kessels Ecology).

2.12.2 Stream Assessment Methodology

The Stream Ecological Valuation method (SEV), has been applied to the Southern, Middle and Northern streams (which will not be affected by sand extraction) to provide useful information on the general condition of the streams on the property. It is not considered appropriate to use the SEV method for the southern tributary that will be modified by the sand extraction activities as this method is only applicable to areas with a defined channel (Storey et al. 2011) and this portion of the stream does not have one.

Results from the SEV are summarised in Table 2.2.

Table 2.2. Results of the Stream Ecological Valuation undertaken by Kessels Ecology (refer Appendix 5).

	Northern	Middle	Southern
Hydraulic function	0.66	0.67	0.71
Biogeochemical function	0.75	0.58	0.82
Habitat provision function	0.48	0.31	0.45
Biodiversity function	0.15	0.22	0.67
Overall mean SEV score	0.558	0.489	0.701

The Ecological Assessment (attached as Appendix 5) concludes that no fish are likely to be present within the Northern and Middle streams, due to their shallow water depths and highly disturbed character. Three fish species were caught in the Southern Stream, which runs predominantly outside the site. These were:

- Shortfin eel (*Anguilla australis*);
- Longfin eel (*Anguilla dieffenbachii*); and
- Banded kokopu (*Galaxias fasciatus*).

Of these species, the longfin eel is classified as “At Risk-Declining” (Goodman et al. 2014).

The species present at this site indicate a reduced diversity compared to what might be expected at a site so near to the sea; moreover, the species present are all considered good climbers and are able to scale formidable obstacles during their upstream migration as juveniles.

2.12.3 Terrestrial Vegetation

Vegetation surveys undertaken for the project identified 13 different vegetation ‘types’ within the project site. Figure 2.7 below describes these vegetation types and shows their location. The vegetation within the red lined area is the vegetation that will be affected by the excavation.

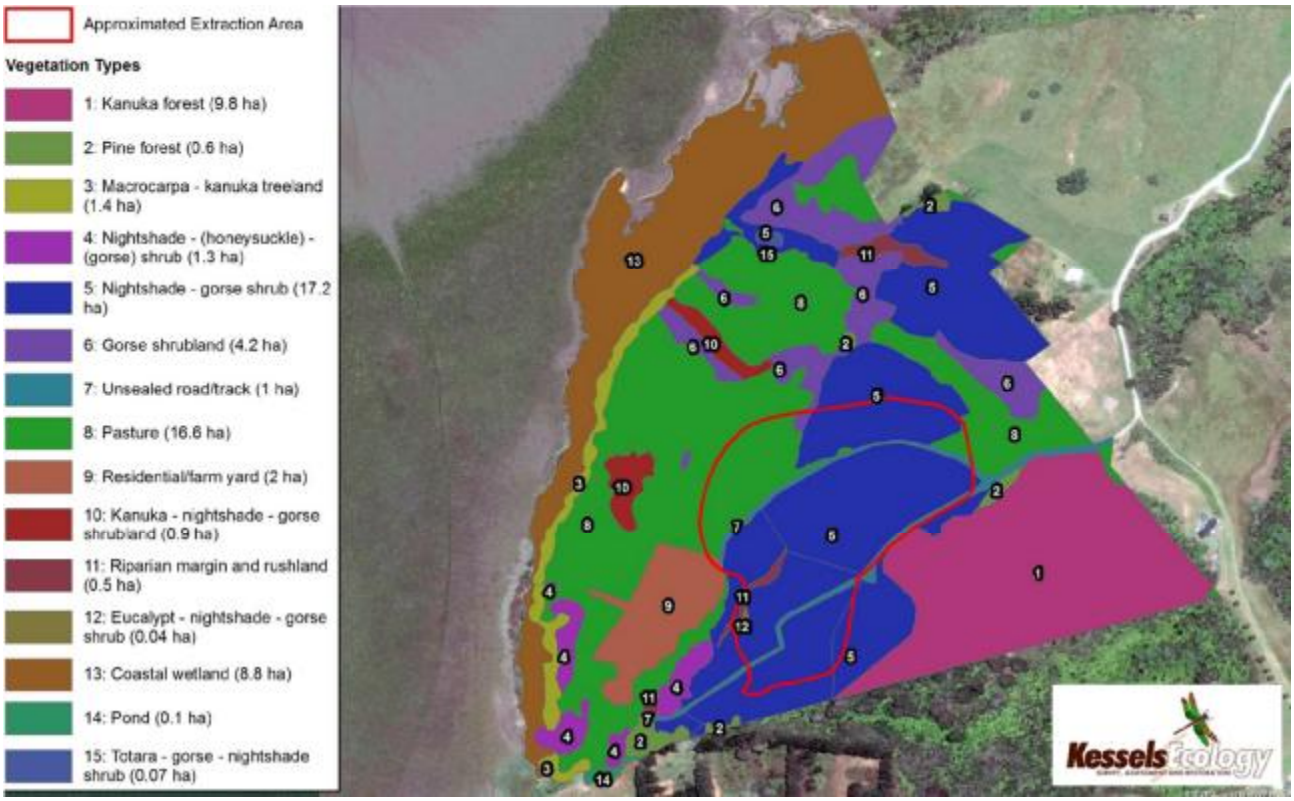


Figure 2.7. Vegetation types within project site (Kessels Ecological Report, Appendix 5).

Figure 2.7 shows that the predominant vegetation cover on the site is pasture, nightshade and gorse shrub, with some smaller areas of pure Gorse shrubland. Other than the covenanted areas, there are two small pockets of native riparian margin and rush land that total 0.5ha. The vegetation types are described in more detail in the Ecological Assessment prepared by Kessels Ecology (attached as Appendix 5).

2.13 Terrestrial Fauna

2.13.1 Birds

Kessels Ecology undertook bird surveys on the site in 2016. The full results of these surveys are included in the report in Appendix 5. In summary, 20 different bird species were recorded on the site, of which 12 species are native to New Zealand and 3 of which are endemic to New Zealand:

- Grey Warbler
- Fantail
- Silvereye

No rare or threatened bird species (based on the threatened bird species list published by Robertson et al. (2012)) were identified during the counts. However, some unidentified oyster catcher calls were heard indicating that some of these species are utilising the wider area around the site.

Based on a literature review undertaken as part of the Ecological Assessment, 22 'threatened' and 'at risk' bird species are likely to be present in the area from South Head to Parakai, Kaipara. None of the species were confirmed to be present at the subject site during field monitoring, however there is a possibility that they may utilise the site at some stage.

2.13.2 Bats

Bat monitoring was also undertaken as part of the Ecological Assessment for the proposal (refer to the report in Appendix 5 for a description of the methodology used).

Monitoring revealed the presence of long-tailed bats at the three monitoring stations established in mature trees in various locations across the site. Long-tailed bat calls, including foraging calls and social interaction calls, were recorded on two or more nights during the survey period. The bat activity recorded is low to moderate.

Long-tailed bats (*Chalinolobus tuberculata*) utilise mature, often hollowed out trees for roosting and the surrounding forest edges for foraging. They are insectivores and primarily hunt moths, mosquitoes, beetles, and midges. No active bat roosts were discovered during the bat monitoring however there still may be a possibility of the existence of roosts in surrounding mature trees. No mature trees are located within the extraction area. The information gathered from the bat monitoring suggests that bats use areas at the subject property mainly for foraging and are likely to be flying across the site.

2.13.3 Lizards

Lizard monitoring was also undertaken as part of the ecological assessment of the site (refer Section 3.3 of Appendix 5 for a description of the methodology used).

Opportunistic observation of the site and of lizard monitoring stations revealed the presence of only the introduced and naturalised Rainbow (or plague) Skink (*Lampropholis delicata*) on-site. Rainbow skinks were observed around logs and branches, as well as in sheltered sandy areas and low growing vegetation.

A chance observation of a fleeing lizard indicated the potential presence of the indigenous, but not threatened Copper Skink (*Oligosoma aeneum*) near monitoring station A031; however, a positive identification of the species could not be made.

Monitoring of potential lizard habitat was also undertaken during vegetation disturbance required for geotechnical investigations. Rainbow skinks were observed during this process, but no other species. Rainbow skinks were more abundant in open areas with woody cover, such as margins of existing access tracks or woodpiles among kikuyu grass, and less abundant where there was a dense vegetation canopy.

While rainbow skinks were the only species observed, the type and extent of vegetation cover suggests that there are potentially other species present.

2.14 Archaeology

Numerous archaeological sites have been recorded along the Kaipara Harbour and also in the vicinity of the Kaukapakapa River, as the area has been identified as a location of moderate historical Maori activity and settlement due to the favourable characteristics of the site. Five archaeological sites are recorded within the boundaries of the site. These are detailed in the table below.

Table 2.3. Summary of archaeological sites within the project site.

CHI / NZAA Reference	Site Type	Description	Location	Within Extraction Area
Q10/530	Midden/Oven	Shell midden 20cm thick lens consisting of cockle. Not seen in 2012 archaeological survey so likely eroded away.	E 1728814 N 5946939	Yes
Q10/528	Pit/Terrace	Site consists of 4 pits on a terrace. In a 2012 survey only depressions were observed	E 1729014 N 5947040	Yes
Q10/514	Pa	Site consists of transverse ditch (20m x 4m x 1m) and shell midden consisting of cockle	E 1729113 N 5947440	No
Q10/516	Pa	Site consists of 2 terraces, 14 pits and shell midden consisting of cockle	E 1729114 N 5947240	No
Q10/526	Pit/Terrace/ Midden/Oven	Terrace with 6 pits and shell midden consisting of cockle	E 1729014 N 5947240	No

To further describe the extent and characteristics of these features, an Archaeological Assessment was prepared by Clough and Associates. This assessment is attached as Appendix 6.

From this assessment, it is understood that the proposed site is a location that was favourable for Māori settlement, as it is near the Kaipara Harbour and the navigable Kaukapakapa River. It also had fresh water and marine resource, a productive forest environment, and suitable agricultural conditions in the surrounding area. Throughout pre-European times, this part of Kaipara has been subject to numerous changes in control and influence by different iwi, but those who controlled the entrance to the harbour had most control of the area. For these reasons, it is considered possible that further archaeological sites will be present on the site, particularly along the southern ridge that runs through the site.

The archaeological sites within the site are considered as part of the wider archaeological context of the area.

3 Description of Proposed Activity

3.1 Overview

The proposed activity is to extract silica sand from the site located at 353 McLachlan Road that meets the strict requirements for use in building construction materials. The sand will be extracted by an excavator, will be washed on site to remove clay particles, and then will be transported from the site to the Applicant's manufacturing plant at Penrose. Up to five truck and trailer units per day will travel to and from the site.

The activity includes extracting groundwater to be used as a top up for sand washing, upgrading parts of McLachlan Road and its intersection with SH16, relocating lot boundaries to accommodate the activity within one Title, providing an additional access easement through the site and rehabilitating stream margins to offset the effects of the modification of an intermittent stream that runs through the extraction area.

Two known archaeological sites within the sand extraction area will be modified as a result of the works. An application for an archaeological authority to modify these sites will be made to Heritage New Zealand in accordance with the Heritage New Zealand Pouhere Taonga Act 2014.

In addition to the sand extraction activities and ancillary works, the project includes the setup of a washing plant facility and associated operational facilities. These facilities are described in further detail in Section 3.3 below.

Figure 3.1 (overleaf) summarises the key components of the activity.

3.2 Project necessity

Sand used in manufacturing building materials by JHNZ is required to be of a high silica content. Sand of this quality is scarce within New Zealand, with the majority of deposits located within National Parks and coastal areas. Only three other locations of silica sand are currently known. These are further north in the Kaipara Harbour at Tapora, in Parengarenga Harbour in the Far North, and Mt Somers in Canterbury. The proposed site has been selected as a site for possible extraction because of the abundant amount of material that lies beneath the vegetation cover, and as it is a visually contained site that is relatively isolated from sensitive receiving environments.

The Applicant needs to secure a new resource to supply its manufacturing plant in Penrose because the existing sand supply at Glorit is coming to the end of its resource life. With significant development and growth within Auckland and around the country, the demand for the building materials produced from this sand will grow just as the current supply is shrinking. If a new source of silica sand is not established, then the sand will need to be imported from overseas at a possibly higher cost, adding inefficiencies to the manufacturing process. Given the very limited availability of Silica sand that meets the specific chemical requirements needed to use the sand in the manufacture of building products and the very significant role that these building products have to the national and regional economy, it is considered that the deposit of silica sand that is applied to be extracted in this application, can be considered to be at least a regionally significant resource. Whilst it is still essential that the adverse effects of extracting this resource are appropriately managed, the importance of the resource to the region needs to also be taken into account when determining this application.

The current process will be improved through transportation efficiencies:

- Trucks driving between Kumeu and Glorit:
  - Trucks transport raw sand from Glorit to Kumeu (50km / truck);
  - Trucks loaded with clay washed from the processed sand return to Glorit from Kumeu (50km / truck);
- Trucks driving between Kumeu and Penrose:
  - Trucks transport processed sand from Kumeu to Penrose (35km / truck); and
  - Empty trucks return to Kumeu from Penrose (35km / truck).

With five trucks on each route, the activity requires approximately 850km of heavy truck movements per day on the State Highway network and local roads. Further to this, strains on the existing transport infrastructure in Kumeu are increasing due to ongoing development within the town and its surrounds, and the wash plant facility at Kumeu is aging.

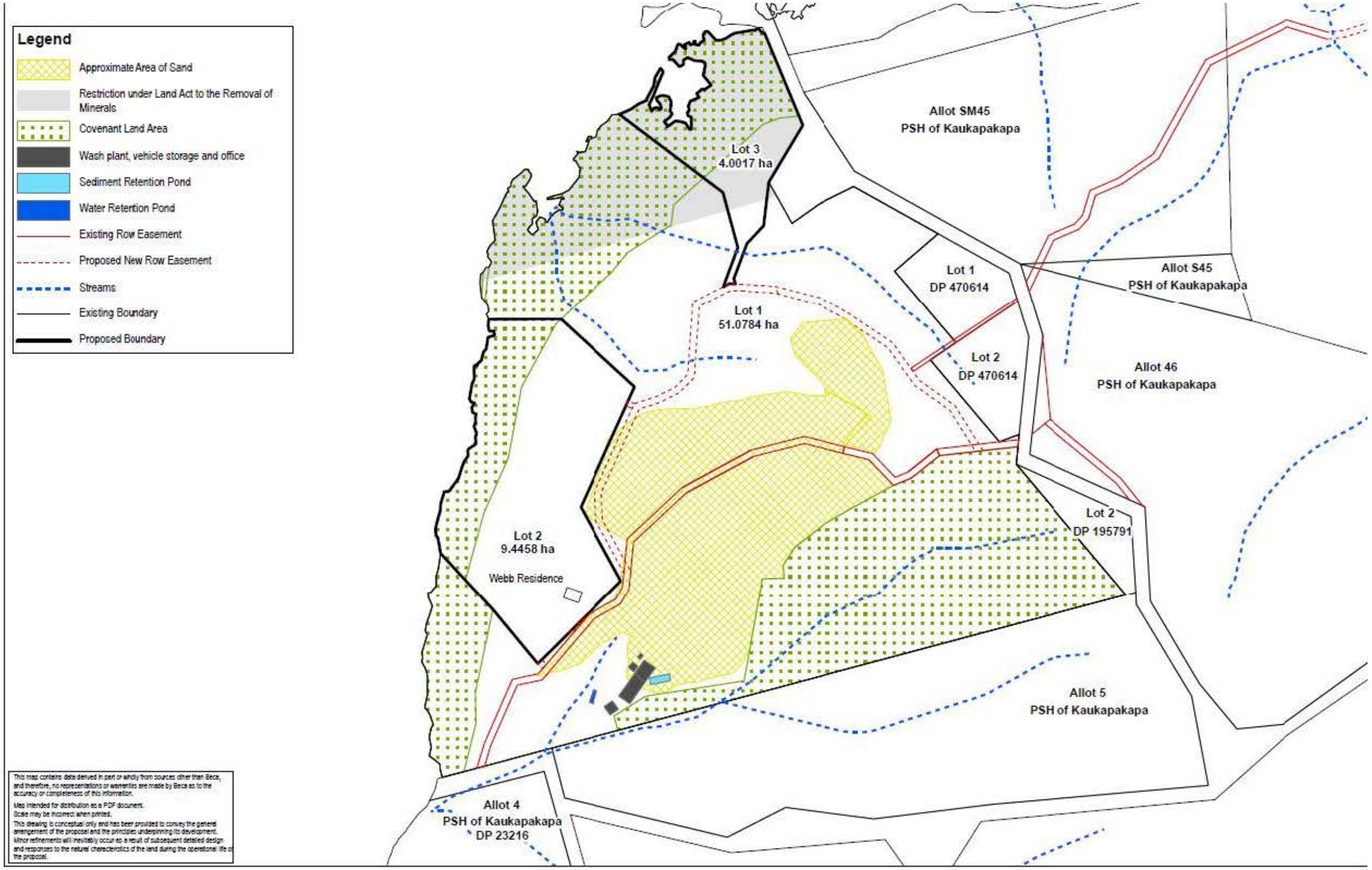


Figure 3.1. Overall site concept plan, showing the approximate area of sand where extraction will occur, locations of proposed internal access roads, locations of the proposed wash plant structures, and the proposed boundaries following a boundary adjustment. Refer Appendix 15 for an A3 site plan.

The proposal seeks to extract the raw sand resource and wash it directly on site, to improve the efficiency of the operation. This will reduce the total kilometres travelled by heavy trucks from 850km per day to approximately 615km per day; or 20% of truck movements required for the current Glorit operation. All wash plant on site will be new and specifically designed for this operation, increasing productivity and efficiency further.

3.3 Sand Extraction Methodology

Sand will be extracted using earthmoving equipment. There is expected to be one full time staff member working on the site, as well as the truck drivers visiting the site and the occasional management person from JHNZ.

The sand extraction process will occur by an excavator and dump truck working on the site. Firstly, overburden will be removed from the extraction area. The sand will then be extracted using an excavator and transferred to a moxy-type dump truck for transport to the wash plant. Raw sand will be placed into the wash plant feed hopper. After the sand is washed, it will be loaded using a front-end loader into trucks to be transferred to Penrose. Clay will be returned to the extraction area.

During the extraction process, both temporary and permanent slopes in the sand will be required. The slope angles will vary depending on the height, location and longevity of the area being worked. Temporary slopes within the sand area will be relatively low in height. Permanent slopes will be based on providing suitable stability to adjacent land and will be between 18 degrees and 30 degrees.

Ponds will be established on site to store the active wash water and to settle out sediment from the earthwork areas on a site. The size and details relating to the wash and sediment ponds are fully described in the ESCP attached as Appendix 7.

3.4 Proposed Physical Works

3.4.1 Sand Extraction

Sand extraction is proposed to be undertaken in a staged manner in discrete locations within the overall extraction area. Extraction stages, or ‘zones’, have been planned out over the next 35 years, as shown in Figure 3.2. Each year approximately 23,000m^3 of sand resource will be extracted. The area that will be exposed in each stage is therefore dependent of the depth of the sand resource that exists in that location. Zones have been defined for each of years 1–5. Beyond that timeframe, zones are identified in lump groups of years 6–10, 11–15, 16–25, and 26+.

While it has been estimated that sand can be excavated over the course of 45 years, the resource consents sought are for a 35-year duration.

Extraction will commence behind the centre ridgeline along the boundary with the covenanted Area ‘D’, and proceed in a manner designed to minimise the area of cut face exposed to the harbour and channel.

Sand is to be extracted using standard earthmoving equipment. The whole sand extraction process is summarised below:

- An excavator and dump truck will relocate overburden from the extraction area. The overburden will be used to back-fill production areas from previous years.
- Sand will be extracted using an excavator and transferred to an articulated dump truck for transport to the wash plant.
- Washed sand will be loaded using a front end loader into trucks for road transport to the JHNZ processing plant.
- Clay will be returned to the extraction area.
- Returned clay and overburden will be contoured on the site and replanted as outlined in the landscape and rehabilitation report attached as Appendix 8.

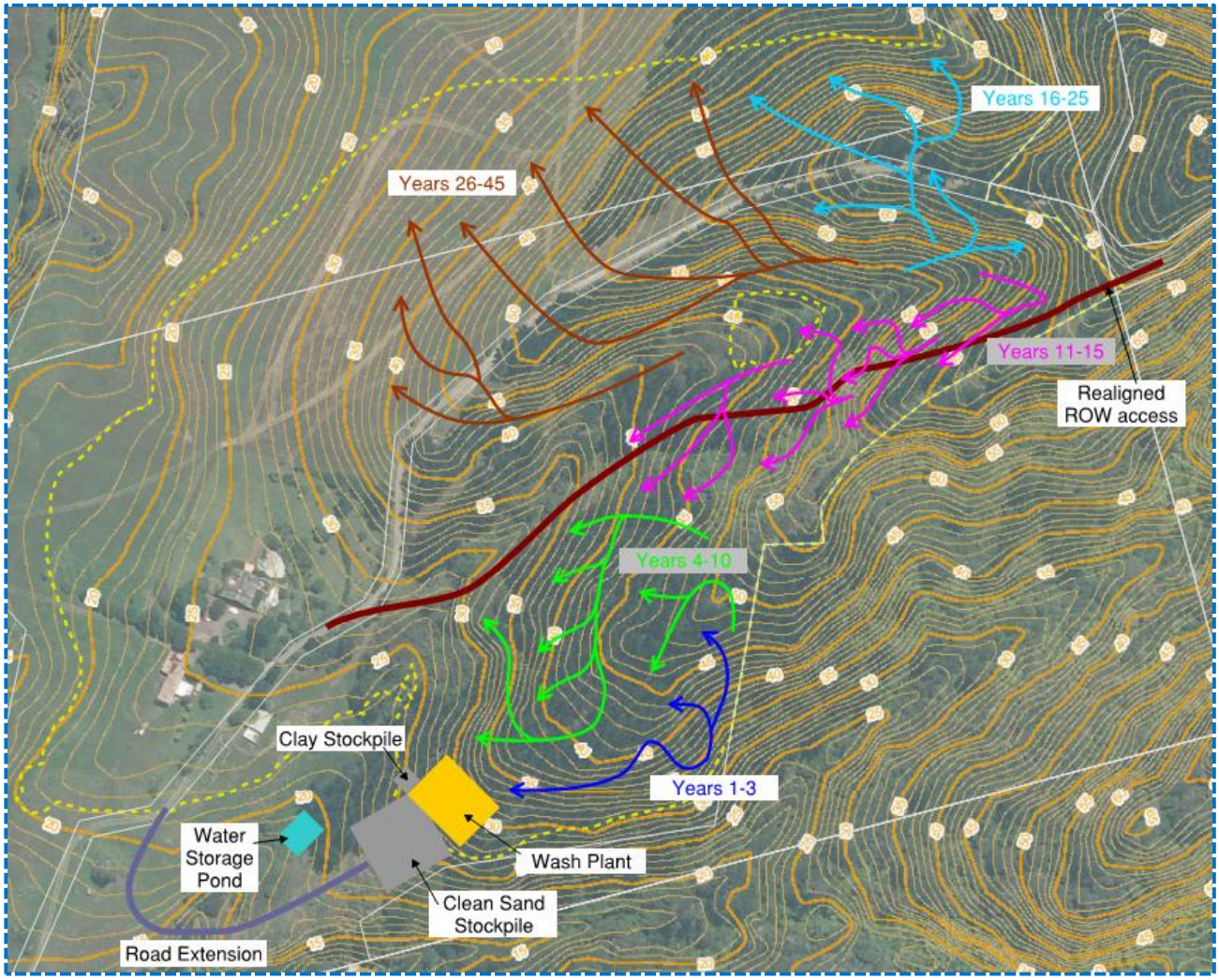


Figure 3.2. Conceptual illustration showing the wash plant location and extraction approach paths. Material is removed from the back of the ridge, minimising the visual impact of the cut face from the harbour and channel and using land contours and mature planting to the east.

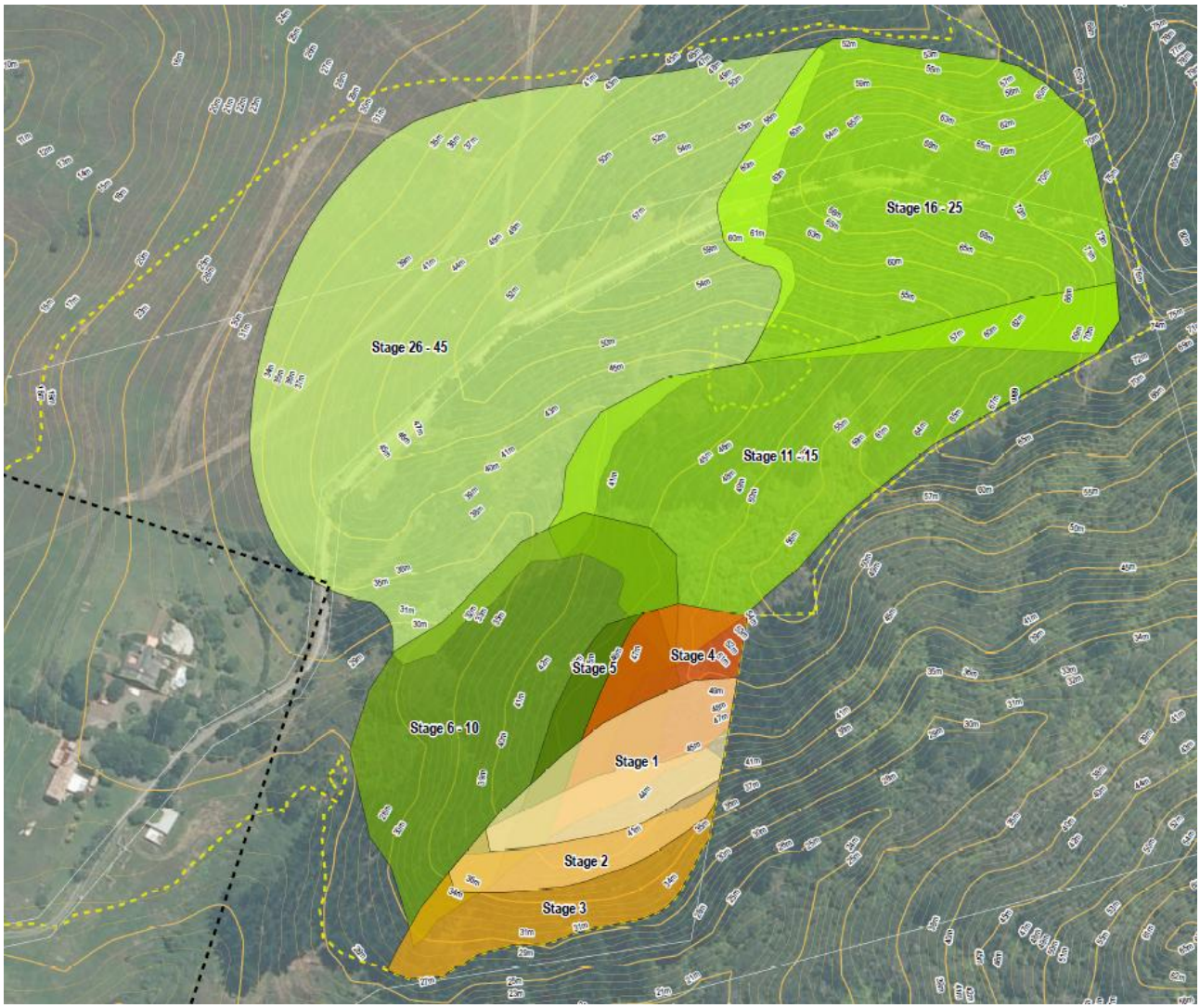


Figure 3.3. Extraction areas identified by time period.

3.4.2 Sand Wash Plant

Following the extraction of raw sand, the sand must be washed to remove excess clay content prior to use in the manufacturing of building product. As such, the installation and operation of an on-site wash plant is proposed near the southern boundary of the site, downhill from the proposed extraction area. The wash plant will be constructed on a concrete slab approximately 500m^2 in area and will consist of the following equipment:

- Hopper;
- Elevator;
- Washer; and
- Conveyor belts.

The highest point of the wash plant will likely be the elevator, which will be between 6 and 8m high.

The raw yellow sand that that will be fed into the wash plant feed hopper is made up of approximately 85% high silica sand and 15% fine clays and oversized material. The wash plant will be able to process approximately 25-30 tonnes of sand per hour.

Out of the 25-30 tonnes of sand processed every hour, approximately 5 percent of this will be clay content and 8 percent will be water content which will drain from the sand. The silica sand extracted will have a minimum particle size and will be greater than 95 percent SiO_2.

The washing process will remove from the sand:

- Clay coatings;
- Carbonaceous contaminants; and
- Oversize material.

After initial oversize screening, the sand is saturated and pumped through a cyclone separator, here the easily removed clays are separated from the sand. The sand is then processed through an attritioner to separate clay particles from the sand that are harder to remove. Again the sand and clay are pumped through a cyclone separator, and the sand from this separation is then placed on a stockpiling conveyor to form the final washed sand stockpile.

The wash water from this process, which contains clay fines, is pumped into a tank or pond where flocculent is added causing the suspended solids to combine and settle. The water in this tank or pond will be reused in the process, and the clay sludge underflow is pumped out for draining and redepositing on the site. A number of process options are available to dry the clay further and make it suitable to be returned back into the extraction area and be used in part for re-contouring of the site.

Sand from the wash process will be stockpiled for collection. Stockpiling will provide further opportunity to dewater the material prior to collection, and as such, the slabs will drain to sumps to reclaim that water. The sumps will discharge to the water storage recovery pond. For the washed sand, the slab has been sized to accommodate approximately one to two weeks production. The stockpile is planned to be less than 7m high. A square slab of 20m x 40m has been allowed.

3.4.3 Water Storage and Settlement Pond

Water used in the sand washing process will be largely recycled within the process with further water added from stormwater runoff from the site. This will be supplemented as required by water taken from the groundwater bore established as part of this proposal. The water storage pond will be located slightly downslope of the wash plant and will be approximately 300m^2 in area.

As there is a net loss of water from the recovery pond due to moisture transported from site in the clean sand and evaporation from the pond surface, there will be a need for some makeup water addition. The water recovery pond will also be configured to provide for capture and treatment of stormwater from the wash plant operational area to further augment the water budget for reuse.

Stormwater will be captured from the concrete pads and directed to a fore bay area of the recovery pond to settle suspended solids. Machine access will be provided to periodically remove settled material. Decant from the settlement pond will discharge into the main pond volume, and settled material will be retained and stabilised on-site, used in the re-contouring process.

The size of the recovery pond will be based on a water balance that maintains sufficient operational volume for reuse in the wash plant while also providing attenuation of storm flows. The design will consider a TP10 evaluation to achieve a minimum water quality volume sufficient to meet the one third of the 2 year 24 hour rainfall for the site. In practice, the water volume of the pond would be expected to be in excess of the water quality treatment volume due to the additional storage required for the reuse water, giving an extended detention capacity. Flows in excess of the pond top design water level will overflow to the existing stream, but these situations are expected to be rare. Due to the long retention volume the expected suspended solids in the overflow will be low. The full details of the proposed water use and sediment control provisions proposed for the site can be found in Appendix 7.

Overland flow paths outside the open extraction areas will be contoured in a manner which bypasses this pond.

3.4.4 Groundwater Take

When needed, groundwater will be extracted at a rate of ~1.4l/s through a deep bore (see location in Figure 3.1 GW01.) The bore will be drilled to a depth of 35 – 40m below ground level, which will place its base within the Helensville Conglomerate.

The proposed extraction rate is conservative and over-estimates the volume of water that will be required to be taken for the activity, as it takes into account the required volume of water for efficient operation of the sand washing plant and the estimated evaporation of water from the storage pond, but it does not take into account:

- Pond recharge rates from surface water run-off, which will be higher during wetter months; or
- Recycled washwater conserved during the washing process.

Due to water leaving the site in washed sand and evaporation, up to 35.6m^3 of water will be lost from the proposed pond each day. This number has been increased to 40m^3 a day for planning calculations. This means that the proposed pond needs to be supplied with 5m^3 per hour. Appendix 9 contains the hydrology report which details this planned groundwater take.

3.4.5 SH16 / McLachlan Road Improvements

The current level of turning movements into McLachlan Road from SH16 is 55-60 per hour. This level exceeds the recommend threshold (when measured against Austroads guidelines) of 18 before the intersection should be designed above basic treatment. New Zealand Transport Agency (the Agency) has confirmed this and has suggested that the northbound, left hand turn intersection be improved with a basic left turn treatment into McLachlan Road. This left turn treatment will provide a width of 6m from the centre line over 20m from the intersection and include a taper of approximately 25m. This work is proposed as part of the application. JHNZ will provide the Agency with schematics of this change for approval, along with a Traffic Management Plan for the construction of works.

The SH16 / McLachlan Road intersection is a standard T intersection. Vehicles turning onto SH16 from McLachlan Road have sufficient sight distance of at least 250m to the north, but only approximately 130m to the south, (Safe Intersection Sight Distance as recommended in Austroads guidelines for 100km/h roads is 248m). Site distance to the south is limited due to vegetation on the road reserve on the east side of the State highway carriageway. The site distance could be increased to approximately 250m to the south, to enable it to comply, by the removal or lowering of the vegetation growing on the road reserve. This will be undertaken as part of the proposal.

3.4.6 McLachlan Road Improvements

Upgrades to McLachlan Road are proposed as part of this application to improve road safety, and to enable the road to be safe for the 4-5 heavy vehicle return-trips per day that will occur on this road as a result of the proposal. JHNZ will undertake best endeavours to complete these road upgrades in conjunction with the site construction works, but if unexpected delays occur in obtaining all required approvals for this work then all truck and trailer units associated with the extraction activity shall be preceded by a pilot vehicle. A full description of these works and the proposed pilot vehicles is included in the Traffic Report attached in Appendix 4.

The upgrade works proposed to McLachlan Road have been discussed through on-site consultation with Auckland Transport. A description of the works proposed at concept level only, and a copy of the correspondence from Auckland Transport confirming the suitability of these works is attached as Appendix 4 and 10. The works proposed to occur on McLachlan Road are summarised below.

- Upgrading of eight locations where visibility and the ability for two vehicles to pass is currently limited;
- Where this occurs, the carriageway will be widened to 7m;
- Installation of sub-soil drains along some sections of surface water channels;
- Upgrade of the existing 3000mmØ culvert at the hairpin curve;
- Installation of road barriers, and
- Repositioning of the road markings at the intersection of Oyster Point Road and McLachlan Road so that trucks can turn this corner without crossing the centre line.

3.4.7 Private Right of Way Upgrade

Although well-constructed and currently in good condition, the gravel surface of the ROW that provides access to the site from McLachlan Road, would require regular maintenance, grading ,and re-gravelling under the action of regular truck traffic to keep it at a suitable standard. JHNZ proposes to seal the ROW and undertake ongoing maintenance as required. The width of the ROW will be formed to 5.5m for the length of the ROW.

JHNZ has had a number of discussions with the easement users and will continue to consult with them on upgrading the ROW. In summary, the following works are proposed as part of this application:

- Widen existing carriageway of the ROW to 5.5m formation;
- Lengthen existing culverts over farm drains and streams;
- Reform surface water channels; and
- Seal the carriageway from McLachlan Road to the site entry.

3.4.8 Site Easement

Access to the existing residence, the neighbouring Fox property, and the JHNZ operation will follow the existing formed easement that runs through the site for approximately the first 10 years of operation. There are no existing culverts or water channels present alongside this easement. JHNZ intends to cut a new road easement location from the existing Webb residence to the north and around and partly through the existing Lot 4 before climbing a gradual gradient to reconnect with the existing easement at the top of the site. The boundaries of Lot 4 will be relocated as part of the proposal (proposed Lot 3) so that this easement does not pass through another site. This new easement will be operative from approximately year 10 of the extraction activities, but will be cut into the site with benches revegetated earlier. The part of the ROW that will be used by the relocated Lot 4 (new Lot 3) will be formed and operational before the Certificate of Title is issued for this Lot.

The location of these access ways and associated culverts is shown in Figure 3.5 below. The new ROW easement passes close to archaeological sites Q/516 and Q/526. The ROW location has been designed to enable an appropriate buffer of 5m as recommended in the Cultural Heritage Management Plan prepared for the earlier subdivision on the site.

3.5 Stream works

No works will occur to streams on the site that require resource consent under the AUP:OP.

Culverts will be constructed or replaced in some of the streams on the site to provide for vehicle access through the site. These are permitted activities under the AUP:OP.

- To allow for vehicle movements to the wash plant and related areas, an existing vehicle crossing point over the southern tributary will be utilised and a new culvert installed.
- An existing farm culvert over the Middle stream will remain in place to serve agricultural and restoration activities until approximately year 11, when a new primary access through the site will be established. This route has been aligned to utilise the existing crossing point, which would be upgraded as necessary with new pipes.
- A new crossing of the Northern stream will be established to provide access to the new proposed Lot 3. The crossing point has been selected to avoid an established wetland associated with the upper section of this ephemeral watercourse, and to coincide with a point where the stream is narrow and tightly constrained within step banks.

The only other works that will occur within a waterway is the modification of the ephemeral headwaters of the Southern tributary which does not have a defined channel and is more a low lying area of wetland with some wetland plants. This is a permitted activity if it occurs in accordance with the standards contained in Rule E.3.6.1.1. These standards primarily relates to appropriate erosion and sediment control measures. These measures are detailed in the appended Erosion and Sediment Control Plan appended to this application. After the completion of extraction in years 4-10, a new wetland area will be created here to replace this lost ephemeral area. Overburden and topsoil will be reinstated in the area and a new wetland area created in the new lowest point where water will run. This area will be vegetated 10m either side in native vegetation to provide shading and an improved aquatic habitat. The Ecological Report attached as Appendix 5 for details of this rehabilitation.

In the first five years of the proposal, the lower reaches of the Southern tributary that will not be affected by the extraction activity will be enhanced with native planting for a 10m width either side of the stream and any weed species will be removed. By the time the headwater area of this stream is modified, the lower reaches of this stream will have been greatly enhanced and provide a much-improved aquatic habitat.

Works on existing streams and wetland areas will include planting (10m either side) of streams outside of the extraction areas and rehabilitation works at the end of extraction. Areas improved or created will include:

- Recreation of 0.36ha of wetland habitat within the extraction area;
- Restoration and protection of the existing 0.32 ha of wetland vegetation area on the northern stream margin;
- 0.78 ha of restoration and protection of the part of the margins of the southern stream that lie within the subject site; and
- 1.85ha of restoration and protection of the margins of the middle stream.

The following area of streams and wetlands will be improved as enhancement of the property over and above what is required to mitigate the effects of the proposal:

- Restoration of stream riparian vegetation on the northern stream of 1.6ha. This area is separated from the main extraction area by a ridge, but will provide useful buffering, biodiversity values and ecological linkages of the existing wetland area when restored.

3.6 Site Rehabilitation

Areas within the site subject to sand excavation will be rehabilitated in a progressive manner, in accordance with the Rehabilitation Concept Plan provided in Appendix 8. This plan also describes rehabilitation methods for the riparian corridors that will be enhanced as part of the application and the weed and pest management proposed.

In general, once sand has been extracted from an area, clay and topsoil will be replaced back into the extraction area and re-contoured to match the surrounding natural contours. Land will be revegetated in either pasture grasses or indigenous cover, including mānuka and kānuka slash. Steep slopes will be stabilised with either slash or planted mānuka and kānuka.

To supply slashing for the mānuka and kānuka stabilised areas, a plantation will be developed to the north of the extraction area. This will be selectively harvested on an ongoing basis to provide for the slash rehabilitation areas, while maintaining a predominant cover.

Due to an existing land covenant on part of existing Lot 5, it will be necessary to make sure that plants established in the area north of the new proposed access through the site will not have a mature height of over 10m. As the majority of plants to be established are to enhance wetland or stream margins, this restriction will be complied with.

3.7 Other Planting and Biodiversity Improvements

In addition to the planting and enhancement of the riparian margins along the lengths of all streams that run through the site, and the re-creation of the wetland area in the new lower ground level on the property, the following additional measures are proposed as part of this application to improve the freshwater, coastal and terrestrial biodiversity of the site.

- The planting of 15 large cavity forming trees such as puriri, rimu, and tōtara on the border of the existing covenant areas to provide long-term roosting habitat for bats.
- Animal pest control is proposed over the whole of the site for the duration of the extraction activity.

3.8 Boundary Adjustment

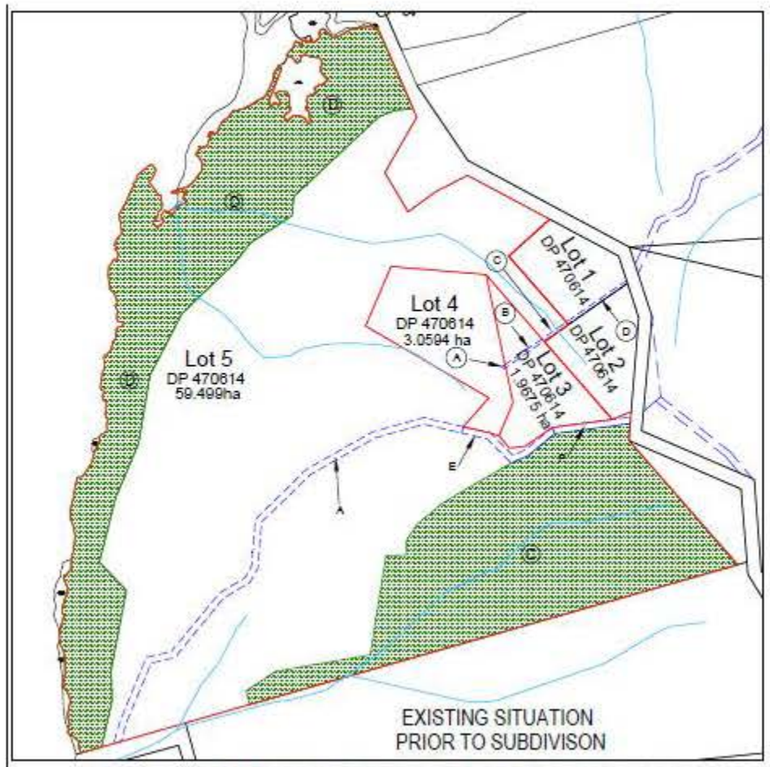
A boundary adjustment is proposed in order to separate the proposed sand extraction land use from the existing rural-residential land uses. Table 3.1 provides a summary of the proposed changes in lot sizes as a result of the proposed boundary adjustments. The proposed scheme is provided on the plan in Appendix 12 and overleaf on Figure 3.4.

Following the proposed boundary adjustment, JHNZ will retain proposed Lots 1 and 3. The sand excavation activities will take place entirely within proposed Lot 1.

The proposed Lot 2 will be retained by the current landowners (RAJ Design).

Table 3.1. Summary of the proposed changes in lot sizes resulting from boundary adjustments.

Existing Allotment	Existing Area	Proposed Allotment	Proposed Area	Difference
Lot 3	1.9675 ha	Lot 2	9.4458 ha	+7.4783 Ha (+380%)
Lot 4	3.0594 ha	Lot 3	4.0017 ha	+0.9423 Ha (+31%)
Lot 5	59.499 ha	Lot 1	51.0784 ha	–8.4206ha (-14%)



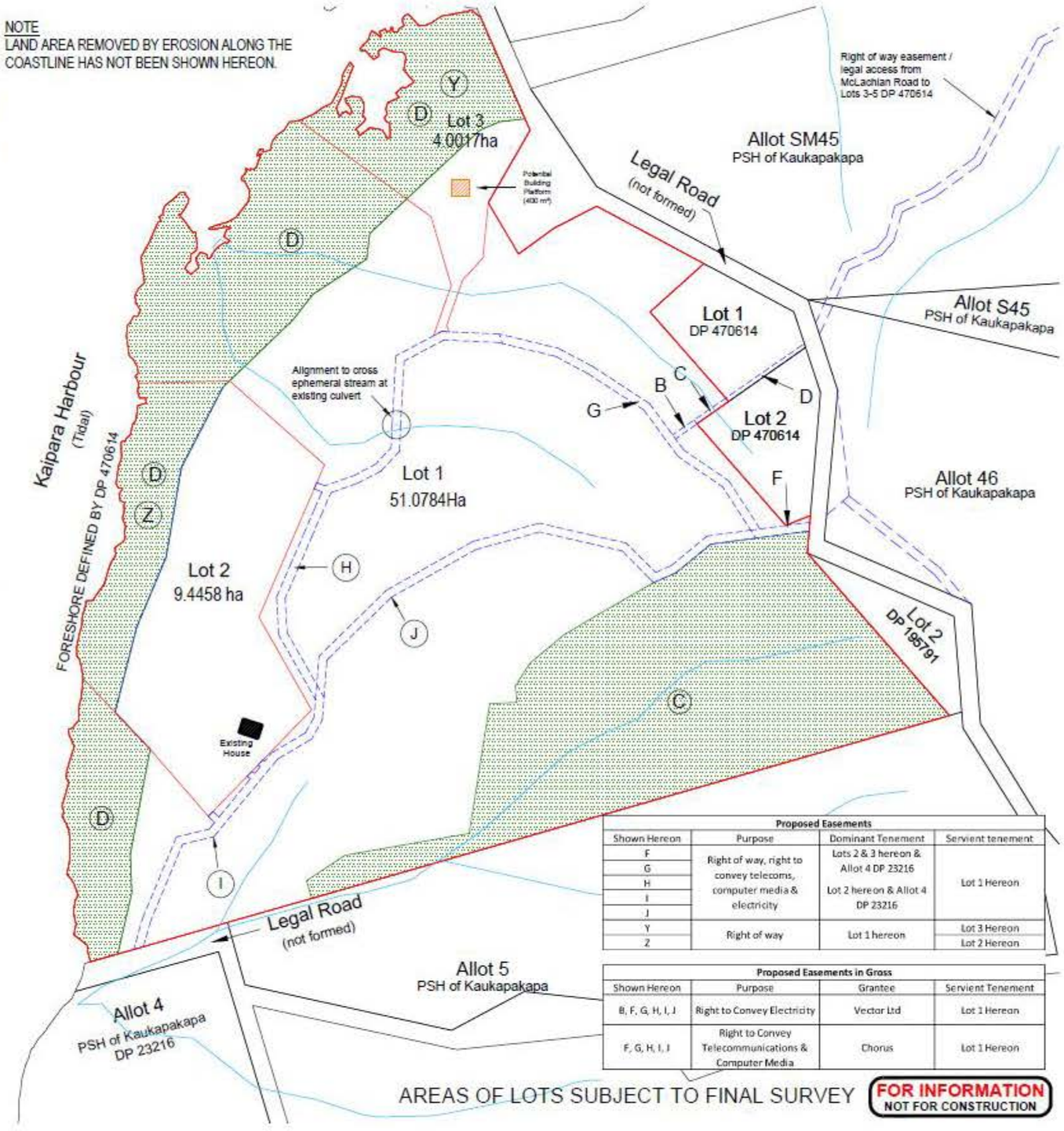
LOTS 3 & 5 COMPRISED IN CERTIFICATES OF TITLE 642853 & 642855

Existing Easements				
PURPOSE	AS SHOWN ON	SERVIENT TENEMENT	DOMINANT TENEMENT	STATUS
Right of Way, Right to Convey Telecommunications & Computer Media	E DP 470614	Lot 5 DP 470614	Lot 4 DP 470614	TO BE EXTINGUISHED
	F DP 470614		Lots 3 & 4 DP 470614	TO BE EXTINGUISHED
Right of Way	A, E & F DP 470614	Lot 5 DP 470614	Allot 4 PSH of Kaukapakapa DP 23216	TO BE EXTINGUISHED
Right to Convey Electricity	A DP 470614	Lot 4 DP 470614	Vector Limited	TO BE EXTINGUISHED
	B DP 470614	Lot 3 DP 470614	Vector Limited	TO BE EXTINGUISHED
	C DP 470614	Lot 5 DP 470614	Vector Limited	TO REMAIN
	D DP 470614	Lot 1 DP 470614	Vector Limited	TO REMAIN

Existing Land Covenants To Remain	
PURPOSE	SHOWN
Land Covenant	C & D

LEGEND
LAND COVENANT
EASEMENT
STREAM

NOTE
LAND AREA REMOVED BY EROSION ALONG THE COASTLINE HAS NOT BEEN SHOWN HEREON.



Proposed Easements			
Shown Hereon	Purpose	Dominant Tenement	Servient tenement
F, G, H, I, J	Right of way, right to convey telecoms, computer media & electricity	Lots 2 & 3 hereon & Allot 4 DP 23216 Lot 2 hereon & Allot 4 DP 23216	Lot 1 Hereon
Y	Right of way	Lot 1 hereon	Lot 3 Hereon
Z			Lot 2 Hereon

Proposed Easements in Gross			
Shown Hereon	Purpose	Grantee	Servient Tenement
B, F, G, H, I, J	Right to Convey Electricity	Vector Ltd	Lot 1 Hereon
F, G, H, I, J	Right to Convey Telecommunications & Computer Media	Chorus	Lot 1 Hereon

Figure 3.4. Proposed subdivision. Please refer Appendix 12 for scaled scheme plan.

4 Resource Consents Sought

Resource consents are sought for the activities and works as described in this AEE and the appended technical reports. The reasons for consents include, but are not necessarily limited to, those outlined in Table 4.1 that list the consent requirements under the AUP:)OP.

Table 4.1. Resource consent requirements and corresponding rules in AUP:OP

Rule	Provision	Activity Status	Comment
H19.8.1 – Rural Zones			
(A60)	Mineral extraction activities	Non-Complying	The proposed sand extraction activity is considered to be consistent with the definition of 'Mineral extraction activities' set out in Chapter J. The definition includes a number of ancillary activities, some that will also be undertaken as part of the works. The majority of the activity proposed is covered by this definition and no further District consents are required under section 9 of the RMA. The AUP:OP defines 'Mineral extraction activities' to include: ■ Excavating minerals; ■ Processing minerals by crushing, screening, washing, or blending; ■ Storing, distributing, and selling mineral products; ■ Accessory earthworks; ■ Removing and depositing overburden; ■ Treating stormwater and waste water; ■ Landscaping and rehabilitation of quarries; ■ Accessory activities and accessory buildings and structures; ■ Workers' accommodation (not proposed).
E39.4.1 – Subdivision			
(A13)	Subdivision not provided for or not complying with Standard E39.6.5.1	Non-Complying	The boundary adjustments are not provided for in the Rural Coastal Zone as the lot sizes will change by more than 10% of the existing area.
E7.4.1 – Taking, using, damming, and diversion of water and drilling			
(A26)	Take and use of groundwater not meeting the permitted activity or restricted discretionary activity standards or not otherwise listed	Discretionary	Groundwater extraction of 40m^3 per day is sought to supply additional water to the sand washing facility.
E11.4.1 – General earthworks [rp]			
(A5)	Greater than 10,000m^2 and up to 50,000m^2 where land has a slope less than 10 degrees outside the Sediment Control Protection Area	Controlled	Overall, an area of approximately 100,000m^2 of earthworks is expected to occur over a 35-year period. The area of earthworks within the extraction area being undertaken at any given time will be dependent on the nature and volume of sand resource that is being extracted. 30,000 tonnes of washed sand will be extracted from the site per year. It is anticipated that no more than 30,000m^2 of overburden and sand resource will be exposed and extracted at any
(A8)	Greater than 2,500m^2 where the land has a slope	Restricted Discretionary	

Rule	Provision	Activity Status	Comment
	equal to or greater than 10 degrees		given time. The majority of time the maximum exposed area will be 10,000m^2. Temporary stockpiling of overburden will also occur during extraction. The removal of overburden will occur in the earthworks seasons only, however sand will be extracted all year round. Some areas of extraction will be within the Sediment Control Protection Area and on land with a slope greater than 10 degrees, and it is likely that earthworks will exceed 2,500m^2 per year.
(A9)	Greater than 2,500m^2 within the Sediment Control Protection Area	Restricted Discretionary	
E14.4.1 – Dust generation			
(A89)	Mineral extraction activities at a rate of between five and 200 tonnes/hour	Restricted Discretionary	Sand extraction will occur at a rate of approximately 15 tonnes per hour.
E15.4.1 – [rp] Vegetation Alteration or Removal			
(A10)	Vegetation alteration or removal, including cumulative removal on a site over a 10yr period, of greater than 250m^2 of **indigenous** vegetation	Restricted Discretionary	A total area of 1,200m^2 of indigenous vegetation will be removed. Further to this, vegetation removal from riparian yards and across the site will likely exceed the permitted standards listed in E15.6.
(A16)	Vegetation alteration or removal within 20m of rural streams, other than those in rural production and mixed rural zones.	Restricted discretionary	
(A17)	Vegetation and removal within 10m of rural streams	Restricted discretionary	
(A18)	Vegetation alteration and removal within 20m of natural wetland	Restricted discretionary	

Overall, the activities for which resource consents are sought have been assessed as Non-Complying.

5 Assessment of Environmental Effects

This section provides an assessment of the actual and potential effects of the proposed activity on the environment. This section has been drafted in accordance with Schedule 4 of the RMA, and addresses the following effects:

- Positive effects;
- Visual and landscape effects;
- Earthworks effects;
- Hydrological effects;
- Ecological effects;
- Traffic and transport effects;
- Air quality effects;
- Noise effects;
- Archaeological effects; and
- Boundary adjustment effects.

5.1 Positive Effects

5.1.1 Transport

As discussed in Section 3.1 of this AEE, the sand extraction site will replace the sand resource used in JHNZ's Penrose manufacturing plant that is currently sourced from the Glorit extraction site. Once established, the proposed wash facility will also replace the existing sand washing facility in Kumeu.

The current operation requires loaded trucks to transport unwashed sand 45km from Glorit to the Kumeu washing facility, where the emptied trucks are loaded with clay spoil to be returned to the Glorit quarry site (45km). Washed sand is loaded onto trucks and transported 35km from Kumeu to the manufacturing facility in Penrose and these trucks then return empty. The proposal seeks to streamline this process and will produce logistical efficiencies, as the wash plant will be located at the extraction site and closer to the manufacturing plant, resulting in 20% fewer truck movements and shorter distances travelled by the trucks along the State Highway network and local roads. This reduction in kilometres will reduce air emissions from trucks and improve the efficiency of the operation. Note that this project, located near Kaukapakapa, proposes five return trucks per day, but the overall efficiency of the operation is improved as only clean washed sand, not sand and clay is transported.

5.1.2 Land Use Benefits

In addition to these positive effects through the increased transport efficiency of the operation, the sand being extracted and washed at the new facility will also enable the closing and redevelopment of the 1.65ha sand washing facility in the Kumeu Township. This site is zoned Business – Light Industrial. Business and Industrial land is in short supply in this area and the availability of this site will provide a benefit to the local community of Kumeu. The adjoining land uses of the site include retail and cafes, as well as storage yards and auto-body shops. Replacing the Kumeu plant with the proposed plant near Kaukapakapa, allows the Kumeu site to be utilised by a more intensive land use in a developing town centre. The redevelopment of this site for future commercial and residential use and as part of the improved flood management plan for the area is identified in the Kumeu – Huapai Centre Plan that is being released for public consultation in August 2017. The plant at Kumeu employs 1 – 2 full-time employees on site, while the redevelopment of this site would likely enable more people to be employed.

In addition, the change of use at this site will also open up further options for the use of the stream at the rear of the Kumeu site that Council has indicated as a potential site for stormwater catchment overflow improvements.

5.1.3 Economic Benefit of Utilisation of Sand Resource

With significant development and growth occurring within Auckland and around the country, the demand for building materials produced from Silica sand is expected to grow. The current supply utilised by the manufacturing plant in Penrose only has a few years of supply left. Once this supply of Silica sand is exhausted, the manufacturing plant will either need to close, with a resulting loss of jobs and will result in this building cladding material no longer being available to the construction industry unless sand is imported from overseas. This will be more inefficient and will add expense to this manufacturing process, ultimately increasing the cost of the end product.

As the availability of Silica sand that meets the specific requirements to be able to be utilised in this manufacturing process is very limited – the resource is located at only three other known locations in New Zealand, this sand deposit takes on a regional if not national economic significance. Whilst it is still essential that the adverse effects of extracting this resource are appropriately managed, the importance of the resource to the region needs to also be taken into account when determining this application.

5.1.4 Ecological Benefits

From an ecological aspect, the proposal will result in significant enhancement of riparian margins that will increase the native biodiversity on the site and improve ecological linkages through the site to the coast, establish large areas of kānuka and mānuka on the site, the clearing of weed species from the property and pest animal control across the site. More planting than is required to mitigate effects is being proposed so that overall, these improvements will combine to provide additional ecological benefits for the site as well as mitigate the effects of vegetation removal and habitat modification. The full ecological measures and benefits proposed are fully described in the Ecological Report attached as Appendix 5. A summary of the measures that are ecological benefits (over and above those required to mitigate the effects of the proposal) are listed below:

- Restoration and protection (legally and physically) of stream riparian vegetation on the northern stream of 1.6ha;
- The removal of large areas of gorse, woolly nightshade and other weed species from the site; and
- Animal and pest control for rat and possums for the duration of the extraction activity over approximately 20ha of the property.

5.2 Landscape and Visual Effects

The proposal includes removal of topsoil and extracting sand from the site over a 35 year period. It also involves the establishment of a sand washing plant with the sand conveyor reaching a maximum height of 8m in height along with the establishment of a small office and the relocation of the access way in the site. As the site is located on a hill side facing the Kaipara Harbour, it has the potential to be seen from multiple viewpoints from the harbour and neighbouring properties.

A full visual assessment of the proposal has been undertaken and is attached as Appendix 8. It includes assessing the change that will occur in the landscape as a result of the proposal from two vantage points (VPs) in the adjoining Kaipara Harbour, as well as from numerous locations on the land surrounding the subject site. The attached Landscape and Land Rehabilitation Report (Appendix 8) also fully describes how the land will be rehabilitated after the sand is extracted from each area.

5.2.1 Potential Effects

The site is located within the coastal environment of the Kaipara Harbour, and is part of the Rural Coastal Zone. Large scale earthworks and changes to vegetated areas within coastal sites can result in significant changes to a visual landscape when viewed from the harbour at a distance and can change the visual experience of a user on site. The degree of effects generated by an activity depends on the character of the surrounding landscape, existing levels of development on the site, the contour of the land, the presence or absence of visual screening, and the characteristics of the activity.

The proposal will result in changes to the existing land cover and land formations, primarily resulting from the bulk extractions proposed. The removal of vegetation and subsequent exposure of sand at the surface will result in an altered landscape visible to a select few groups of receivers, identified in Section 5.2.2 below. The difference in visual appearance of the exposed sand is considered to be of a similar nature to the earthworks caused through the harvesting of a forest block and the ploughing of arable land. It is important to note that the proposed sand extraction will be undertaken in a progressive manner, as discussed in Section 3.3 above. This will limit the amount of sand exposed at any one time and will allow for the revegetation of disturbed sites on a continual basis. Given this, the overall potential visual effects will be similar to forestry and farming, but on a smaller scale as a result of the proposed methodology.

5.2.2 Summary of Landscape and Visual Effects

The Assessment of Landscape and Visual Effects (Appendix 8) undertaken for the project by Littoralis has assessed the potential and actual effects of the proposal for a range of viewing audiences, including:

- Users of the lower Kaipara Harbour west of the site;
- Residents and visitors of Aotea/Shelly Beach;
- Travellers and residents travelling along South Head Road (and side roads to the east); and
- Residents sharing the ROW to the site and immediate neighbours.

These effects are described in full detail in Appendix 8 and are summarised below.

5.2.2.1 Lower Kaipara Harbour Users

The viewing audience of the site from the lower Kaipara Harbour is likely comprised of passengers and crew on commercial and charter boats that navigate through the harbour to and from Helensville and Parakai. This is anticipated to be a small audience, but likely the most impacted by the activities,, due to the generally good visibility of the site from the harbour, albeit distant, and the relative proximity of the navigational channel to the site (2 – 5km away).

Due to the nature of the site's topography and the proposed extraction methodology, the majority of the excavations undertaken throughout the lifetime of the operation will not be conspicuous. For years 1 – 15, extraction will be undertaken between two ridges and the cut face will not be visible from the Kaipara Harbour. The worst-case scenario is the appearance of the site represented in the visual simulation (from VPs 1 and 2 in Appendix 8) of year 15 (+/-), which shows a 3 – 4 month period in which the extent of exposed sand could be experienced by viewers in the harbour.

While the sand will be visible from the harbour during these 3 – 4 months, it is noted that in years 14 and 16 the site will appear very similar to the existing state, although by year 16 the existing gorse will have been replaced with kānuka slash.

Given that the view of the excavation cut face will be visible for 3 – 4 months out of the proposed 35 year duration and the area will be limited to a size similar to a small agricultural plot, the adverse effects on the visual amenity experienced by users of the lower Kaipara Harbour are less than minor.

5.2.2.2 Residents and Visitors of Aotea/Shelly Beach

The view from Aotea and Shelly Beach, approximately 7km to the west-northwest of the site, will be of a similar nature to that of the Kaipara Harbour, albeit from a greater distance. Aotea and Shelly Beach provides a popular boat launching site for recreational anglers and boating enthusiasts. The Landscape and Visual Assessment (attached as Appendix 8) has identified this viewing audience as being of a modest scale compared to the rest of the viewing catchment, but also potentially the largest concentration of people that would have the potential to view the site from a static position.

Visual simulations (see VP 3 in Appendix 8) indicate that the viewing distance of 7km makes it difficult to distinguish landscape detail and thus changes in the landscape produced by the proposal.

Given that the view of the excavation cut face will be difficult to discern from 7km away, and that the cut face will only be conspicuous for 3 – 4 months out of the proposed 35-year duration of the activity, the adverse effects on the visual amenity experienced by users at Aotea and Shelly Beach are less than minor.

5.2.2.3 Travellers along South Head Road

South Head Road is located along the southern and western shores of the Kaipara Harbour. It is described in the Landscape and Visual Assessment as being moderately well used, crossing backshore flats along the northwest route leading away from Parakai. The road runs to the north of the Kaipara Peninsula and is located between 5 and 10km to the south and west of the site.

An inspection of this route revealed only a few publically accessible locations with a view of the sand extraction site. The largest concentration of potential viewers is from an area which will be developed for rural residential land use at Tuparekura Road. This development area is located atop a spur that projects out across the surrounding land and has expansive views of the harbour and beyond. This location is further to the west from the subject site than Shelly Beach, and thus views and effects will be of a similar nature but of a lesser extent.

The viewing location in closest proximity to the project site is located at the seaward end of Haranui Road outside of Parakai. This is a small local road providing access to a few homes and a marae. VP 5 (in Appendix 8) demonstrates that the viewers from this location looking towards the project site will be unable to discern details due to the distance from and scale of the proposed works.

As noted previously, the worst case scenario will be the 3 – 4 months during year 15 where the cut face will be visible. While this face will be discernible from the sites along South Head Road, the activities associated with the excavation, including movement of machinery and the wash plant, will not be visible. Given this, the adverse effects on visual amenity experienced by people at the sites along South Head Road will be less than minor.

5.2.2.4 ROW Users and Neighbours

The audiences nearest to the potential visual effects are the users of the shared ROW and neighbours that share boundaries with the project site. The Landscape and Visual Assessment (Appendix 8) describes the potential effects on each of the users and neighbours in some detail. The neighbouring properties to the north and east are shielded from the proposed works area by the northern and eastern spurs and surrounding covenanted vegetation. The most significant effects to be potentially experienced by these neighbours include:

- 351A McLachlan Road – Temporary earthworks associated with the improvements to the ROW will be visible, but are of very short duration and effects are less than minor;

- 357 McLachlan Road – Potential to glimpse the project site over the tree line of the covenanted bush from a single bedroom. View is expected to be obscured by new forest growth within the next 4 – 5 years. Effects are no more than minor; and
- 359 McLachlan Road – Topography and vegetation between this location and the project site will significantly limit visibility of the proposed activity. Effects are less than minor.

Users of the neighbouring property to the south (Allot 4 DP 23216, McLachlan Road Kaukapakapa 0984) will experience the most intimate view of the proposed works, as they require access along the ROW through the project site. These users will be able to witness the changing landscape as the project is carried out, and as such, the potential adverse effects will be more than minor. However, the current owner and occupier of the property, Mr Fox, has provided his written approval to the proposal. This approval is provided in Appendix 13. As such, these effects can be disregarded.

5.2.2.5 McLachlan Road Users

The project site is not visible along nearly the entire length of McLachlan Road due to topography of the land between the road and the site. The exception occurs at the western end of the road near the coast, as shown in VP 11 of Appendix 8. A slender fragment of the excavation areas proposed for years 16 – 25 emerges above the northern spur when viewed from this location. The assessment has concluded that the viewing audience here would be very limited, and the changes to the landscape over time would be barely noticeable by the audience. As such, the effects are less than minor.

5.2.2.6 Conclusion

As discussed above, the proposed works do have the potential to result in adverse visual effects on a range of viewing audiences. These effects have been characterised as being primarily less than minor, with no more than minor effects limited to owners and occupiers of 357 McLachlan Road. The owners and occupiers of the neighbouring site (Allot 4 DP 23216) who may experience more than minor effects have provided their written approval to the application.

With the proposed progressive extraction methodologies, the location of the site behind topographical features that will obscure the majority of activity, and the proposed site rehabilitation, the overall effects on potential viewing audiences will be less than minor.

5.2.3 Landscape and Character Effects

The Landscape and Visual Assessment (Appendix 8) has also considered the potential and actual effects from the proposal on the intrinsic values and characteristics of the site. The site's context within the Kaipara Harbour's coastal environment is not formally identified in planning documents as having heightened landscape value or sensitivity, but the relationship between the site and the nearby coastal estuarine environment is noted as being of particular importance with respect to the Rural Coastal Zone objectives and policies of the AUP:OP.

The proposal will effectively result in the removal of two spurs through the extraction of the underlying sand dunes, thus permanently modifying the natural landscape within the site. While this results in a physical change to the environment, the site is in a substantially degraded state following past land uses, including forestry harvesting and farming. In this respect, the proposed post-excavation rehabilitation involving the reintroduction of indigenous planting, riparian restorations, and wetland enhancement, will provide positive effects in extending and restoring the natural landscape and character features associated with the coastal environment.

Overall, effects on the landscape and character will be adequately mitigated and remedied to be less than minor.

5.3 Earthworks Effects

5.3.1 Potential Effects

The proposed extraction will involve bulk earthworks covering approximately 1.5ha during the first five years. This will include cutting of topsoil and clay from extraction areas and stockpiling of that material for replacement on completion. Earthworks will also be undertaken in association with construction, upgrade and maintenance of the ROW and McLachlan Road.

Earthworks have the potential to generate adverse effects on downslope stream environments, and subsequently, the coastal marine area, through sedimentation and accelerated erosion. Bulk earthworks and small areas of land disturbance within rural land is the primary source of sediment generation, which is one of the major contaminants of the coastal marine area. Suspended sediments carried over land, into streams, and out to sea can result in the smothering of benthic organisms, reduced water clarity, and changes to the chemical composition of an aquatic habitat. Unstable stockpiling could also potentially lead to slips and unintended stream diversions.

The Kaipara Harbour and the small tributaries feeding into the harbour are potentially vulnerable to effects of uncontrolled bulk earthworks. Further to this, the site contains steep terrain consisting of sand and soil that can be mobilised in the event of heavy rains when exposed. As such, a site specific set of erosion and sediment controls have been developed for the proposal in general accordance with *Auckland Council Technical Publication 90* (TP90) and the *Auckland Council Guidance Document: Erosion and Sediment Control* (GD05, 2016). The Erosion and Sediment Control Plan (ESCP) (Appendix 7) has been prepared for the first 5 years of extraction to avoid, remedy or mitigate potential adverse effects by minimising and managing erosion and sediment entering the harbour and tributaries. The ESCP will be updated as extraction progresses, based on the same principles.

The principles of GD05 used to inform the ESCP are described below:

- **Minimise Disturbance:** Only work those areas required for construction to take place.
- **Stage Construction:** Carefully plan works to minimise the area of disturbance at any one time.
- **Protect steep slopes:** Where steep slopes exist within the works area, enable these to be protected as steep slopes as they are more prone to erosion.
- **Protect Watercourses:** Map all water bodies before works commence.
- **Stabilise exposed areas:** Rapidly stabilise by sewing new seed or mulch cover.
- **Install perimeter controls:** Divert clean water away from areas of disturbance and divert runoff from areas disturbed to sediment control measures.
- **Employ detention devices:** Treat runoff by methods that allow sediment to settle out.
- **Make sure the ESCP evolves:** As construction progresses and the nature of land disturbing activities change, the ESCP needs to be modified to reflect the changing conditions on the site.
- **Assess and adjust:** Inspect, monitor and maintain control measures.
- **Use trained and experienced contractors**

5.3.2 Erosion Controls

To reduce the potential for erosion to occur and to mitigate potential adverse effects arising from any erosion, the following controls are proposed. In assessing the effect created by earthworks associated with the proposal it is relevant to note that the AUP:OP does not limit the area of earthworks that can occur in the zone if they are ancillary to farming and forestry. This is a relevant permitted baseline of effects that should be taken into account when assessing the proposal.

Table 5.1. Proposed erosion controls

Erosion Controls	Comment
Site access points	The internal road between the wash plant and the site access will be of gravel construction and stabilised throughout its length, including the site access point. The ROW carriageway will be sealed.
Minimisation of exposed areas	Extraction will be staged to minimise the area exposed at any one time. Vegetation removal will be limited to areas where soil disturbance is to be undertaken. While the consent being applied for is to have an area of up to 3ha open at any one time, at the majority of times, this area will be 1ha. By limiting the area of exposed land, appropriate retention devices will be able to be utilised and less land surface area will be exposed to erosive forces.
Limiting site length	Exposure of long slopes increases the potential for water traveling over the site to cause erosion and generate increases in sediment loss. The length of a slope exposed will be limited by installing contour drains on long slopes. Contour drains or benched slopes will be installed with a spacing of approximately 30 – 50m.
Stabilisation and reinstatement	Exposed surfaces will be progressively stabilised and rehabilitated when earthworks in each area are completed. How this will occur is described in the Landscape Rehabilitation Plan (Appendix 8).
Dust Control	Dust will be controlled by a number of management practices, as detailed in the MfE's Good Practice Guide for Assessing and Managing Dust (2001), including: ■ Minimising the area of wind-exposed soil, ■ Limiting traffic to specific roads and minimising the distance travelled, ■ Controlling vehicle speeds, ■ Minimising drop heights, ■ Limiting stockpile height and providing shelter for stockpiles from wind, Water application may be necessary, especially within the internal roads. Dust management will comply with Permitted Activity standards.
Stockpiling	Several long-term stockpiles will be required to be constructed within the site: ■ A stockpile of topsoil and clay (overburden) stripped to access the sand beneath; ■ A clean sand stockpile derived from the washing process, to be removed from site at a maximum of 5 trucks per day; and ■ A clay pile derived from the washing process containing the 'dirty' fines of the mined material. ■ Stockpile runoff will be diverted to the process for recycling as wash water.

5.3.3 Sedimentation Controls

Sedimentation management is proposed using multiple sediment control devices, as outlined in the ESCP map appended to the ESCP (Appendix B of Appendix 7). The appended sediment control plan details these devices for the first 5 years of the project and then provides for the detailed design of these devices to be undertaken in accordance with the same principles as the extraction area moves over time.

Appropriate control of sedimentation is also closely related to appropriate management of onsite stormwater and in this case, wash wastewater from the plant. Section 3 of this AEE explains how in most circumstances, 100% of the wash wastewater will be recycled on-site and also discusses how stormwater that passes over the earth worked areas will be collected and settled. The devices and methods that will be used on site to minimise sedimentation effects are outlined below and fully described in Appendix 7 – ESCP.

A comprehensive stormwater management plan will be developed as part of final construction plans, to include detailed stormwater management design. Effective design and management of stormwater flows will minimise any risk of peak flow increases to natural watercourses. In addition, it is proposed to minimise stormwater discharges to the stream from the wash plant area. All runoff from this area will be directed to the water storage and settlement pond.

To improve the efficiency of sediment control devices, a 'treatment train' approach has been applied to the selection of measures. A 'treatment train' is a range of techniques applied in series located in a manner dependant on the characteristics and topography of a site. The approximate locations of proposed sediment control devices are shown in the ESCP.

The mineral extraction being undertaken at this site involves porous, sandy material. This geology has been confirmed with an extensive geotechnical investigation of the site finding Awhitu Group quartz sand of fine – medium size. This group transitions to Waitemata Group silt and clay at depth. The porosity of this sandy layer, which is to be exposed for long durations of the project, contributes to the proposed erosion and sediment control practices, which are outlined in Table 5.2 below.

Table 5.2. Summary of proposed sediment controls.

Sediment Controls	Comment
Clean water diversions	Clean water will be diverted away from works with perimeter controls. Clean water diversions will be constructed uphill of all earthworks to prevent clean water from mixing with sediment laden water. Clean water will be diverted onto unworked land prior to discharging to streams.
Slope protection	A large volume of sand extraction will occur throughout the lifetime of the activity. Appendix C of the ESCP gives an indication of the Volumetric Staging Plan, with the annual extraction of sand estimated at 23,000 m^3 (equating to 30,000T washed sand per annum). Extraction of sand will continue in that location until a stable gradient is obtained (see Sand Lower Contact Contours, Appendix D of the ESCP). When sand extraction is completed in each area, clay and topsoil will be re-established on the slopes followed by rehabilitative planting. Slopes have the potential to generate significant sediment discharges, and must be protected from excessive erosion. The high porosity of the sand material alleviates this risk, but notwithstanding this, contour drains or benched slopes will be used to break up slope lengths with spacing of approximately 30 - 50m. Surface roughening, soil stabilisers or geotextile methods may also be implemented to protect cut slopes from erosion. Check dams will be required to be installed in any dirty water diversion bund or channel running down slope. Sediment retention spillways will be underlain with geotextile or plastic to avoid erosion of the structure's bund. In some circumstances, the spillways will need to be designed to dissipate their flow over a large area to avoid erosion within the receiving environment.

Sediment Controls	Comment
Sediment retention ponds	Sediment retention ponds (SRP) can be used as a form of retention and treatment of sediment laden water across the site. These will be positioned appropriately to capture runoff generated within exposed earthworks areas with a maximum contributing catchment area not exceeding 5.0 ha. Sediment retention ponds will be sized in accordance with GD05, with a minimum volume equivalent to 2% of the contributing catchment area (i.e. 200m^3 capacity for each hectare of contributing catchment). Chemical flocculation may be required in sediment retention ponds depending on the efficiency of the retention device. This flocculation can be in the form of a rainfall activated dosing system (FlocBox or FlockSock) or manual dosing. One SRP is required for the first 5 years of mineral extraction. Future works (6+ years) are likely to require another SRP to be constructed as the operations will move catchments. The location of any SRP will be considered carefully to allow it to remain onsite permanently and cater for sediment runoff and treatment for the longest time possible. A plan showing the likely size and location of the sediment retention ponds is shown in Appendix B of the ESCP.
Decanting earth bunds	Decanting earth bunds (DEBs) may be installed to provide limited retention and treatment of sediment laden water where the size of the earthworks catchment is small and/or too steep for the installation of a SRP. DEBs will be positioned at the base of slopes such that they are treating the greatest volume of sediment laden water. DEBs will be designed and sized according to the GD05 guidelines which require a minimum 2 m3 per 100 m2 (2%) of earthworks catchment, sized to a minimum 3:1 length to width ratio and installed with a floating T-bar dewatering device.
Groundwater diversion	The desired mineral extraction cut will involve the excavation through steep topography. In the event that these excavations encounter groundwater, any water seeping from the soil will be collected using the same methods as surface water. It is unlikely that the works will encounter the groundwater table, but it is possible that perched groundwater will be encountered in some areas of the project during winter periods. In these circumstances ground water is to be pumped or directed to a sediment retention pond in dry weather.
Diversion bunds	Sediment diversion bunds or channels will be installed in downhill locations where it is necessary to divert sediment laden water into a DEB or SRP. Diversion bunds or channels will be installed in accordance with GD05. Heavy machinery operation and earthworks will not occur on the downhill side of diversion bunds unless a secondary sediment control device is present. Diversion bunds will remain in place until a minimum of 80% stabilisation is achieved at the completion of works.
Silt fences	Silt fences or super silt fences will be installed across the contour to slow sheet flow and impound sediment from small catchment areas. They will be used where it is not practical to collect runoff and divert it to a SRP or DEB. In some instances where the site is constrained, e.g. too steep or limited construction area, silt fences or super silt fences will act as the primary treatment device. Heavy machinery operation and earthworks will not occur on the downhill side of silt fences unless the area downhill has its own silt fences and sediment control devices.

5.3.4 Summary of Earthwork Effects

Excavation works will be undertaken in stages, with erosion and sediment controls installed in all circumstances. The approach outlined in the ESCP will be included in the updated ESCP for each extraction area which will clarify responsibilities, and outline the measures that will be installed, and maintained, as appropriate.

The implementation and weekly monitoring of the erosion and sediment control measures will enable any unlikely effects that do occur to be quickly detected, and any necessary amendments will be made to the erosion and sediment control methodology.

While the proposed measures are based on Council's best practice guideline, the implementation of the methodologies to be employed will be important. The sediment control measures to be utilised are detailed in the application and supporting documents and recognise the risk and the values of the environments to which sediment is discharged.

The continual evolvement of the ESCP to recognise changes occurring across the site will allow for best practices to be implemented to minimise the risk of any potential failure or inefficiencies of a sediment retention device occurring.

Overall, with the implementation of the Erosion and Sediment control protection measures outlined, the adverse effects created by the earthworks associated with the proposal will be less than minor.

5.4 Hydrological Effects

5.4.1 Potential Effects

The proposal includes the extraction of groundwater at a rate of approximately 1.4 l/s, for a duration of about 8 hours each day, where needed to supplement the collected stormwater to be used for washwater on the site. This equates to a maximum take of 40m^3 per day. Groundwater extraction has the potential to reduce the water table levels in the surrounding environment, which could lead to adverse effects on nearby groundwater takes, soil stability, and saline intrusion within a coastal environment. A drop in the groundwater table may also reduce the flow of unconfined aquifers feeding into streams.

To understand the potential and actual effects of the proposed groundwater take, a Groundwater Effects Assessment (Appendix 9) has been undertaken by Beca.

5.4.2 Predicted Drawdown

Groundwater levels within the site were recorded from three bores (GW01, GW02, and GW03) during a pump test, which occurred over a period of 94 hours. A 24-hour constant rate test was also undertaken, followed by 26 hours of recovery monitoring. The pumping test occurred within the production well at GW01. As indicated in the Groundwater Effects Assessment, only a small drawdown was recorded in GW02 (~150m distance from GW01) and no drawdown recorded in GW03 (~300m distance from GW01).

Based on these observations, the estimated drawdown at various distances was modelled (see Table 5.3). The model is inherently conservative, as it assumes that groundwater pumping will occur for 180 continuous days and that there is no aquifer recharge.

Table 5.3. Groundwater pump testing results (Hydrology Report, Appendix 9)

Days of Pumping	Drawdown (in m) @ 35m from GW01	Drawdown (in m) @ 100m from GW01	Drawdown (in m) @ 500m from GW01
1 day	0.10	0.04	0.00
30 days	0.36	0.19	0.01
90 days	0.44	0.28	0.05
180 days	0.50	0.33	0.09

5.4.3 Summary of Hydrological Effects

Three potential well sites were investigated, to help select the final production well site and pumping testing was undertaken to predict drawdown estimates. The assessment concludes that the potential drawdown levels will have less than minor effects on the aquifer in their own right. Furthermore, considering that the proposed pump rate will be significantly less than that of the pump testing rate, the drawdown levels will likely be much less than identified. Additional mitigating factors include:

- Groundwater at the site is generally deep (>20m below ground level) and no shallow water tables exist;

- Washwater will be stored and reused to minimise the actual groundwater takes;
- Runoff from the wash plant site that enters the water storage pond can also be utilised for the washing process;
- No consented groundwater bores are located within 2km of the proposed take; and
- The small amount of drawdown predicted at 500m indicates that drawdown effects on unidentified permitted groundwater takes will be negligible.

Overall, the effects of the proposed groundwater take will be negligible.

5.5 Ecological Effects

5.5.1 Permitted Baseline

Vegetation clearance undertaken as part of the works involves the removal of primarily exotic shrubs, invasive pest plants such as gorse and tobacco weed, and wildling pines. Vegetation removal over large areas as part of an ongoing operation has the potential to accelerate the risk of erosion of slopes and sedimentation of stream, thereby reducing the quality of downstream and terrestrial ecosystem services.

Vegetation clearance activities on this site are permitted activities unless the clearance occurs within 20m of a stream or wetland or the clearance involves greater than 250m^2 of native vegetation. Therefore only the effects of the vegetation clearance along the streams and the clearance of the 0.12ha of vegetation need be considered under this application.

5.5.2 Potential Effects

The ecological values of the site have been identified in the Ecological Assessment (Appendix 5), undertaken by Kessels Ecology. As discussed in Section 2 of this AEE, the Ecological Assessment identified 13 vegetation types, undertook freshwater surveys, monitored bat behaviour, observed bird species, and surveyed lizard populations.

The subject site is not identified as a Significant Ecological Area under the AUP:OP. It has been subject to historical land uses that have reduced its ecological value over a long period of time. Nevertheless, the assessment has identified some important ecological values that still exist on the site. A sand extraction activity has the potential to adversely affect the ecological values of terrestrial, freshwater and coastal ecosystems. This section outlines the measures proposed, as part of the project, that will avoid, remedy or mitigate any adverse ecological effects of the proposal such that these will not be more than minor.

The potential ecological effects arising from the proposal that have been assessed include:

- The removal of 1,200m^2 of indigenous vegetation, including riparian margin and rush land vegetation;
- The removal of 1.5ha of non-indigenous vegetation (such as gorse and nightshade) from within 20m of streams and wetlands
- Adverse effects of dust and noise on indigenous vegetation;
- Disturbance of lizards and their habitat;
- Disturbance of invertebrates and their habitat;
- Disturbance of bat habitat, particularly potential roost habitat;
- Disturbance of birds and their habitat;
- Degradation of water quality in streams and the estuary by sediment discharges;
- Modification and removal of aquatic and riparian habitats as a result of sand extraction and culvert installation.

These effects have been described in full in the Ecological Assessment (Appendix 5). A summary of this assessment and the proposed mitigation measures follows.

5.5.3 Habitat Removal and Replacement

Habitat restoration is proposed to offset the loss of the 0.12 ha of ecologically significant riparian and rush land habitat, and 1.5 ha of exotic riparian vegetation. To mitigate the loss of 0.12 ha riparian margin and rush land wetland it is proposed to re-create a similar wetland following sand extraction, consisting of a total area of not less than 0.36 ha. As there will be a time lag (approximately 10 years) between removal of the rush land wetland and its re-creation, it is also proposed that the existing area of ephemeral riparian wetland along the Northern stream is fenced and enhanced as an offset mitigation measure.

Approximately 1.5 ha of exotic riparian vegetation will be removed, which provides low quality habitat for a limited range of indigenous fauna species. The effects of this removal will be mitigated by re-planting and restoring approximately 2.6 ha of indigenous riparian vegetation around the Middle and Southern streams. This stream riparian planting and the proposed associated pest control will also help offset the effects of habitat loss for terrestrial fauna.

Detailed requirements for restoration planting will be included in the EMRP for the site, incorporating the type and number of plants needed and an ongoing annual work plan which will detail the activities that need to be undertaken to achieve a self-sustaining planted area. The area of habitat recreation within the extraction area is proposed to be at least 0.36 ha; this will be confirmed in the detailed management plans for the site, as this will depend on final land contours post sand extraction.

As well as mitigating for adverse impacts arising from the works, the proposal will seek to improve the habitat values and ecological connectivity within the property in the long term. Enhancement measures will improve the ecological function and value of the site, as summarised above and in the attached ecological report.

5.5.4 Benefits of stream riparian vegetation

Fencing and planting of waterways will reduce sediment and nutrient inputs from the catchment and is considered (by Kessels) as the most suitable method for mitigating the residual adverse effects of the vegetation clearance. Weed control, and providing a wider buffer zone, will slow runoff to the streams and provide for treatment. Additional benefits to the streams include:

- Increasing shading and limiting light available for aquatic plant and periphyton growth;
- Decreasing stream temperature, which will improve habitat conditions for macroinvertebrates and fish;
- Attenuating sediment inputs from the catchment by preventing erosion;
- In the long term, inputs of plant material and wood from the riparian margins will provide food and habitat for fish and invertebrates; and
- Improving connectivity between the streams/drains and nearby terrestrial areas, benefiting biodiversity and providing corridors for movements of animals.

Despite the ecological value of this area of vegetation, its removal is small in the regional context, and will result in an overall minor adverse effect on local ecological values.

5.5.5 Dust

Dust has the potential to adversely affect vegetation through particulate matter disturbed by extraction activities or by vehicle traffic at the site, settling on plant leaf material. Acidic or alkaline components may then cause direct damage to leaves (Grantz et al., 2003). Dust covering leaves may also negatively affect a plant's ability to photosynthesize. This could lead to long-term changes to the forest edge that could favour the invasion of exotic plant species.

Due to the nature of the material being extracted being sand with moist clay, the attached Air Discharge Effects report outlines that particles are less likely to be transported significant distances. In addition, the majority of the areas of significant vegetation are either along the coast and therefore not in the direction of the prevailing wind, or are located over a ridge from the majority of the extraction area. As a result, the potential adverse effects on vegetation from dust are assessed as being less than minor.

5.5.6 Effects on Fauna

5.5.6.1 Bats

Bat monitoring at the periphery of the site recorded bat calls that were audible from the monitoring stations, indicating that bats were utilising the locality as feeding and commuting habitat, and it is possible that bats are roosting in mature trees in the area. The local bat population could, potentially, be negatively affected if roosting trees or areas of feeding habitat are removed.

No mature trees are to be removed as a direct result of the proposal, and only small areas of land will be earth worked at one time. This will mean that the potential for adverse effects on any bats in the area is negligible. However to compensate for any risk to this valuable species, 15 cavity-bearing trees such as puriri, and indigenous forest trees and shrubs; rimu, tōtara and kānuka are proposed to be planted in suitable locations well in advance of vegetation clearance. Pre-clearance surveys and checks will be undertaken should any felling of woody vegetation be required for any reason. As the extraction progresses through the staging, these indigenous species will mature and provide improved habitat for the bat population.

5.5.6.2 Birds

Birds living within rural and boreal environments have been shown to be adversely affected by man-made noise, which can interfere with communication between individuals and alter behaviour. Earthwork activities can produce ground vibrations and low-frequency sound, which travel significant distances from their origin.

A total of 20 different bird species were recorded on site, of which 12 are native to New Zealand, but not listed as rare or threatened bird species. The sensitivity of the species to disturbance varies greatly. While a number of rare and threatened seabirds are known to be located on the Kaipara Harbour, no evidence of seabirds utilising an area of the subject site for nesting or foraging where observed. It is more likely that nesting or foraging would be present along the intertidal area, and associated mangrove forest. The Kaipara Harbour area provides a magnitude of varying habitats for many of New Zealand's rarer avian species and there are many other habitats nearby that will remain available to sensitive bird species.

Thus, the likely exclusion of many of such species from the area surrounding the sand extraction site is likely to have an overall minor effect on populations.

Many of these species also face severe predation from pest species such as stoats, rats, and possums. Proposed pest control of possums and rats over the entire property will have a positive effect through reducing predator populations.

5.5.6.3 Invertebrates

The proposed extraction activities and associated vegetation clearance will lead to the disturbance of habitat for a number of indigenous invertebrate species. In particular, local populations of terrestrial and riparian species inhabiting the riparian margin and rush land close to the extraction site will potentially be displaced, depending on their mobility and the quality of available habitat nearby. There is, however, no indication that any of the invertebrate species found on the site are either limited or of particular value and it is therefore likely that they will be found throughout the site and locality. Consequently, the disturbance of a small area of habitat (maximum of 3 ha) at one time over the 50 ha site, is unlikely to create an adverse effect on these populations.

In addition, the protection and restoration of the riparian margins of all streams running thorough the property and a small freshwater wetland habitat, as well as control of weeds and animal pest species, will mitigate or offset the adverse effects on invertebrates at the site.

5.5.6.4 Lizards

During the ecological survey undertaken on the site, only plague skinks were found. However, the ecologists concluded that there was a possibility that indigenous species could be present, as the habitat was suitable for them (being dry sloping soil covered with gorse and other shrub like vegetation). The proposed sand extraction activity and associated vegetation clearance will destroy some of this available lizard habitat at the site.

The proposed revegetation of the extracted areas will provide a future habitat to any populations of native lizard species. The proposed pest animal management (Appendix 5) will also provide additional benefits to any potential native repopulation of the area.

5.5.7 Summary of Ecological Effects

Overall, the potential and actual adverse effects on ecological values of the site are temporary, and will be mitigated or off-set by progressive rehabilitation and ecological enhancement of the site over the life of the activity. The indigenous and non-indigenous riparian vegetation and habitat lost due to earthworks and extraction will be replaced, all stream margins enhanced and protected, and the proposed use of kānuka slashing to stabilise extracted areas will result in areas of indigenous bush cover in areas that are currently covered in invasive species. In addition, animal pest control will occur over the entire site, riparian corridors will be protected through legal and physical means, and riparian margins will be enhanced with weed control and indigenous planting.

Details of the mitigation planting, including plant species, areas, timing and pest management will be confirmed through detailed planting schedules and plans to be submitted to Council for approval prior to the sand extraction activity commencing.

Given the large extent of management and mitigation measures proposed, any adverse ecological effects will be less than minor. Overall, the project is anticipated to result in net positive effects on the site's ecological values. A summary of the parts of the proposal that are mitigation of effects and those parts that are additional enhancement of the site are clearly outlined in Table 20 of the Ecological Assessment appended.

5.6 Traffic and Transport

5.6.1 Permitted Baseline

The site is located at the end of a private right of way (ROW) off McLachlan Road. McLachlan Road is a largely unsealed, rural, two-way public road carrying on average 605 vpd throughout the week. The majority of this traffic is comprised of light vehicles, most likely generated by property owners of rural residential sites utilising the road. The road has an average of nine heavy commercial vehicle movements occurring along the road per day throughout the week.

The volume of traffic on McLachlan Road could increase as a permitted activity either by the existing residents and farmers increasing their trips, or by farming and forestry activities increasing their intensity as permitted activities on the road. Of relevance to this application are the large areas of land located to the north and south of McLachlan Road that are in pine plantation. When these areas mature for harvesting, a large number of forestry trucks may potentially utilise McLachlan Road. Forestry harvesting within the Rural Coastal Zone is a Permitted Activity.

5.6.2 Vehicle Movements

The existing state of McLachlan Road and the current number of traffic movements on the road are described in Section 2.6.1 and more fully described in the Traffic Assessment (attached as Appendix 4). During consultation, some neighbours have raised concerns about parts of McLachlan Road in terms of safety (either width for passing and/or poor visibility).

The proposed operation by JHNZ will result in 4 – 5 trucks driving to and from the site daily (10 movements per day), which will effectively add 1.6% to the total Monday – Friday traffic volume, but nearly 90% to the heavy vehicles along the road. Trucks will operate between the hours of 7am to 5.30pm Monday to Saturday. This equates to about 1 truck movement every hour, with the exception of night time hours. Additionally, there will be around two staff vehicle movements per day, resulting from on-site employees outside of typical road network peak hours.

All traffic will travel to and from the site via SH16:

- Heavy trucks carrying the washed sand will travel from the site to the manufacturing plant in Penrose. All empty trucks arriving to the site will travel from the plant in Penrose; and
- Light vehicle trips (primarily staff movements) will likely originate from the greater Auckland area. Occasional trips from external technical contractors will also occur. Light vehicle movement generation is expected to be less than the average of a single household.

5.6.3 Effects on State Highway 16 / McLachlan Road Intersection

The potential effects on safety of the SH16/McLachlan Road intersection has been assessed against the Austroads Guide to Road Design Part 4A to determine the suitable turning treatments at the intersection. (These assessments are fully outlined in the Traffic Assessment, attached as Appendix 4).

The peak traffic on SH16 is estimated at 10% of the ADT or 250 two way vehicle movements in the peak hours. With this volume of through movements, a basic intersection treatment is appropriate when assessed against Austroads guidelines which caters for up to approximately 18 turning movements per hour.

The present turning movements during the road network weekday AM or PM peak hour is approximately 55 – 60. These existing movements indicate that the intersection would benefit from a treatment somewhere between basic provisions to channelised protected turning bays. JHNZ has consulted with the NZ Transport Agency and in accordance with its recommendation (see correspondence in Appendix 1 to the Traffic Assessment), JHNZ proposes to provide a basic left turn treatment into McLachlan Rd. This left turn treatment will provide a width of 6m from the centre line over 20m from the intersection and include a taper of approximately 25m. As the work will be undertaken within the SH16 designation, JHNZ will work with the NZ Transport Agency to develop an appropriate design and obtain any necessary approvals, including outline plans.

With regards to sight distances, the SH16 / McLachlan Road intersection is a standard T intersection. Vehicles entering SH16 from McLachlan Road have sufficient sight distance of at least 250m to the north, which meets the recommended sight distances for 100km/h roads as outlined in the Austroads guidelines. However, views to the south are limited to approximately 130m, due to existing vegetation growing on the inside of the road curve. It is estimated that removing this vegetation could increase the sight distance to approximately 250m to the south, which would provide additional road safety for the intersection. JHNZ proposes removing this vegetation is proposed if permission can be obtained from the NZ Transport Agency, which manages the land on which this vegetation is located.

5.6.4 McLachlan Road

McLachlan Road has 500m of sealed surface from the SH16 intersection and is unsealed thereafter for a further 3km to the intersection with the ROW. The formed road width varies from 5m to 7m and has sections with tight curves and only 5m width. Several sections of the road are sub-standard in regard to width and are currently in need of widening to enable a car and a truck to safely pass in opposing directions.

JHNZ has undertaken consultation with Auckland Transport (AT) regarding the use of the road by the proposed 4 – 5 return heavy vehicle trucks per day. AT has advised that McLachlan Road is currently 17th on AT's priority list for full upgrade and sealing.

If resource consents for the proposal are granted, that the sand extraction operation may need to commence before AT upgrades the road and therefore JHNZ has agreed to undertake safety works on the road in eight key locations where road widening or sight distance improvements will enhance safety. All upgrades will be undertaken to AT standards subject to its approval. The specific areas of McLachlan Road to be addressed are shown in Figures 5.4 – 5.6 of the Traffic Assessment (Appendix 4).

In summary the proposed works are:

- Widen the road in specific sections by 2 – 3m;
- Cut away banks to improve visibility around corners;
- Improve the culvert that results in a narrow carriageway around one tight corner; and
- Lower the intersection with Hafton Road to improve visibility.
- Improve road markings at the intersection with Oyster Point Road

These upgrade works will improve the general safety for all road users, and in particular, enable any existing or proposed trucks on the road to operate safely. Agreement has been reached with AT that the works will make the road suitable for the sand extraction activity. The undertaking of these works in the road reserve are a permitted activity in accordance with Rule E26.5 and E26.6 of the AUP:OP.

It is intended that the road upgrades described in the Traffic Assessment, will occur as part of the site preparatory works. A pilot vehicle will be used to precede any JHNZ truck and trailer units, including those used for site preparation, going to and from the site on McLachlan Road, until such a time that the road upgrades are complete.

These pilot vehicles will allow road users to be aware of the presence of an oncoming truck, and will reduce the risk of a vehicle encountering a truck and not being able to stop or pull over. The use of a pilot vehicle until such a time as the road widening works occur will address any adverse safety effect on the road network during this time. JHNZ will use best endeavours to undertake the works as promptly as possible and will submit design plans to AT for approval prior to commencing construction works on the site.

It is understood that the current maintenance grading of the road is occurring less frequently than desirable. Using the Paterson Model, the road should be graded approximately 20 times per annum. The additional traffic from JHNZ's proposal will require an extra 3 grading cycles per year and an additional 70m^3 of gravel. As the road asset is owned by AT, the Traffic Assessment recommends AT consider reviewing the maintenance schedule for this road to enable maintenance to an adequate standard. The additional trucks created by this proposal, given the current standard of the road, do not create an adverse effect that is more than minor and when taking into account the considerable safety improvements that will occur to McLachlan Road, the effects for safety of all road users of this proposal will be positive.

5.6.4.1 Conclusion

The proposal will improve the safety of McLachlan Road for the current volume of traffic. Without the improvements, the existing road environment is potentially inadequate for existing users, including current truck usage. The measures proposed are a significant improvement for all users of McLachlan Road and will mitigate or offset any additional traffic movements proposed (4 – 5 return truck movements per day and 2-4 car movements per day). In addition, and until the road upgrades occur, a pilot vehicle will precede all JHNZ truck and trailer units on McLachlan Road going to and from the site. Any adverse effects from the traffic generated by the proposal are less than minor, with the overall effects of changes to McLachlan Road seen as a positive effect.

5.6.5 Right of Way

The movement of heavy vehicles along the right of way (ROW) located outside the site, could have impacts on the safety of ROW users and on the condition of the carriageway itself.

The existing ROW has been constructed with a formed carriageway width of 5m and with surface water channels on each side in cuttings. To improve safety with the increase of heavy vehicles on the ROW, the carriageway will be widened to a 5.5m formation with associated culverts and surface water channels. To avoid nuisance of regular maintenance grading and re-gravelling, JHNZ proposes to seal the full length of the ROW from McLachlan Road to the site entry. The other users of this ROW will benefit from the widening and sealing as it will address safety and maintenance effects of truck movements and will reduce any potential for dust nuisance. ROW users only have "rights to pass" as set up by the easement documents and therefore no approvals are required for these upgrades to occur.

While some temporary disruption may occur, however adverse effects resulting from the relocation and upgrade of the ROW will be less than minor.

5.6.6 Site Access

The movement of heavy vehicles on the easement through the site could impact on the safety of users and the condition of the carriageway itself. It is proposed to relocate the access to the future Lot 3 (RAJ Design) and the adjacent Fox property to a new location in extraction years 16 – 25.

The easement access will be relocated to an area north of the sand extraction area, as shown on Figure 3.1. This new access will be cut in and landscaped in year 1 and finished ready for use by all users (proposed Lots 1 – 3 and Allot 4 DP23216) and the sand trucks by approximately year 16. The portion of the easement required for access by proposed Lot 3 will be formed prior to the Certificate of Title being issued for this lot which may be earlier than the year 16 indicated. No adverse effects will be created by the relocation of the access. Written approval has been received from the owner of Allot 4 and all other affected land parcel owners that form part of the application site.

5.7 Air Quality

5.7.1 Potential and Actual effects

The generation of dust can result in adverse nuisance and health effects when occurring within close proximity to sensitive receivers, such as nearby residential properties, public amenities, and sensitive ecological environments. Dust generation occurs where wind currents come into contact with exposed disturbed surfaces, and is exacerbated where the surface contains fine particles, where the area of exposed land is dry, and where disturbances are frequent due to traffic, excavation, and the handling of materials.

Dust emissions from exposed surfaces generally increase with increasing wind speed. However, dust pick-up by wind is only significant at wind speeds above 5 m/s. The smaller the particle size of the material on an exposed surface, the more easily the particles are able to be picked up and entrained in the wind. Moisture binds particles together preventing them from being disturbed by winds or vehicle movements.

Vehicles travelling over exposed surfaces tend to pulverise any surface particles. Particles are lifted and dropped from rolling wheels and the surface. Dust is also sucked into the turbulent wake created behind moving vehicles. A full description and assessment of the potential effects of dust nuisance from the proposal is included as Appendix 10.

Several aspects of the proposal have the potential to generate discharges of dust into the air, including:

- Earthworks and stockpiling activities;
- Extraction of raw material;
- Transportation of the raw material from the extraction area face to the washing plant;
- Stockpiling of processed sand;
- Transportation of finished products off site; and
- Backfilling extraction areas with overburden and the by-product clay of the washing process.

5.7.2 Receiving Environment and Dust Generating Potential

The site consists of two ridges stretching from the north east to the south west, sloping steeply in all directions. The site is surrounded by hilly countryside with a peak of 112m located approximately 700m east of the site. The topography to the west of the site steeply slopes towards the coastline. Properties north of the site are partially sheltered by a ridge.

Meteorological conditions influence the emissions and dispersion of dust. The most important meteorological parameters are wind speed, wind direction and rainfall. The prevailing wind direction is from the southwest, although winds from the northeast and northwest are also relatively common. Wind speeds greater than 5m/s that can pick up surface dust occur during both south west and north east winds. Prevailing wind flows are expected to be channelled by the two main ridges stretching from the east to the west. The site is relatively exposed to the coast to the west, but the higher hills to the east are likely to provide a shelter from the south westerly winds for the surrounding properties.

The potential for dust emissions increases during dry conditions. The driest months for the site are January to March.

The particulate generated from processes, such as those involved in the extraction process, is likely to be predominantly made up of larger size fractions (greater than 10µm). These size particles are less likely to be easily widely distributed by air.

The proposed sand extraction and washing facility is surrounded by vegetated terrain that is part of the subject site. The area immediately around the wash plant will also be extensively planted as shown on the land rehabilitation plan. The nearest off-site dwellings (at 351A and 357 McLachlan Road) are approximately 300m from the closest extraction areas (years 16 – 25). These dwellings are well beyond the distance at which dust from extraction is expected to have an adverse effect.

The sand extraction process itself involves the processing of extracted material that consists of sand bound with clays. This combined material is then washed on site to separate. The cleaned sand will be removed from the site to the manufacturing plant at Penrose. Residue material will be stockpiled before being relocated back on site to and vegetated. Conditions where material is left on site that could generate dust effects will only occur very rarely and therefore situations where there will be a high dust generating potential are low.

5.7.3 Existing Environment

Dust is part of the existing environment, given that it is a rural area and production activities are expected to generate a certain level of dust. McLachlan Road is an unsealed road that carries 605 vpd at the end near SH16 and 144vpd near Hafton Road. The numbers of heavy vehicle movements on the road could increase without constraint due to increased farming or forestry activities in the area.

5.7.4 Dust Control Measures

Measures for controlling dust emissions include methods that modify the condition of the materials so that it has less tendency to lift with the wind, or disturbances such as vehicle movements and methods that reduce the velocity of the wind at the surface. The dust prevention methods proposed for this activity are detailed in the draft Dust Management Plan (appended to the Assessment of Effects of Air Discharges report). In addition a condition of consent is proposed to limit the speed of trucks on any unsealed part of the road or right of way to between 30-50 km/hr to reduce dust generated by large trucks. These methods will be effective and will be used alone, or in combination, depending on the circumstances. This list is not exhaustive and other methods may also be used. Note that the need to control dust on this site will be minimised by the nature of the material to be worked itself. The sand contains clay, which is heavy, naturally wet and of a large particle size and therefore it is less likely to become windborne and be noticed beyond the site.

The key mitigation measures proposed are summarised below:

Table 5.4. Dust control and mitigation measures proposed.

Activity	Mitigation Proposed
Earthworks and extraction	Keeping exposed surface areas to a minimum (maximum 3 ha at any one time) and re-vegetating exposed areas as soon as practical; Avoiding undertaking potentially dusty activities (such as the stripping and spreading of topsoil) on days when conditions are dry and winds are strong and blowing towards sensitive receptors; and Using water as a dust suppressant to keep potentially dusty surfaces such as un-vegetated areas and haul roads damp when required.
Road traffic and Right of Way Traffic	Limiting truck speeds to between 30 and 50 km/hr; Minimising haul distances as far as practical; Keeping internal roads and construction surfaces damp with water carts and/or fixed sprinklers when required; Regularly maintaining internal tracks by grading and laying of fresh rock/gravel; Regularly maintaining the site access roads by grading and the laying of coarse gravel; Requiring vehicles entering and leaving the site that are carrying dusty materials to have their loads covered; Keeping paved roads and yard areas clean using either washing or vacuum sweepers. Right of Way to be sealed along its length from McLachlan Road intersection to the entrance to the site
Loading / unloading of overburden and sand	Minimising drop heights when loading and unloading vehicles; Pre-watering materials to be transferred when required; and Undertaking loading and unloading operations on the leeward side of stockpiles where practicable.
Exposed areas	Revegetating exposed soil with appropriate vegetation as soon as practical; Minimising the area of surfaces covered with fine materials; Avoiding undertaking potentially dusty activities (such as the stripping and spreading of topsoil) on days when conditions are dry and winds are strong and blowing towards sensitive receptors; Locating stockpiles within the pit below local ground level and as far as practicable from the boundaries of the site; Minimising the height of stockpiles as far as practicable; and Keeping exposed surfaces damp with water carts and/or fixed sprinklers when required.
Washing process	Keeping materials damp at the principal dust sources such as conveyor transfer points to control the moisture content of materials; and Minimising drop heights from the loading of raw materials into the feed hopper and from stacking of stockpiles.

In the unlikely event that dust cannot be adequately controlled within the site or on the adjacent road or ROW, JHNZ will consider the use of additional measures (as described in the Dust Management Plan attached as Appendix 10 to this AEE). These measures may include, but are not limited to the use of additional water carts and irrigation systems to dampen dusty surfaces and to be used in the washing of houses.

5.7.5 Monitoring

To mitigate and minimise dust emissions, a dust monitoring plan will be implemented. The monitoring programme is outlined in Section 7 of the Dust Management Plan (Appendix 10). The programme proposes regular monitoring under normal circumstances, and additional monitoring as required during periods of high wind or following complaints from nearby receivers. If any complaints are received, the Dust Management Plan, enables individual solutions to be developed and implemented with any individual property owners.

5.7.6 Summary of Air Quality Effects

The proposal has the potential to generate dust due to the extent of land disturbance, the amount of land to be exposed at any one time, and the movement of heavy vehicles along unsealed roads. That said, the potential for dust to be created by the sand extraction activity, such that it may have an adverse effect is limited due to the nature of the material being worked (being sand with a high moisture content and being mixed with clay) and its isolated location. Dust from McLachlan Road is part of the existing rural road environment and will only be marginally increased by 10 extra truck movements per day. It is noted that extra dust could be generated at any time by forestry trucks also using the road as a permitted activity in the area.

Dust effects from the ROW will be avoided by the sealing of the ROW along its length from the site to McLachlan Road. The Air Discharge Effects Assessment concludes that the effects of dust resulting from the small increase in truck traffic on this road and the proposed 50km/hr speed limit mean effects will be minimal. This temporary nature of the dust, combined with the wide range of mitigation techniques that can be employed by the applicant to minimise these effects, mean that the adverse effects of dust that will be generated by the proposal are expected to be minimal.

With the proposed dust management controls and contingency measures in place, it is anticipated that dust will be managed in a way that will have less than minor effects on the receiving environment.

5.8 Noise Effects

Noise generated by the wash plant, excavation machinery, and haulage trucks has the potential to create nuisance to nearby residents and land users. To assess the potential and actual effects arising from noise levels, an Acoustic Assessment was undertaken by Marshall Day Acoustics (attached as Appendix 11).

The Acoustic Assessment modelled the noise generated by the trucks on the ROW access and the machinery that will be working on the site. In summary, it determined that the predicted operational noise levels will be compliant with the relevant noise limits of the AUP:OP at all existing dwellings on all sites, other than the subject site. The noise contours generated to assess this are shown in Figure 5.1 and Figure 5.2.

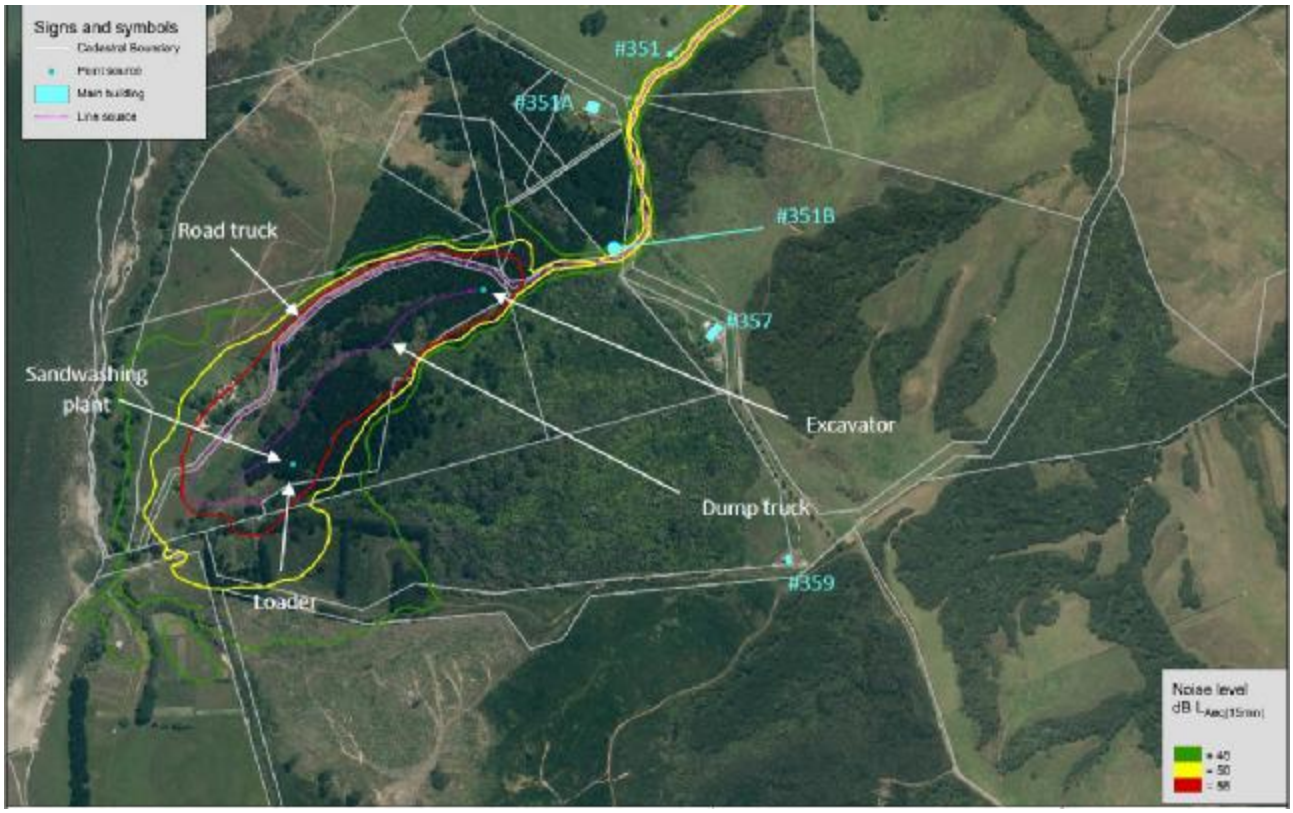


Figure 5.1. Noise contours - modelled on truck and excavator movements at top of excavation area (from Appendix 11).

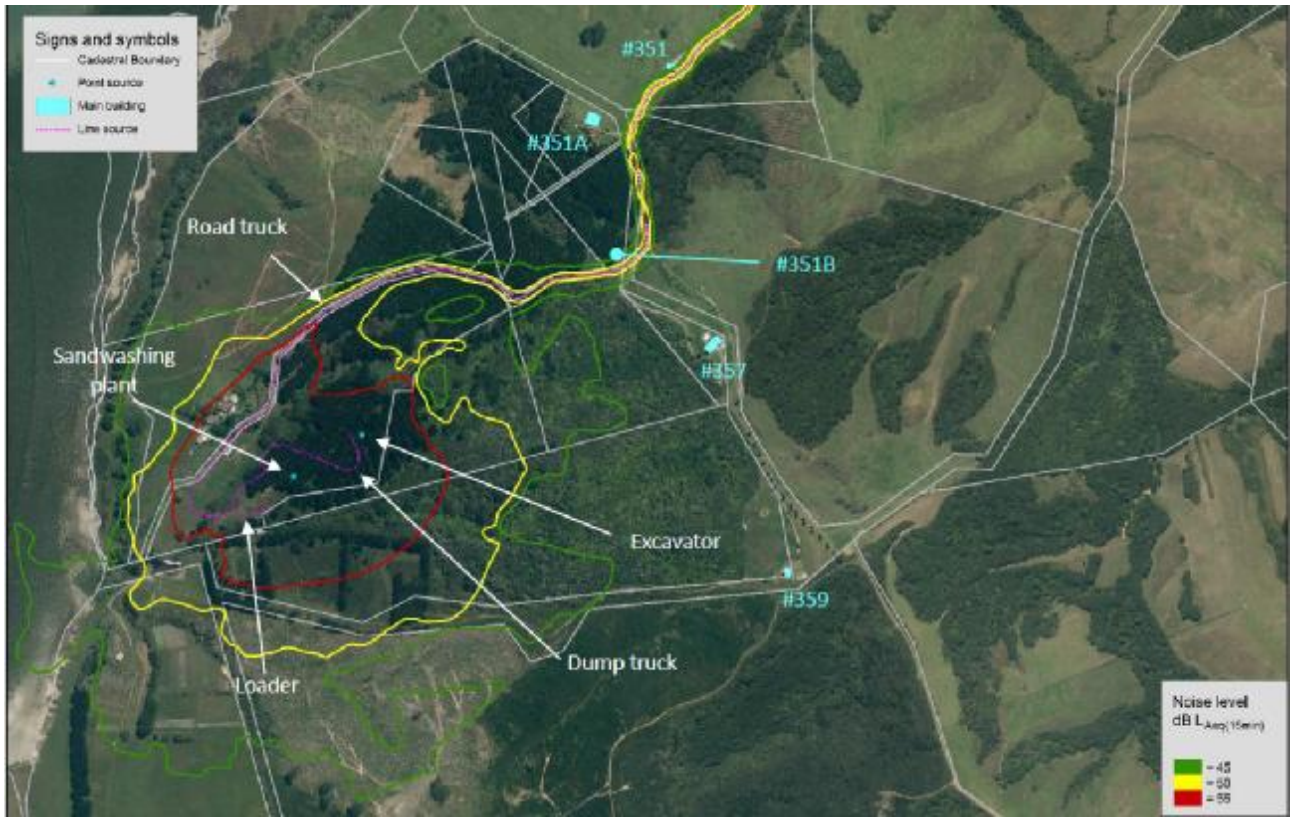


Figure 5.2. Noise contours - modelled on truck and excavator movements at bottom of excavation area (from Appendix 11).

These noise contour plans show that at two sites (Lot 4, and 351 McLachlan Road), an exceedance of the relevant noise limit is predicted. Lot 4 does not contain a dwelling and has been purchased by the Applicant. The boundaries of Lot 4 are to be relocated as part of the proposal and therefore, the area of land that is shown as being exposed to noise that exceeds AUP:OP noise limits, will be included within the subject site when this consent is implemented. Therefore this effect can be disregarded.

The dwelling at 351 McLachlan Road is located in close proximity to the ROW and would receive noise from truck passes that exceed the permitted level of noise under the AUP:OP. 351 McLachlan Road is the original lot from which the subdivision was established that formed the ROW through the subject site. The dwelling at 351 is located in close proximity (approximately 7m) to the ROW which will be the truck route. It is noted that noise effects cannot technically be assessed against the AUP:OP limits at this location, as the activity takes place within the same site as is being assessed. Nonetheless, noise levels have been predicted and assessed at the easement boundary for completeness. The Acoustic Assessment attached finds that it is predicted that there will be a small exceedance of the daytime noise limit at this location near this dwelling when considering a single truck pass. This prediction is based on the noise level of a truck being averaged up to the maximum 5dBa allowed, resulting in a maximum noise level of 60dBA being permitted. The noise generated by a single truck movement has been assessed as 61dBa. Therefore there will be an exceedance of only 1dBa at this dwelling.

JHNZ has been consulting with the owner and occupier of 351 McLachlan Road to discuss measures to mitigate this noise. No mitigation has been requested except for the sealing of the ROW which is proposed to occur as part of this application. The sealing of the ROW will remove the possibility that noise levels will vary through the establishment of potholes and variable surfaces on the ROW.

Overall, the Acoustic Assessment concludes that noise from the excavation activity will not contribute noticeably to noise levels at this dwelling. The noise of each individual truck passing the site will be significantly above the ambient noise environment. However, the truck noise will be of a short duration, spread throughout the day.

On this basis, as all aspects of the proposed activity comply with the AUP:OP permitted noise levels and are below the ambient noise levels recorded for the area, the proposal will not generate noise effects that are more than minor.

5.9 Archaeological Effects

The proposal involves the disturbance of two archaeological sites: Q10/528 (pits); and Q10/530 (midden) as they are located within the area of sand that will be extracted. The relocation of the ROW will pass within 50m of sites Q10/516 and Q10/526, but will not disturb or modify either site. A fifth archaeological site (Q10/514) is located more than 100m from any proposed land disturbance. In addition to this, due to the history of Maori occupation in the area, it is likely that the project may disturb other, presently undiscovered archaeological sites located on the southern running ridge that runs through the sand extraction area. Details of these sites and a full assessment of the effects of the proposal is described in the Archaeological Assessment (attached as Appendix 6). These sites are assessed as comprising a small part of the larger archaeological setting of settlements along the Kaipara Harbour.

The Regional Policy Statement contained within the AUP:OP (RPS) identifies several criteria for evaluating the significance of historic heritage places. In addition, Heritage New Zealand provides guidelines setting out criteria that are specific to archaeological sites. As the sites are not scheduled in the AUP:OP, both sets of criteria have been used to evaluate the value and significance of the recorded archaeological sites. The archaeological value of sites relates mainly to the extent to which they can provide evidence relating to local, regional, and national history.

The Archaeological Assessment considers that sites Q10/514, Q10/516, and Q10/526 have moderate to high archaeological value based on the criteria of the AUP:OP and Heritage New Zealand guidelines. This value is largely based on their informational and knowledge potential, as well as their contextual value as sites within a larger archaeological landscape. These sites are not modified or affected by the proposal.

The Archaeological Assessment could not determine the full extent of archaeological value of Site Q10/528 (pits) due to vegetation cover. However the site's overall value is assessed as low to moderate based on the 2012 archaeological survey. This survey observed only 2 slight depressions instead of the 4 previously recorded pits. It is likely that erosion and grazing has resulted in the reduction in value of these sites. In addition, pits are not rare within the Kaipara area, and the site is part of the wider archaeological landscape.

Site Q10/530 (midden) is located within an overland flow path, and no remains were found during either the 2012 investigation or investigations made for this proposal. This site may have disappeared due to erosion and therefore the information and knowledge value of the midden has deteriorated, leaving the site with little or no value. Therefore, the proposal is likely to have no further adverse effect on this site.

The proposed sand extraction will remove two recorded archaeological sites of Q10/528 (low/moderate value) and Q10/530 (little value). There is also potential for unrecorded archaeological sites to be located along a ridgeline that could not be adequately assessed due to vegetation cover. Additional survey is proposed following vegetation clearance to further assess the significance of Q10/528 and to assess if unrecorded archaeological sites may be present on the southern ridge. These effects cannot be avoided while undertaking the sand extraction activity. However, an authority will be obtained from Heritage New Zealand prior to any works that would affect the archaeological sites, as required by the Heritage New Zealand Pouhere Taonga Act 2014. An Accidental Discovery Protocol will also be put in place via a consent condition. These protocols will enable any information value that these potential sites may hold to be collected so it is not lost as a result of this proposal.

Overall, the adverse effects of the proposal on archaeological sites and values will be no more than minor.

5.10 Boundary Adjustment

As discussed in Section 3.8 and shown on the subdivision scheme plan (Figure 3.4 and Appendix 12), the boundary adjustments between existing Lots 3 – 5 will create the proposed Lots 1 – 3. The sand extraction will take place on proposed Lot 1.

The boundary adjustment will generally involve transferring land area from existing Lot 5 to existing Lot 3 (proposed sand extraction allotment). In addition, the proposal will relocate the title of existing Lot 4 to a new location. This new location will be on the northern boundary of the site. The site will still gain access via the shared ROW through the site in its new location, but will be relocated so that the area of sand resource that lies within its existing boundaries is transferred to the proposed Lot 1 (the sand extraction allotment).

Subdivision within the Rural Coastal Zone is a non-complying activity under the AUP:OP, which seeks to prevent further fragmentation of rural lots within the zone. Fragmentation and the consequential changes to land use, lot size, and amenity are considered to reduce the potential for productivity within rural areas and increase pressure on strained or non-existent infrastructure.

The proposed adjustment will not result in the creation of any additional lots, or any additional building platforms and will not therefore contribute to further fragmentation of rural lots in the area. Existing Lots 4 and 5 (proposed Lots 2 and 3) will retain their existing lifestyle rural-residential land uses, although Lot 2 containing the existing residence will become larger (9ha) and will have the potential for some grazing activities. Existing Lot 3 (proposed Lot 1) will become the largest lot and will be used for the proposed sand extraction activities. The covenanted areas created in the previous subdivisions will remain.

The boundary adjustment will result in an approximately 60ha rural site (existing Lot 5) and an approximately 2ha rural residential site (existing Lot 3) becoming a 9 ha rural residential site (proposed Lot 2) and an approximately 50 ha rural production site (proposed Lot 1). The combined 60ha are currently only used for rural residential purposes, with a small area of land leased to the neighbour for grazing. The proposal will therefore not detract from the current productive land use of the site and will enable the productive activity of sand extraction to occur. After the extraction activity has ceased, the land can be returned to indigenous planting or pasture activities. The new lot configuration will not significantly effect this potential as it is only a change in the large lot from 59.5ha to 51.1ha. Due to the unusual nature and characteristics of the proposal, approving this boundary adjustment will not create any precedent effects or any adverse effects on the rural character of the area and will enable the productive extraction of the site-specific resource.

The relocation of existing Lot 4 to proposed Lot 3 will result in a new building platform being established. This new location is preferable to the previously identified site as the previous location was within an archaeological site. The new location is outside of the known extent of moderate to high-value archaeological sites as well as being located on a flatter, lower lying area of land. The proposed building site complies with all site setbacks and building controls in the AUP:OP.

5.11 Conclusion

The assessment of effects summarised above, and contained in the appended technical reports demonstrate that no adverse effects will be generated by the proposal that are more than minor. Effects on landscape will be minor due to the visually contained nature of the site, the limited viewing audiences in the site surrounds and the expanse of the landscape in which the site sits. Ecological and sediment effects are minimised by the limited values of the site itself, detailed and appropriately designed sediment control measures, the removal of the significant area of weed species on the site and the planting and protection of all stream margins and the re-establishment of an ephemeral wetland area.

Noise levels generated by the proposal are shown to be within the limits of what is permitted by the AUP:OP and dust from extraction and sand washing activities will not be experienced to a degree that is more than minor beyond the site.

The proposal will also result in works being undertaken in eight locations on McLachlan Road and at the intersection with SH 16 to improve safety for current and proposed road users. Improving the safety of McLachlan Road creates a positive effect on the environment as the road will better meet guidelines even for the current level of vehicle movements. Until these road improvements are complete, truck and trailer movements generated by the proposal will be proceeded by pilot vehicles to minimise any potential adverse safety effects.

Overall, considering all adverse and positive effects and the mitigation measures proposed, this proposal to extract sand from 353 McLachlan Road will not generate adverse effects on the environment that are considered to be more than minor.

6 Consultation

Consultation has been ongoing throughout project development with a range of stakeholders since mid-2016. Parties consulted include:

- Local community members and neighbours;
- Users of McLachlan Road;
- Mana Whenua;
- Auckland Transport; and
- NZ Transport Agency.

Summaries of the consultation undertaken and outcomes are provided below. Consultation materials and correspondence that have been provided to members of the community are provided in Appendix 13.

6.1 Neighbours and Local Community

JHNZ commenced consultation with the immediately adjacent landowners in October 2016.

Consultation was commenced by providing a letterbox drop to all those that lived along McLachlan Road, and any of its tributaries (i.e. those living on Hafton Road, Onewhero Road, and Alpine Road). This leaflet contained details about the proposal, the anticipated project timeframes, and direct contact details to the representative of JHNZ. Copies of the leaflet and a list of the addresses these were delivered to are included in Appendix 13. Following the leaflet drop, JHNZ received several responses. Those interested were offered guided site visits of the project area with detailed explanations of the proposal, as well as site visits to the existing operations in Glorit and Kumeu. Three residents have taken up the offer for a site visit; however, numerous face to face meetings were held between concerned residents and JHNZ.

The primary concern raised by members of the local community related to the safety of McLachlan Road and their desire for the standard of the road to be improved for safety reasons and for it to be sealed. A summary of the key points received from the community is provided below. A full copy of correspondence received from members of the community can be provided on request.

Additional concerns raised included:

- Potential for dust nuisance effects;
- Potential impairment of view to Kaipara Harbour from two residences; and
- General concerns of a non-residential use of land.

Following guided tours of the site and current operations at Kumeu and Glorit, the majority of concerned residents were satisfied that they would not be affected by the proposal.

Two residents expressed that they opposed the mineral extraction activity itself.

One neighbouring property owner, Mr Fox of Allot 4 Psh of Kaukapakapa DP23216 has provided his written approval to the consent application (see Appendix 13).

During the consultation process, the owners of Lot 2, 353 McLachlan Road sold their property on the open market. Copies of the letter drops advising of the location and details of the extraction activity were included in the marketing material for the property, the real estate agent was personally contacted, and the project was described. Therefore this property was purchased with full awareness of the proposed activity in the

area. Since this property changed hands, JHNZ has been in contact with the new owners and to date, no concerns have been raised to date.

6.2 Mana Whenua

Engagement with Mana Whenua commenced in October 2016. Letters providing details of the Applicant and the project were sent via email and post to Mana Whenua groups identified as having an interest in this area, as defined on the Auckland Council website and through Te Kahui Mangai. Multiple follow up emails and phone calls were made to each of the groups between October and April 2017 to offer further engagement and site meetings.

Iwi contacted were:

- Ngati Whātua o Kaipara;
- Te Runanga o Ngati Whātua;
- Ngati Te Ata o Waiohua;
- Te Akitai Waiohua; and
- Te Kawerau a Maki.

Of the responses received, Ngati Whātua o Kaipara and Te Kawerau a Maki requested further consultation. The remaining iwi all deferred their interest to the other Mana Whenua groups.

Copies of correspondence and written responses are provided in Appendix 13.

A site visit was held on 30 March 2017 with representatives from three local marae affiliated with Ngati Whātua o Kaipara, as well as Te Kawerau a Maki, the project team, and the Applicant. During the site visit, parties were provided with an overview of the proposal and briefed on the location and descriptions of cultural heritage on-site. Discussions around the proposed earthworks and overall site ecological rehabilitation were also held. During these discussions, and as noted in the written responses provided in Appendix 13, the following matters were raised:

- The need to implement an Accidental Discovery Protocol;
- The implementation of a Cultural Heritage Management Plan prepared for the previous subdivision of the site (where relevant); and
- Discussions around ongoing consultation and potential iwi involvement in ecological restoration.

Two of the representatives from Ngati Whātua o Kaipara noted that they are familiar with the current operations at Glorit and that they would discuss the proposal further with the landowners of the Glorit site. They also noted that, despite being familiar with Kumeu, they did not realise the existing wash plant was in operation.

As a result of the consultation, it is proposed to implement the Accidental Discovery Protocol provided in the AUP:OP in the event of accidental uncovering of archaeological material.

In addition, establishing suitable protection mechanisms for existing sites and undertaking further investigations of the site will be undertaken in consultation with Ngati Whātua o Kaipara. This will include:

- Fencing sites during works
- Avoiding deep rooting vegetation near sites
- Avoidance of grazing effects on archaeological sites
- Procedures for accidental discovery during earthworks

6.3 Auckland Transport

AT was contacted about the proposal in December 2016. Subsequently, a representative of JHNZ and roading experts from Beca met with AT on McLachlan Road in February 2017. The purpose of this meeting was to discuss the safety issues raised by the community, the level of traffic proposed by the activity and ways to improve the safety of the road so that the use of it by the proposed activity would not generate adverse effects that were more than minor.

Relevant to the discussions is that the full upgrade and sealing of McLachlan Road is currently 17th on the priority list for unsealed roads as issued by AT, which is located on its website and compiled by AT's assessment of business cases for the costs and benefits of improving roads across the Region. This indicates that there are performance issues with the road and that the community will have this road improved by AT in the short term, although potentially not before the start of the JHNZ extraction activity.

As a result of this site meeting, AT sent through plans showing the eight locations where it considered McLachlan Road needed to be upgraded to be safe. The works required at these locations range from removal of vegetation, widening the carriageway to 7m, lowering the height of the carriageway, and improving an existing culvert. JHNZ has taken these recommended works and has included them as part of its proposal. No additional resource consents are required for these works.

JHNZ understands that if it undertakes these works to AT standards as soon as reasonably practical, AT has no objection to the proposal.

A copy of the correspondence received from AT is also included in Appendix 4.

6.4 NZ Transport Agency (the Agency)

A copy of the draft proposal was provided to the Agency in March 2017. While the Agency planning review team raised no queries with the proposal, they requested that JHNZ provides an improved left turning treatment on McLachlan Road at the intersection with SH16 and trim a stand of vegetation, located south of the intersection adjacent to the southbound lane to improve sight distances. These improvements were identified by the Agency as being required for the current volume of traffic.

A copy of the correspondence received from the Agency is also included in Appendix 4.

7 Statutory Assessment

This section provides a statutory assessment of the application against the matters of Part 2 of the RMA and other statutory and planning documents relevant to the proposal, including:

- New Zealand Coastal Policy Statement 2010 (NZCPS);
- National Policy Statement for Freshwater;
- Auckland Regional Policy Statement;
- Auckland Unitary Plan: Operative in Part; and
- Heritage New Zealand Pouhere Taonga Act 2014;

The relevant matters of these documents are discussed below.

7.1 Resource Management Act 1991 (RMA)

The RMA outlines the functions, powers, and duties of consenting authorities to be exercised in order to give effect to the purpose and principles of the RMA. The RMA defines a hierarchy whereby priority is given to the matters set out in Part 2 – Purpose and Principles.

7.1.1 Section 5 – Purpose

The Purpose of the RMA, set out in Section 5, is to promote the sustainable management of natural and physical resources, which includes enabling "people and communities to provide for their social, economic, and cultural wellbeing". This must be achieved in the context of Section 5(2), in particular the responsibility of (c) for "avoiding, remedying, or mitigating any adverse effects of activities on the environment".

The proposal is located within a remote and rural location and involves the extraction of silica sand, an important natural resource used to manufacture building materials. The quality of sand required is scarce in New Zealand, with only three other locations of the resource known. However, the demand for building materials is significant due to population growth in urban centres – particularly Auckland. As such, the extraction of sand is required to enable the ongoing supply of building materials to the construction industry, and is therefore important to the social and economic well-being of local users and the rest of New Zealand. Utilising this sand deposit prevents the need to import this silica from Australia and is therefore a more efficient, sustainable and cost effective way of producing these building materials.

The location of the sand extraction activity has been selected not only for its resource availability, but also as the landscape and surrounding environment is not identified as having outstanding natural character or landscape features. The Applicant proposes to undertake the extraction with any actual and potential adverse effects avoided, remedied, or mitigated through the broad range of measures discussed in the works methodology (Section 3) and this Assessment of Environmental Effects (Section 5).

Given the assessments described in this AEE, the need for and the rarity of the sand resource, it is considered that the proposal is consistent with the purpose of the RMA.

7.1.2 Section 6 and Section 7

The broader principles of the RMA are set out in Sections 6 – 8 of the RMA. Matters of particular relevance to this application are discussed in Table 7.1.

Table 7.1. RMA assessment.

Section	Principle / Matter	Comment
6(a)	the preservation of the natural character of the coastal environment (including the coastal marine area), wetlands, and lakes and rivers and their margins, and the protection of them from inappropriate subdivision, use, and development:	The proposal will modify land located within the coastal environment of the Kaipara Harbour, but due to the poor visibility of the site and proposed rehabilitation, will not change the overall character. The application also proposes extensive rehabilitation and mitigation to enhance ecological values of the area.
6(d)	the maintenance and enhancement of public access to and along the coastal marine area, lakes, and rivers:	No public access to the coast or streams is currently provided or is adversely affected by the proposal.
6(e)	the relationship of Maori and their culture and traditions with their ancestral lands, water, sites, waahi tapu, and other taonga	Mana Whenua have been invited to provide input into the proposal, and no conflict between the proposal and these cultural values is currently known or been advised of.
6(f)	the protection of historic heritage from inappropriate subdivision, use, and development:	Numerous archaeological sites have been identified as being in the locality of the activity. The results of an archaeological investigation undertaken concludes that the two sites that will be modified have low to moderate value. Accidental Discovery Protocols will be in place when working within proximity to these sites.
7(a)	kaitiakitanga:	A range of management plans are being developed to provide robust mitigation and remediation of any adverse environmental effects that arise as a result of the proposal. Iwi have been invited to participate in the development of these, including a Cultural Heritage Management Plan.
7(aa)	the ethic of stewardship	
7(b)	the efficient use and development of natural and physical resources	The proposal seeks to access a natural resource to be utilised in the development of materials necessary for the housing market in Auckland and wider new Zealand. This prevents this resource needing to be imported and is therefore a more efficient way of developing these essential products.
7(c)	the maintenance and enhancement of amenity values	Existing amenity values will be maintained, as the technical reports submitted demonstrate. The effects created will not create adverse effects that are more than minor in terms of dust, visual effects or any other matter that would affect amenity in the coastal rural production area.
7(d)	intrinsic values of ecosystems:	The extraction site will undergo ecological restoration and rehabilitation that will result in an overall improvement to the ecological values on site, particularly stream values and indigenous vegetation linkages. The current state is predominantly degraded with exotic weed species as well as allowing free stock access to waterways.
7(f)	maintenance and enhancement of the quality of the environment	

Having regard to Part 2 of the RMA, the proposal will achieve sustainable management of natural and physical resources.

7.1.3 Section 104D Assessment

For a resource consent with an overall non-complying activity status the decision maker is required under Section 104D of the RMA to determine the following:

(1) Despite any decision made for the purpose of section 95A(2)(a) in relation to adverse effects, a consent authority may grant a resource consent for a non-complying activity only if it is satisfied that either—

(a) the adverse effects of the activity on the environment (other than any effect to which section 104(3)(a)(ii)applies) will be minor; or

(b) the application is for an activity that will not be contrary to the objectives and policies of—

(i) the relevant plan, if there is a plan but no proposed plan in respect of the activity; or

(ii) the relevant proposed plan, if there is a proposed plan but no relevant plan in respect of the activity; or

(iii) both the relevant plan and the relevant proposed plan, if there is both a plan and a proposed plan in respect of the activity.

(2) To avoid doubt, section 104(2) applies to the determination of an application for a non-complying activity.

The proposal will create adverse effects on the environment by excavating sand and clay material from beneath the topsoil layer of the hills. Expert assessment submitted as part of this AEE however demonstrates that visually, the effects can be absorbed in the landscape. Assessments have also concluded that sufficient measures to mitigate sedimentation effects, and to enhance stream margins and areas of terrestrial vegetation will be put in place to mitigate on balance the adverse effects to be less than minor. This assessment is based on the existing environmental values of the site, the extensive rehabilitation and remediation measures proposed, and the mitigation and management plans that will be in effect for the duration of the activity.

The AEE and assessment against the relevant objectives and policies demonstrate that the proposal is not contrary to the objectives and policies of the ARPS and the AUP:OP (section 7.5 and 7.6 below). These objectives indicate a clear priority for activities to occur that depend on the natural or physical resource in the location of which they are proposed and specifically identify mineral extraction as a priority activity.

Overall, it is concluded that both the gateway tests in section 104D for non-complying activities are met in that the proposal does not create adverse effects on the environment that are more than minor and is not contrary to the objectives and policies of the relevant plans.

7.2 Heritage New Zealand Pouhere Taonga Act 2014

The purpose of the Heritage New Zealand Pouhere Taonga Act 2014 is to promote the identification, protection, preservation, and conservation of the historical and cultural heritage of New Zealand.

The proposed extraction will take place in an area with numerous identified archaeological sites, two of which will be removed by the activity. The Archaeological Assessment undertaken (Appendix 6) has concluded that the works will be undertaken in accordance with the principles of this Act and that the sites that will be modified have no to moderate value as they have already been either totally or partly eroded. Archaeological Authorities will be obtained as necessary prior to the commencement of extraction activities. Further to this, an Accidental Discovery Protocol is proposed as a condition of consent. JHNZ will undertake an additional survey of the southern ridge following vegetation clearance to further assess and record any

further presently unrecorded sites that may exist in this area, due to it being likely that the site was an area of high historical Maori occupation.

7.3 New Zealand Coastal Policy Statement 2010 (NZCPS)

The NZCPS sets out objectives and policies to protect New Zealand's coastal environment, including land that contributes to the overall coastal environment. As the proposal will occur within an area that contributes to the coastal landscape by being adjacent to it, the project has been assessed against and planned to give effect to the relevant objectives of the NZCPS, as summarised in Table 7.2.

Table 7.2. New Zealand Coastal Policy Statement assessment.

Objectives	Comment
Objective 1 To safeguard the integrity, form, functioning and resilience of the coastal environment and sustain its ecosystems, including marine and intertidal areas, estuaries, dunes and land, by: ■ *maintaining or enhancing natural biological and physical processes in the coastal environment and recognising their dynamic, complex and interdependent nature;* ■ *protecting representative or significant natural ecosystems and sites of biological importance and maintaining the diversity of New Zealand's indigenous coastal flora and fauna; and* ■ *maintaining coastal water quality, and enhancing it where it has deteriorated from what would otherwise be its natural condition, with significant adverse effects on ecology and habitat, because of discharges associated with human activity.*	The project area is within a significantly modified coastal environment that has been subject to extensive vegetation clearance, stock grazing, dairying, and forestry. The proposed extraction will result in further modification to the area, primarily through permanent changes to the physical landform. This landscape has not been identified as being outstanding or significant. However, extensive rehabilitation is proposed to create a landform that is cohesive with the surrounding landforms and landscape, and improves the ecology and habitat values of the site through vegetation restoration and improvements to permanent streams connected to the Kaipara Harbour. Overall, the proposal will maintain and over time, enhance existing natural processes on the site and linked to the coast.
Objective 2 To preserve the natural character of the coastal environment and protect natural features and landscape values through: ■ *recognising the characteristics and qualities that contribute to natural character,* ■ *natural features and landscape values and their location and distribution;* ■ *identifying those areas where various forms of subdivision, use, and development* ■ *would be inappropriate and protecting them from such activities; and* ■ *encouraging restoration of the coastal environment.*	The locality of the proposal is not identified as a significant coastal landscape. The visual assessment undertaken for the proposal concludes that the activity will be barely discernible from common viewing points within the Kaipara Harbour and that, after restoration and enhancement measures are carried out, the natural landscape values will be somewhat improved.
Objective 3 To take account of the principles of the Treaty of Waitangi, recognise the role of tangata whenua as kaitiaki and provide for tangata whenua involvement in management of the coastal environment by: ■ recognising the ongoing and enduring relationship of tangata whenua over their lands, rohe and resources;	Mana Whenua have been invited to provide input into the project so that any concerns they may have can be taken into account. The proposal has been designed to avoid adverse effects on significant archaeological sites. Mana Whenua will also been invited to provide resources during the ecological rehabilitation of the site in the future.

Objectives	Comment
■ promoting meaningful relationships and interactions between tangata whenua and persons exercising functions and powers under the Act; ■ incorporating mātauranga Māori into sustainable management practices; and ■ recognising and protecting characteristics of the coastal environment that are of special value to tangata whenua.	No other elements of the proposal are known to be influenced by the Treaty of Waitangi or Maori values.
Objective 6 To enable people and communities to provide for their social, economic, and cultural wellbeing and their health and safety, through subdivision, use, and development, recognising that: ■ *the protection of the values of the coastal environment does not preclude use and development in appropriate places and forms, and within appropriate limits;* ■ *some uses and developments which depend upon the use of natural and physical resources in the coastal environment are important to the social, economic and cultural wellbeing of people and communities;* ■ *functionally some uses and developments can only be located on the coast or in the coastal marine area;* ■ *the coastal environment contains renewable energy resources of significant value;* ■ *the protection of habitats of living marine resources contributes to the social, economic and cultural wellbeing of people and communities;* ■ *the potential to protect, use, and develop natural and physical resources in the coastal marine area should not be compromised by activities on land;* ■ *the proportion of the coastal marine area under any formal protection is small and therefore management under the Act is an important means by which the natural resources of the coastal marine area can be protected; and* ■ *historic heritage in the coastal environment is extensive but not fully known, and vulnerable to loss or damage from inappropriate subdivision, use, and development.*	The proposal seeks to extract sand of a particular composition and purity. Such sand resources are almost exclusively found within coastal environments, and as a result, this is where the activity must be located. This particular location is within a significantly modified coastal environment that has already been subject to extensive vegetation clearance, stock grazing, dairying, and forestry. No part of the proposal will take place within the Coastal Marine Area, and all land-based activities will be managed in a way that will avoid, remedy, or mitigate potential and actual adverse effects on the coastal environment. This objective also notes that use in coastal environments may be appropriate where the activity proposed depends on the natural and physical resources of the site and is important to the cultural, social and economic well-being of people and communities. This is clearly the case with this proposal and this objective clearly anticipates this type of activity in the coastal environment.
Objective 7 To ensure that management of the coastal environment recognises and provides for New Zealand's international obligations regarding the coastal environment, including the coastal marine area.	The proposal does not take place within the Coastal Marine Area and will not endanger New Zealand's ability to fulfil any international obligations with respect to the coastal environment.

The proposal is consistent with the objectives of the NZCPS.

7.4 National Policy Statement for Freshwater Management (2014)

The National Policy Statement (NPS) for Freshwater Management puts forward a framework of objectives and policies for regional authorities to incorporate into regional policy statements and plans on the protection and enhancement of water quality values, maintaining water quantity availability, and the integrated management of freshwater and its catchments.

The proposal gives effect to the objectives and policies of the NPS as demonstrated in the assessment of the proposal against the objectives and policies of the AUP:OP (see below). In particular, it results in the improvement of the quality of all riparian margins on the site, which will improve the quality of water and ecosystems found within these.

7.5 Auckland Regional Policy Statement

At the regional and district levels, the sustainable management of resources within Auckland is guided by the objectives and policies of the ARPS within the AUP:OP.

The ARPS aims to achieve integrated, consistent and co-ordinated management of the Region's resources. Its aim is also to provide greater certainty over the ways that natural and physical resources are to be managed, and create an awareness of the constraints and opportunities in this Region.

7.5.1 Chapter B7.6 – Minerals

An accessible supply of minerals, especially those required to support the anticipated growth and development of Auckland, is identified as important for the region by these policies. Consequently, the ARPS provides for the effective and efficient use of the Region's minerals by identifying it is a priority to:

- Provide for mineral extraction activities within appropriate areas to secure supply of extractable minerals for Auckland's continuing development;
- Require mineral extraction activities to be established and operated in ways which avoid, remedy, or mitigate significant adverse effects on the environment; and
- Discourage locating sensitive activities adjacent to regionally significant mineral resources unless they can avoid compromising existing and future mineral extraction.

The proposed extraction is required to supply the manufacture of building materials, which are increasingly in demand due to the significant growth occurring within Auckland and across the country. Development within Auckland is forecast to continue to grow and a local source of this raw material avoids the need to import the sand at higher costs.

As discussed in Section 5 of this AEE, the proposal will implement a robust range of environmental management methods to avoid, remedy, and mitigate the potential and actual adverse effects anticipated by the extraction and its associated activities as far as practicable. The ARPS clearly signals that it is a priority for the Region to secure accessibility to minerals essential for Auckland's development, and that these activities should avoid remedy or mitigate any significant adverse effects they create.

Consenting this proposal to extract silica sand for conversion into building materials, where adverse effects created by the activity are less than minor, therefore assists to achieve the objectives and policies of Chapter B7.6 of the ARPS.

7.5.2 Chapter B.3 – Infrastructure

The proposal requires the use of a rural road by 4-5 heavy truck and trailers per day, which given the current state of the McLachlan Road could create a traffic safety issue if they were not to be preceded by pilot vehicles. Objectives and policies within the ARPS require that infrastructure within the region is resilient, efficient, effective, and provides for the health, safety and wellbeing of people and communities. Additionally, the ARPS recognises the benefits of infrastructure where it enables economic growth.

The proposal includes the upgrade of eight key sections of McLachlan Road that AT has identified. These parts of the road will be upgraded to the appropriate road design standards required by AT and will remove the need for AT to make these improvements when it undertakes the scheduled upgrade of the road in the future. The proposal also includes the upgrade of the left hand turn into McLachlan Road from SH16 when heading north. The level of upgrade proposed by JHNZ is well beyond what would be required to offset the effects of 10 additional truck movements per day and will significantly improve the current level of service and safety of the road and improve the health and safety for its road users. As such, the proposal is consistent with the relevant objectives and policies in Chapter B.3 of the ARPS.

7.5.3 Chapter B7.2 – Indigenous Biodiversity

The ARPS sets out objectives and policies that seek to maintain existing indigenous biodiversity through protection, restoration, and enhancement where ecological values are degraded or where development is occurring.

As discussed in Section 2.12 and the Ecological Assessment (Appendix 5), the site is not located within a Significant Ecological Area. It is primarily covered in exotic and invasive flora, and the biodiversity of indigenous fauna is limited. Areas of indigenous wetland and bush do occur around the margins of the site in covenanted areas. However, these areas will not be affected by the proposal and will be enhanced, with the exception of one small area of native rush land vegetation and an ephemeral wetland area that will be removed as part of the proposal. These biodiversity effects will be more than offset by the recreation of a wetland after sand extraction and the planting and protecting of all riparian margins on the site and the expansion of areas of native vegetation. A total area of 3.6ha of indigenous habitat will be restored as part of the proposal.

The ecological investigations carried out on the site concluded that long-tailed bats are present in the vicinity of the site, as well as a number of native and some threatened shore bird species. The assessment of effects concluded that the extraction would not directly affect these habitats and that the additional native planting would provide some enhanced habitat to offset any adverse effects. The extensive rehabilitation of the site in grasses or mānuka and kānuka will also provide improved replacement habitat for lizards and birds. The proposal is therefore consistent with the regional priority for increasing native biodiversity.

7.5.4 Chapter B7.3 – Freshwater Systems

The application includes suitable measures, such as minimising open areas and providing sediment control ponds, to avoid adverse effects of sediment on the freshwater ecosystems on the site. These sediment controls will be updated and modified over time through the requirement for specific Erosion and Sediment Control Plans for each extraction phase, to enable effective management of sediment run-off.

There are four intermittent streams that run through the site and these are currently degraded by stock grazing and have predominantly gorse vegetation on their margins. These streams margins will be replanted in indigenous vegetation to 10m width and fenced off from stock. This planting and fencing will provide a significant improvement to the freshwater systems on the site.

A small low quality ephemeral wetland located in the sand extraction area will be disturbed. The effect of this removal will be offset by establishing a new lowland wetland area in the new low point of the site after sand has been extracted. Water from here will feed into the downstream intermittent and ephemeral stream on the coastal side of the washing plan. Margins of this stream will also be planted and protected to improve the freshwater system that currently exists here. The new wetland, in conjunction with the native planting, and protection of all of the stream margins on the site, will result in a long term overall improvement of the site's freshwater systems.

In addition, all runoff water from the earthworked area will be collected and used in the wash process and appropriate sediment control devices will be used and maintained for water from this area. Only water from the unworked areas will runoff into natural streams and wetlands.

7.5.5 Chapter B7.4 – Coastal water, freshwater, and geothermal water

The ARPS sets out objectives and policies to safeguard the life-supporting capacity and natural, social, and cultural values of water from the adverse effects arising from water takes and discharges. Progressive enhancement of water quality is also identified where water is in a degraded state.

The proposal involves taking groundwater to supplement the collection of runoff to wash sand and the storage of the washwater in a constructed pond. To meet these objectives and policies, the wash plant facility and associated structures have been designed to minimise the amount of water taken from the environment through water re-use and recycling. Discharges to the environment will also be avoided as far as practicable by design and reuse of water within the activity, rather than discharge to streams. In the few events where discharges will occur, appropriate sediment control methods have been designed.

The proposal also includes the removal of weed species and the revegetation of 10m width of all 4 stream systems on the property with native planting. These margins will be fenced off and protected from stock. These measures will provide significant medium and long term improvements to freshwater quality and therefore surrounding coastal water quality of the site.

Through the proposed integrated management, limited use of water on site, and improvement of riparian margins, adverse effects on the quality and quantity of water will be minimal, and the objectives and policies in B7.4 will be met.

7.5.6 Chapter B7.5 – Air

The ARPS enables the discharge of contaminants to air within rural and coastal environments, including dust and sand, provided that air quality levels are maintained at appropriate levels. The objectives and policies require that discharges of contaminants to air are managed so as to avoid, remedy or mitigate their adverse effects for the purpose of protecting human health, property, the environment, flora, and fauna. Land use activities that cannot avoid such adverse effects are required to be located within appropriate areas far from sensitive receivers. There are limited sensitive receivers in the near vicinity of this proposal and the RPS also gives priority to the extraction of essential minerals where there are limited locations for this extraction.

As discussed in Section 5.8 (and Appendix 10), the proposed works will have limited air discharges, primarily being limited air borne particles from earthworks and some additional dust from truck movements along existing gravel roads. Adverse effects of air discharges are unlikely due to the wet nature of the sand and clay, and larger particle size. The appended Air Discharge Effects Assessment, concludes that no sensitive receivers are located in areas where they may be subject to increased air discharges that will cause adverse effects. However, management methods are proposed in the Dust Management Plan (Appendix 10) that will mitigate any effects of unforeseen discharges to air so that they will not create an adverse effect on the environment that is more than minor.

As such, the proposal is consistent with the objectives and policies of ARPS Chapter B7.5.

7.5.7 Chapter B8 – Coastal Environment

The coastal environment within Auckland is identified in the ARPS as being a fundamental part of the region's identity. The social, cultural, and natural values of the coastal environment are protected through the objectives and policies of the ARPS by:

- Managing subdivision, use, and development in a way that preserves the characteristics and qualities that contribute to the natural character of the coastal environment; and
- Seeking to restore or rehabilitate areas with degraded natural character, where practicable.

The proposed extraction is to be undertaken within a site with already degraded natural character values, but in a manner that will not, in the long term, detract from the coastal character of the area. The visual assessment submitted with the application concludes that when viewed from the surrounding coastal area, the changes to the site will be virtually indiscernible. The proposal includes the rehabilitation of the area, which will result in the removal of extensive weed species and the planting of native vegetation. These measures will contribute to the overall long term natural character of the coastal site and meet the objectives of the RPS.

7.6 Auckland Unitary Plan: Operative in Part

Further to the overarching objectives and policies of the ARPS, the individual chapters of the AUP:OP provide more detailed and specific requirements for activities within Auckland. The 11 objectives and policies relevant to the proposed activity have been identified and discussed below.

7.6.1 Chapter H19.2 – Rural Zones

The provisions of Chapter H19.2 apply to all Rural Zones, including the Rural Coastal Zone; and include objectives and policies related to subdivision. These policies seek to:

- Provide for rural production activities throughout the area while containing adverse environmental effects on-site;
- Protect elite soil and manage prime soil for potential rural production; and
- Avoid the fragmentation of productive land by lifestyle development.

The proposal seeks to undertake a boundary adjustment between three existing lots. Two lots are currently vacant and were recently subdivided from the parent lot to be used as lifestyle properties. The parent lot is occupied, containing a dwelling and land uses, including grazing and formerly forestry. The subject site's soil is not considered to be of elite or prime standard for development, as much of the soil is mixed with the underlying coastal sand dune. The soil does however contain the limited silica sand resource which is the high-value resource targeted for extraction in this application.

The proposed boundary adjustment will not generate any new lots, and will not change the development potential for any of these lots. Proposed changes will result in the same number of small rural residential sites, with one of these containing the existing dwelling, being larger than provided for by the AUP:OP. The current owners of the land, wish to remain on-site in the existing dwelling with the land around the dwelling kept with their title. This new boundary configuration will enable the important use of extracting minerals to occur within one title, for ease of management.

Given this, the proposal meets the objectives and policies of Chapter H19.2.

7.6.2 Chapter H19.5 – Rural Coastal Zone

The objectives and policies of Chapter H19.5 provide for:

- Rural production activities, provided management and mitigation is undertaken where there are adverse effects on rural character and amenity values, landscape values, biodiversity values, and Mana Whenua cultural heritage values;
- Buildings that are of a scale and intensity where they do not detract from the zone's rural and coastal character and amenity values; and
- Activities, where the significant relationship between land, freshwater bodies, and the coastal marine area and their contribution to Auckland's rural and coastal character is maintained and enhanced.

The proposal will alter the physical land form of the site by extracting silica sand from beneath the topsoil. However, the land will be rehabilitated in a way that does not significantly alter the character of the site when viewed from beyond the site and within the context of the rural coastal environment. The rehabilitation will also be carried out in a way which does not detract from the existing physical and natural values of the area. The proposal will be managed in a way so that:

- Adverse effects on amenity and biodiversity values are mitigated through targeted management and remedied through robust rehabilitation and enhancement plans;
- Structures located on-site are limited in size and scale, and are largely hidden from public viewpoints;
- Re-contouring of modified landforms is undertaken in a way that appears natural; and
- Current levels of road safety are improved in the medium term by upgrades proposed to parts of the road network utilised by the activity.

The type of mineral to be extracted is silica sand, it is generally accessible only within coastal environments and is necessary for the housing construction industry in New Zealand. The extraction activity proposed is significantly less intensive than other mineral extraction activities, such as rock quarries and open cast mining activities, and the scale of ancillary buildings and activity associated with the proposal will not be out of place in the rural area.

Overall, the proposal is consistent with the relevant objectives and policies of the Rural Coastal Zone.

7.6.3 Chapter E28 – Mineral Extraction from Land

The objectives and policies of Chapter E28 provide for mineral extraction from land within Auckland where its delivery is efficient and meets Auckland's needs, while significant adverse effects are avoided, remedied, or mitigated as far as practicable. These objectives and policies are reproduced in full in Appendix 14.

The proposal takes place within an area of Auckland that is relatively isolated from sensitive receiving environments, and avoids any places that have been scheduled within the AUP:OP as being significant in terms of natural heritage, Mana Whenua values, natural resources, coastal values, historic heritage, and special natural character. The proposed activity is to extract the very limited silica sand that is required to develop building materials used in the construction industry. The proposal will replace existing sand extraction operations currently occurring, with a significantly more efficient process with respect to transport. The proposal will contribute positively to the growth of Auckland and its economy.

These objectives and policies recognise the importance to the region of mineral resources and consequently require "significant adverse effects" (E28.2 and E28.3(2)(c)) usually generated by mineral extraction activities to be avoided, remedied or mitigated "as far as practicable" (E28.4). Section 5 of this AEE sets out extensive avoidance and mitigation measures which result in the adverse effects on the environment being less than minor. The proposal is therefore clearly consistent with the objectives and policies of Chapter E28. More specific assessment is provided below:

Table 7.3. Objectives and Policies of AUP:OP Chapter E28.

Objectives and Policies	Comment
E28.2 Objectives	
Mineral extraction from the land and its delivery is efficient and meets Auckland's needs while significant adverse effects are avoided, remedied or mitigated.	The proposal will improve the logistical efficiency of JHNZ's supply chain, from extraction to manufacturing, through the consolidation of activities into a single operation, thereby reducing the distance travelled by haulage trucks. The proposal is required to meet the needs of supplying building manufacturing products to the Auckland region. Significant adverse effects will be avoided, remedied, or mitigated.
E28.3 Policies	
Avoid where practicable undertaking new mineral extraction activities in areas where there are natural and physical resources that have been scheduled in the Plan in relation to natural heritage, Mana Whenua, natural resources, coastal, historic heritage and special character.	The extraction area is not located within the vicinity of any locations scheduled for particular values in the AUP:OP. The extraction does take place within the coastal environment, where some archaeological sites are identified. Silica sand will only however be found in coastal environments.
Where it is not practicable to locate mineral extraction activities outside the areas identified in Policy E28.3(1), consideration will be given to all of the following: ■ the benefits likely to be derived from the mineral extraction activities; ■ any reduced transport effects from having a mineral extraction site closer to the area of demand; ■ the extent to which significant adverse effects can be avoided; and ■ the extent to which adverse effects can be remedied, mitigated or, where not mitigated, can be offset.	Despite its location within a coastal environment: ■ No works are to be undertaken within the Coastal Marine Area; ■ Significant economic benefits to Auckland's housing and development will result through the supply of JHNZ's building products; ■ While isolated from sensitive receiving environments, the location of the site is within close vicinity to JHNZ's manufacturing site in Penrose; ■ The proposal will result in reduced heavy vehicle movements on the State Highway Network; ■ The proposal results in parts of McLachlan Road being upgraded to improve the current safety level of the road and its intersection with SH16; and ■ Adverse effects will be avoided, remedied, and mitigated. Off-set mitigation and rehabilitation is proposed that seeks to improve the environmental values over that which currently exist.
E28.4 Avoid, remedy or mitigate as far as practicable significant adverse effects associated with mineral extraction activities.	
E28.5 Require proposals for new mineral extraction activities in rural areas to provide adequate information on and to demonstrate; ■ design and layout of site; ■ adequate measures to manage noise, dust, vibration illumination, maintain amenity values ■ manage traffic effects and maintain safety of road users ■ avoid, remedy or mitigate adverse effect on soil and water quality ■ maintain land stability	This application includes comprehensive information on these aspects and proposes conditions of consent to update certain information as the activity progresses. ■ plans have been submitted detailing the high level design and layout of the site and the mitigation proposed ■ detailed technical reports and conditions have been submitted to manage noise, dust and traffic ■ significant road upgrades are proposed to improve the current safety of the road ■ measures have been detailed to demonstrate how sediment effects on water quality will be avoided

Objectives and Policies	Comment
■ mitigate significant adverse effects on visual and landscape values; ■ protect values of identified heritage and archaeological site, ■ provide options for the rehabilitation of the site.	■ maximum cut slopes have been specified and a staged extraction plan submitted to demonstrate how land stability will be maintained ■ information has been submitted to demonstrate that adverse effects on landscape and visual values will not be created beyond the site ■ a comprehensive assessment of the archaeological sites and values has been submitted that demonstrates that no sites of value will be removed and that further requirements for investigation are put in place to accurately record any additional sites on the property if discovered ■ details of site rehabilitation have been provided.
Require an Extraction Management Plan to be submitted.	The proposal includes a Mineral Extraction Plan that will be updated as the activity progresses. The current plan sets out in detail what is to occur over the first 5 years of extraction.

7.6.4 Chapter E1 – Water quality and integrated management

Table 7.4. Objectives and Policies of AUP:OP Chapter E1.

Objectives and Policies	Comment
E1.2 Objectives	
Freshwater and sediment quality is maintained where it is excellent or good and progressively improved over time in degraded areas.	Water and sediment quality of the receiving environment has been assessed as being of moderate quality, and indicative of a deforested land catchment primarily used for rural production activities. The proposal will result in large areas of exposed earth, and has proposed a range of mitigation measures to control sediment discharges during excavation activities, and also proposes extensive rehabilitation and stabilisation measures that are expected to improve water and sediment quality downstream over time. Washwater discharges from the wash plant will be minimal given water reuse on the site. Discharges will be treated to an acceptable level prior to any discharges to the environment.
The mauri of freshwater is maintained or progressively improved over time to enable traditional and cultural use of this resource by Mana Whenua.	
Stormwater and wastewater networks are managed to protect public health and safety and to prevent or minimise adverse effects of contaminants on freshwater and coastal water quality.	
E1.3 Policies	
Manage discharges, until such time as objectives and limits are established in accordance with Policy E1.3(7), having regard to: ■ the National Policy Statement for Freshwater Management National Bottom Lines; ■ the Macroinvertebrate Community Index as a guideline for freshwater ecosystem health associated with different land uses within catchments in accordance with Policy E1.3(2); or	As discussed in Section 5 of this AEE, the primary contaminant to be discharged from the works area will be sediment, likely sand and clays. Robust erosion and sediment controls have been developed to capture sediment-laden water, and reuse this water as far as practicable within the sand washing process. While it is anticipated that much of the overland flows will soak into the ground prior to reaching downslope aquatic habitats, the sediment and erosion controls have been

Objectives and Policies	Comment
■ other indicators of water quality and ecosystem health.	up-scaled to provide more certainty and control on water flows. With these controls in place, it is anticipated that the resulting water quality of aquatic habitats during excavation will be maintained. Over time, with the proposed ecological rehabilitation of excavated areas and stream margins, it is expected that water quality values will improve over their existing levels. The site has been used for forestry and rural production for generations, and the proposed revegetation of the site will be beneficial to the health of streams and the downstream Kaipara Harbour. A small ephemeral wetland will be removed during the excavation. However, the off-set mitigation and re-establishment of a new equivalent wetland area in the new low point of the extraction area will offset this. Overall, the works are consistent with these objectives and policies.
Manage discharges, subdivision, use, and development that affect freshwater systems to: ■ maintain or enhance water quality, flows, stream channels and their margins and other freshwater values, where the current condition is above National Policy Statement for Freshwater Management National Bottom Lines and the relevant Macroinvertebrate Community Index guideline in Table E1.3.1; or ■ enhance water quality, flows, stream channels and their margins and other freshwater values where the current condition is below national bottom lines or the relevant Macroinvertebrate Community Index guideline in Table E1.3.1.	
Require freshwater systems to be enhanced unless existing intensive land use and development has irreversibly modified them such that it practicably precludes enhancement.	

7.6.5 Chapter E2 – Water quantity allocation and use

Table 7.5. Objectives and Policies of AUP:OP Chapter E2.

Objectives and Policies	Comment
E2.2 Objectives	
Water in surface rivers and groundwater aquifers is available for use provided the natural values of water are maintained and established limits are not exceeded.	The proposed groundwater take will be sourced from the deep Helensville conglomerate, and extraction rates will be kept to only that which is required for the proposed sand washing. As discussed in Section 5 of the AEE and the Hydrology Report (Appendix 9), the groundwater take will have negligible effects on surface aquifers and water availability within the surrounding areas. Further to this, the proposal has been designed with water use efficiency as a key objective for both environmental and economical outcomes.
Water resources are managed within limits to meet current and future water needs for social, cultural and economic purposes.	
Freshwater resources available for use are managed and allocated in order of priority to provide for domestic and municipal water supplies, animals, and economic development.	
Water resources are managed to maximise the efficient allocation and efficient use of available water.	
Mana Whenua values including the mauri of water, are acknowledged in the allocation and use of water.	
E2.3 Policies	
Priority of water use	
Manage the allocation of fresh water within the guidelines provided by Appendix 2 River and stream minimum flow and availability and Appendix 3 Aquifer water availabilities and levels and give priority to making	As discussed in Section 5 of the AEE, the proposed groundwater take does not take place within the vicinity of any known existing groundwater takes. Known local surface water takes will not be affected by the proposed

freshwater available for the following uses (in descending order of priority): ■ existing and reasonably foreseeable domestic and municipal water supply and animal drinking water requirements; ■ existing lawfully established water users; ■ uses of water for which alternative water sources are unavailable or unsuitable; and ■ all other uses.	groundwater take, as surface water within the catchment is primarily fed by rainfall and surface run-off. Groundwater within the Helensville conglomerate is not known to contribute to surface water flows in this area. As water availability is high and demand is negligible, the proposed take is consistent with the objectives and policies of E2.
Efficient allocation and use	
Promote the efficient allocation and use of freshwater and geothermal water by: ■ requiring the amount of water taken and used to be reasonable and justifiable with regard to the intended use, and where appropriate: – municipal water supplies are supported by a water management plan; – industrial and irrigation supplies implement best practice, in respect of the efficient use of water for that particular activity or industry; ■ requiring consideration of water conservation and thermal efficiency methods; and ■ provide for storage and harvesting of fresh water.	As discussed in Section 3 above, the proposal will retain, reuse, and recycle as much water as is possible in order to achieve improved environmental and economical outcomes. A water storage pond will be constructed that will be fed via: ■ The proposed groundwater take; ■ Surface water run-off from the wash plant facility; and ■ Treated water from the sediment control pond. Any water that is not lost during the washing process (*i.e.* from evaporation or water absorbed by the washed sand) will be returned to the storage pond for re-use. Vegetative cover is also proposed, as appropriate, around the pond to reduce exposure of the water to sunlight. Given the proposed water management, the proposal is consistent with the objectives and policies of E2.
Take and use of water	
Require all proposals to take and use groundwater from any aquifer to demonstrate that: ■ the taking is within the water availabilities and levels for the aquifer in Table 1 Aquifer water availabilities and Table 2 Interim aquifer groundwater levels in Appendix 3 Aquifer water availabilities and levels, except in accordance with Policy E2.3(11), and meeting all of the following: – recharge to other aquifers is maintained; and – aquifer consolidation and surface subsidence is avoided. ■ the taking will avoid, remedy or mitigate adverse effects on surface water flows	The proposed groundwater take will occur from a bore that has been drilled into the Helensville Conglomerate. Pump testing has shown that the proposed take is available from the aquifer and that there will be negligible effects on the surrounding environment as a result of the activity. The aquifer is located deep below ground and has limited hydraulic connection to surface water levels and coastal water. No known existing bores are located within the area and settlement resulting from the deep water well is anticipated to be negligible. Given this, the effects (as discussed in Section 5.4) are consistent with the objectives and policies of Chapter E2.
Surface Water Diversions	
Surface water diversions (22) Require proposals to divert surface water to demonstrate the diversion will to the extent practicable avoid significant adverse effects and remedy or mitigate other adverse effects including where relevant, effects on:	The proposal involves the diversion of surface rainwater from around the earthworked site to avoid increase in sediment generation. No diversion of stream flows will occur as a result of the proposal. It is anticipated that the majority of surface water flow on-site soaks into the ground prior to flowing downslope, but sediment control ponds have been suitably designed

■ existing lawfully established surface water takes including those allowed by section 14(3)(b) of the Resource Management Act 1991; ■ existing buildings, structures and services; ■ existing flood hazard risks; ■ river bank stability; ■ scheduled historic heritage places or scheduled sites and places of significance to Mana Whenua; ■ people and communities; and ■ the life supporting capacity of freshwater, ecosystem processes, and indigenous species and their ecosystems.	to accommodate any water that will be diverted to them through the life of the project. The proposal is consistent with the objectives and policies of Chapter E2.
Quarrying	
Enable regionally significant mineral extraction activities provided that significant adverse effects are managed through considering all of the relevant policies in this section.	The proposed extraction is of a regionally significant resource of silica sand, as only sand of a very specific quality can be used in the manufacturing of specific building materials by JHNZ. Deposits of the sand that meets the quality required are only found in 3 known locations throughout New Zealand and therefore other options to provide this key component for these materials are limited. The extraction process will be undertaken while avoiding, remedying, and mitigating adverse effects as far as practicable and are considered no more than minor.

7.6.6 Chapter E11 – Land Disturbance (Regional)

The objectives and policies of Chapter E11 provide for large-scale earthworks where adverse effects to receiving stream and coastal environments are minimised, and where soil is conserved for productive purposes.

The proposal will result in the excavation and stockpiling of topsoil and clay in order to expose the raw sand resource. Such earthworks have the potential to result in erosion and sedimentation of downslope environments, and as such, robust management methods will be employed throughout the duration of the project. In addition, the progressive rehabilitation of extracted areas and stockpiling of clay and top soil for reuse on site will retain existing soil quality.

The proposal is consistent with the objectives and policies of Chapter E11, as demonstrated in the table below.

Table 7.6. Objectives and Policies of AUP:OP Chapter E11.

Objectives and Policies	Comment
E11.2 Objectives	
Land disturbance is undertaken in a manner that protects the safety of people and avoids, remedies and mitigates adverse effects on the environment.	The objectives of the proposed extraction seek to limit adverse effects on the environment by land disturbance through a range of sediment and erosion controls, and seek to retain all topsoil on site for later use in land rehabilitation.
Sediment generation from land disturbance is minimised.	
Land disturbance is controlled to achieve soil conservation.	

Objectives and Policies	Comment
	These objectives are consistent with those of Chapter E11 of the AUP:OP.
E11.3 Policies	
Manage land disturbance to: ■ retain soil and sediment on the land by the use of best practicable options for sediment and erosion control appropriate to the nature and scale of the activity; ■ manage the amount of land being disturbed at any one time, particularly where the soil type, topography and location is likely to result in increased sediment runoff or discharge; ■ avoid, remedy and mitigate adverse effects on accidentally discovered sensitive material; and ■ maintain the cultural and spiritual values of Mana Whenua in terms of land and water quality, preservation of wāhi tapu, and kaimoana gathering.	The proposal involves the extraction and removal of underlying sand resource. While it is not possible to retain this soil on the land due to the nature of the proposal, all soil and sediment that is not utilised in sand processing will be retained on-site as far as practicable. The amount of area exposed at any one time will be limited. ■ Topsoil and clay above sand resource will be excavated first, stockpiled elsewhere on site, and stabilised for land re-contouring and rehabilitation at the end of the extraction process; ■ Erosion and sediment controls will be in place for the duration of the activity to minimise the potential for off-site sediment discharges; and ■ An Accidental Discovery Protocol will remain in effect throughout the proposal. As the Applicant expects to become a long-term member of the local community, ongoing communication with Mana Whenua will be facilitated, especially where there is the potential for any disturbance to cultural heritage on the site. The proposed management of land disturbance and impacts on cultural heritage are consistent with the objectives and policies of E11.
Manage the impact on Mana Whenua cultural heritage that are discovered undertaking land disturbance by: ■ requiring a protocol for the accidental discovery of kōiwi, archaeology and artefacts of Māori origin; ■ undertaking appropriate actions in accordance with mātauranga and tikanga Māori; and ■ undertaking appropriate measures to avoid adverse effects. Where adverse effects cannot be avoided, effects are remedied or mitigated.	
Design and implement earthworks with recognition of existing environmental site constraints and opportunities, specific engineering requirements, and implementation of integrated water principles.	As discussed in Section 3 and Section 5 of this AEE, sand extraction and earthworks will be undertaken within a managed environment with a range of sediment and erosion controls in place. The extraction staging has been developed to limit effects on slope stability and sediment controls have been selected to minimise sedimentation of downstream environments. The works have been designed to minimise adverse effects on the receiving environment on and land stability.
Require that earthworks are designed and undertaken in a manner that ensures the stability and safety of surrounding land, buildings and structures.	

Objectives and Policies	Comment
Require any land disturbance that will likely result in the discharge of sediment laden water to a surface water body or to coastal water to demonstrate that sediment discharge has been minimised to the extent practicable, having regard to the quality of the environment; with: ■ any significant adverse effects avoided, and other effects avoided, remedied or mitigated, particularly in areas where there is: – high recreational use; – relevant initiatives by Mana Whenua, established under regulations relating to the conservation or management of fisheries, including taiāpure, rāhui or whakatupu areas; – the collection of fish and shellfish for consumption; – maintenance dredging; or – a downstream receiving environment that is sensitive to sediment accumulation; ■ adverse effects avoided as far as practicable within areas identified as sensitive because of their ecological values, including terrestrial, freshwater and coastal ecological values; and ■ the receiving environments ability to assimilate the discharged sediment being taken into account.	All significant adverse effects will be avoided, and minor adverse effects will be mitigated or remedied in accordance with the proposed erosion and sediment controls. The receiving environment of the site has not been identified as sensitive. Please refer Section 5.4 of this AEE and the Erosion and Sediment Control Plan (Appendix 7). The works are therefore consistent with the objectives and policies of E11.

7.6.7 Chapter E12 – Land Disturbance (District)

The objectives and policies of Chapter E12 provide for earthworks on sites where adverse effects to neighbouring sites are minimised with respect to the health and safety of those receivers.

The proposal will result in the excavation and stockpiling of topsoil and clay. Topsoil stockpiles will be re-grassed until they are required for rehabilitation of the excavated area after the completion of the sand extraction in each staged area. Excavated and washed sand will be placed on slabs on flat areas of the site near the wash plant. The excavation has been planned to occur in a manner that will maintain a safe batter slope, to avoid potential land instability on neighbouring lots. The progressive extraction and proposed stabilisation methods seek to further mitigate the potential for adverse effects resulting from the earthworks.

The proposal is consistent with the objectives and policies of Chapter E12, as demonstrated in Table 7.7.

Table 7.7. Objectives and Policies of AUP:OP Chapter E12.

Objectives and Policies	Comment
E12.2 Objectives	
Land disturbance is undertaken in a manner that protects the safety of people and avoids, remedies and mitigates adverse effects on the environment.	The proposed extraction seeks to limit adverse effects on the environment by land disturbance through a range of sediment and erosion controls, and extraction has been planned to be undertaken in a manner that retains a stable slope during and after extraction.

Objectives and Policies	Comment
	These objectives are consistent with those of Chapter E12 of the AUP:OP.
E12.3 Policies	
Avoid where practicable, and otherwise, mitigate, or where appropriate, remedy adverse effects of land disturbance on areas where there are natural and physical resources that have been scheduled in the Plan in relation to natural heritage, Mana Whenua, natural resources, coastal environment, historic heritage and special character.	Land to be disturbed by the proposal has not been scheduled in the AUP:OP for any particular environmental overlays. Regardless, all adverse effects on the environment resulting from the proposed earthworks will be avoided, remedied, or mitigated as far as practicable.
Manage the amount of land being disturbed at any one time, to: ■ avoid, remedy or mitigate adverse construction noise, vibration, odour, dust, lighting and traffic effects; ■ avoid, remedy and mitigate adverse effects on accidentally discovered sensitive material; and ■ maintain the cultural and spiritual values of Mana Whenua in terms of land and water quality, preservation of wāhi tapu, and kaimoana gathering.	The proposal involves the extraction and removal of underlying sand resource in a staged manner and in accordance with a site specific extraction plan that will limit the amount of open excavations to 3ha, but in most occasions, 1ha. Further to this, the site will be subject to a range of erosion and sediment controls. As the Applicant expects to become a long-term member of the local community, ongoing communication with Mana Whenua and neighbours will be facilitated as a matter of course, but especially where there is the potential for any disturbance to cultural heritage on the site. The proposed management of land disturbance and impacts on cultural heritage are consistent with the objectives and policies of E12.
Manage the impact on Mana Whenua cultural heritage that are discovered undertaking land disturbance by: ■ requiring a protocol for the accidental discovery of kōiwi, archaeology and artefacts of Māori origin; ■ undertaking appropriate actions in accordance with mātauranga and tikanga Māori; and ■ undertaking appropriate measures to avoid adverse effects, or where adverse effects cannot be avoided, effects are remedied or mitigated.	
Design and implement earthworks with recognition of existing environmental site constraints and opportunities, specific engineering requirements, and implementation of integrated water principles.	As discussed in Section 3 and Section 5 of this AEE, sand extraction and earthworks will be undertaken within a managed environment with a range of sediment and erosion controls in place. The topography of the site means that no water will flow to adjoining sites and all flows discharge to the Kaipara Harbour. But this will occur only after all water passes through the sediment control pond and/or the revegetated stream margins and the covenanted coastal wetland area. The extraction staging has been developed to limit effects on slope stability and sediment controls have been selected to minimise sedimentation of downstream environments. The works have been designed to minimise adverse effects on the receiving environment and land stability.
Require that earthworks are designed and undertaken in a manner that ensures the stability and safety of surrounding land, buildings and structures.	

7.6.8 Chapter E14 – Air Quality

The objectives and policies of Chapter E14 provide for discharges to air where the Auckland Ambient Air Quality Targets (*Targets*) are met and where adverse effects on human health, property, and the environment are managed.

The proposal could potentially result in the discharge of dust to air from earthworks, extraction, sand processing, and the movement of trucks along gravel roads. These discharges could potentially cause health and nuisance effects on neighbouring receivers. As such, dust generation will be managed to avoid as far as practicable such adverse effects on neighbouring receivers through a range of techniques outlined in the Dust Management Plan (Appendix 10).

The proposal is consistent with the objectives and policies of Chapter E14 as demonstrated below.

Table 7.8. Objectives and Policies of AUP:OP Chapter E14.

Objectives and Policies	Comment
E14.2 Objectives	
Air quality is maintained in those parts of Auckland that have high air quality, and air quality is improved in those parts of Auckland that have low to medium air quality.	The proposal takes place within a rural and coastal environment, where the primary discharges to air consist of dust from rural production activities and traffic along gravel roads. The proposal will involve minor dust discharges to air, but will be managed to meet the Targets and will maintain the existing air quality of the area. It is important to note that this objective requires that the operational requirements of mineral extraction activities are recognised and provided for and therefore a certain amount of air discharge will be acceptable in association with this activity.
Human health, property and the environment are protected from significant adverse effects from the discharge of contaminants to air.	
The operational requirements of light and heavy industry, other location-specific industry, infrastructure, rural activities and mineral extraction activities are recognised and provided for.	
E14.3 Policies	
Manage the discharge of contaminants to air, including by having regard to the Auckland Ambient Air Quality Targets in Table E14.3.1, so that significant effects on human health, including cumulative adverse effects, are avoided, and all other adverse effects are remedied or mitigated.	The proposal will result in the potential for dust generation and emissions, both from extraction activities and from the transport of the sand material by heavy trucks on unsealed roads, but not to the level that this will affect human health or create an environmental effect that is more than minor. A Dust Management Plan (refer Appendix 10) has been developed to provide site specific controls to mitigate the potential to generate dust. Further to this, the Applicant will remain in contact with the community to receive complaints regarding dust effects and design site specific solutions should these be required. As discussed in Section 5.8, adverse effects from the air discharges are anticipated to be less than minor, and levels are not expected to exceed the Targets (set out in Table E14.3.1 of the AUP:OP). No noxious odours or fumes will be generated by the works. Given the mitigation measures proposed and that the operational requirements of mineral extraction activities must be recognised and provided for, a certain amount of air discharge will be acceptable in association with this proposal and the proposal is consistent with the objectives and policies of E14.
In the Rural – Rural Production Zone, Rural – Mixed Rural Zone, Rural – Rural Coastal Zone, Future Urban Zone, Auckland Council District Plan - Hauraki Gulf Islands Rural 1-3 and Landform 1-7: ■ recognise that rural air quality is generally a result of dust and odours, and other emissions generated by rural production activities; ■ avoid, remedy or mitigate adverse effects of dust and odour discharges; ■ provide for minor and localised elevation of dust and odour levels where the air discharge is from: – the operation of infrastructure or location specific industry; or mineral extraction activities;	
Avoid, remedy or mitigate the adverse effects on air quality from discharges of contaminants into air by ■ using the best practicable option for emission control and management practices that are appropriate to the	

Objectives and Policies	Comment
scale of the discharge and potential adverse effects; or – adopting a precautionary approach, where there is uncertainty and a risk of significant adverse effects or irreversible harm to the environment from air discharges.	

7.6.9 Chapter E15 – Vegetation management and biodiversity

The objectives and policies of Chapter E15 provide for appropriate land use and subdivision where ecosystem services and indigenous biological diversity values are maintained, or enhanced where ecological values are degraded.

The proposal will result in the removal of a small area of indigenous rush land and riparian vegetation, but will result in the recreation of a new wetland area of 1.08ha, the protection and enhancement of an existing wetland area on the northern stream of 0.32ha and the restoration of other stream margins totalling 2.19ha. A total of 3.6ha of land will be enhanced with native vegetation and protected. Rehabilitation of large areas of the site in kānuka and mānuka is also proposed. The proposal will also result in the removal of several hectares of invasive vegetation cover. The proposed land rehabilitation plan results in outcomes that will enhance the ecological values within the site, providing an improved habitat for native flora and fauna.

As such, the proposal is consistent with the objectives and policies of Chapter E15.

7.6.10 Chapter E18 – Natural character of the coastal environment

The proposal will take place within a coastal environment, however, it is noted that the natural character of this environment is not identified as being significant or outstanding under the AUP:OP.

Table 7.9. Objectives and Policies of AUP:OP Chapter E18.

Objectives and Policies	Comment
E18.2 Objectives	
The natural characteristics and qualities that contribute to the natural character of the coastal environment are maintained while providing for subdivision, use and development.	The proposal will modify existing landforms by removing two small ridges within the site, but the predominant coastal features, vegetation and ridgelines will remain intact overall. The landscape assessment concludes that the overall coastal character of the area is not adversely affected. The proposal also includes the rehabilitation of the earthworked areas, and will ultimately replace the existing low-value predominantly weed vegetation on site with indigenous species with a greater vegetative cover across the site. Over time, the ecological values will exceed those presently existing on-site.
Where practical the natural character values of the coastal environment are restored or rehabilitated.	
E18.3 Policies	
Manage the effects of subdivision, use and development in the coastal environment to avoid significant adverse effects, and avoid, remedy or mitigate other adverse	The proposed extraction activities and the ancillary activities have been programmed in a manner that will limit the visibility of extraction and excavation from the

Objectives and Policies	Comment
effects, on the characteristics and qualities that contribute to natural character values, taking into account: ■ the location, scale and design of the proposed subdivision, use or development; ■ the extent of anthropogenic changes to landform, vegetation, coastal processes and water movement; ■ the presence or absence of structures, buildings or infrastructure; ■ the temporary or permanent nature of any adverse effects; ■ the physical and visual integrity of the area, and the natural processes of the location; ■ the intactness of any areas of significant vegetation, and vegetative patterns; ■ the physical, visual and experiential values that contribute significantly to the wilderness and scenic values of the area; ■ the integrity of landforms, geological features and associated natural processes, including sensitive landforms such as ridgelines, headlands, peninsulas, cliffs, dunes, wetlands, reefs, freshwater springs, streams, rivers and surf breaks; ■ the natural characteristics and qualities that exist or operate across mean high water spring and land in the coastal environment, including processes of sediment transport, patterns of erosion and deposition, substrate composition and movement of biota, including between marine and freshwater environments; and ■ the functional or operational need for infrastructure to be located in a particular area.	Kaipara Harbour and from neighbouring private properties. The extraction will result in a permanent modification of the existing landforms over time. The changes from a visual amenity perspective will be mitigated through the revegetation of the site as works progress, and through the existing dominant features on-site not being modified. It is proposed to expand the area of land covered with indigenous vegetation, and rehabilitate existing streams on site. The proposed boundary adjustment will have no appreciable effect on existing characteristics and qualities that contribute to natural character values. The proposal will not involve any activities within the Coastal Marine Area, and all coastal processes are anticipated to remain unchanged as a result of the proposal. Given the type of resource to be extracted, it is necessary to operate within the coastal environment. However, given the distance of the works from the Coastal Marine Area, and the sediment control measures and vegetation to be put in place, the works will be managed in a way to minimise the reduction of coastal quality.
Promote land use practices and restoration activities that will restore or rehabilitate natural character values.	The proposed land rehabilitation plan will improve the local ecology of the site and the surrounding area through the creation of new and more extensive habitat, and will establish better ecological linkages through the site, particularly along stream margins. The long term natural character of the site will not be adversely affected as the rehabilitation plan provides measures to recreate a natural-appearing final landscape.

7.6.11 Chapter E19 – Natural features and natural landscapes in the coastal environment

The proposal will take place within a coastal environment; however, it is noted that no natural features or natural landscapes are identified as being significant or outstanding under the AUP:OP.

Table 7.10. Objectives and Policies of AUP:OP Chapter E19.

Objectives and Policies	Comment
E19.2 Objectives	
The characteristics and qualities of natural landscapes and natural features which have particular values, provide a sense of place or identity, or have high amenity value, are maintained while providing for subdivision, use and development in the coastal environment.	The site is located in a broad and expansive coastal environment, but not an environment identified as having any particular value or in the regional planning documents. The visual assessment concludes that the landscape can easily absorb the staged changes proposed. It is therefore appropriate that the regionally important activity of extracting silica sand is able to occur on this site.
E19.3 Policies	
Manage subdivision, use and development in the coastal environment adjoining scheduled outstanding natural landscapes or outstanding natural features to: ■ protect visual and biophysical linkages between the site and outstanding natural landscapes or outstanding natural features; and ■ avoid adverse cumulative effects on the values of outstanding natural landscapes or outstanding natural features.	The site does not adjoin any scheduled outstanding natural landscape or feature, nor any sites or landforms identified as having outstanding or high natural character.
Maintain significant landforms and indigenous vegetation and habitats that are connected to outstanding natural character and high natural character areas.	
Manage the effects of subdivision, use and development in the coastal environment to avoid significant adverse effects, and avoid, remedy or mitigate other adverse effects on the characteristics and qualities of natural landscapes and natural features which have particular values, provide a sense of place or identity, or have high amenity values, taking into account: ■ the location, scale and design of the proposed subdivision, use or development; ■ the extent of anthropogenic changes to landform, vegetation, coastal processes and water movement; ■ the presence or absence of structures, buildings or infrastructure; ■ the temporary or permanent nature of any adverse effects; ■ the physical and visual integrity of the area, and the natural processes of the location; ■ the intactness of any areas of significant vegetation, and vegetative patterns;	The visual assessment, demonstrates that due to the manner in which the activity will be undertaken, the rehabilitation proposed, the limited visibility of the activity from beyond the site, including from the coastal area, and the ability for the landscape to absorb the changes proposed, this policy will not be compromised.

Objectives and Policies	Comment
■ the physical, visual and experiential values that contribute significantly to the wilderness and scenic values of the area; ■ the integrity of landforms, geological features and associated natural processes, including sensitive landforms such as ridgelines, headlands, peninsulas, cliffs, dunes, wetlands, reefs, freshwater springs, streams, rivers and surf breaks; ■ the natural characteristics and qualities that exist or operate across mean high water spring and land in the coastal environment, including processes of sediment transport, patterns of erosion and deposition, substrate composition and movement of biota, including between marine and freshwater environments; and ■ the functional or operational need for infrastructure to be located in a particular area.	

Overall, from the assessments above, the proposal is considered to be consistent with the objectives and policies of both the ARPS and the AUP:OP.

8 Draft Conditions of Consent

The following proposed conditions of consent are put forward as part of the proposal to be applied to the land use consent being applied for to establish and undertake a sand extraction activity at the subject site. It is acknowledged that Council shall apply other standard conditions to the application particularly in relation to the boundary adjustment and earthwork component of the application.

General

- The activities authorised by this consent shall be undertaken in general accordance with the information provided by the consent holder in the application and the supporting documentation. However, where there is any inconsistency between the application documentation and these conditions, the conditions shall prevail.

Upgrades to McLachlan Road

- Prior to the commencement of construction works on 353 McLachlan Road (the Site), detailed engineering design plans that describe the road upgrades proposed to occur on McLachlan Road (generally in accordance with the works described in **Annexure A** to these conditions) (the Upgrade Works) will be submitted for the approval of Auckland Transport. The consent holder will use best endeavours to work with Auckland Transport to undertake as soon as reasonably practicable the Upgrade Works. The Upgrade Works will be undertaken in accordance with Auckland Transport's Code of Practice.
- Until the Upgrade Works on McLachlan Road are completed, a pilot vehicle must precede any truck and trailer unit moving to and from the Site.

Upgrades to SH16 Intersection

- The consent holder will use best endeavours to work with NZ Transport Agency to undertake improvement works to the intersection of SH16 and McLachlan Road. The improvement works are:
  - A left turning bay for north bound traffic on SH16 turning into McLachlan Road; and
  - One-off trimming of vegetation in the SH16 road reserve to improve visibility for vehicles exiting McLachlan Road and travelling south on SH16.

  Prior to the commencement of the extraction activity occurring on site detailed engineering design plans of the improvement works will be provided to the Council for its information and record.

Upgrades to Private Right of Way

- The full length of the Right of Way from McLachlan Road to where it enters the Site shall be upgraded to a 5.5m carriageway width and shall be sealed prior to any excavation of sand commencing from the Site.

Truck speed

- Until such time as McLachlan Road is sealed, all truck and trailer units operated by the consent holder shall travel at no more than 50 km/hr when travelling along any unsealed portions of McLachlan Road.

Hours of operation

- The sand extraction operation, including sand washing, earthworks and transportation of material to and from the Site, shall only operate between the hours of 7.00am and 5.30pm Monday to Saturday. No sand extraction activities may occur on the Site on public holidays.

Indigenous Fauna Mitigation Plans

- Prior to the commencement of sand excavation activities on the Site, the consent holder shall submit an Indigenous Fauna Mitigation Plan **(IFMP)** to **[Role] Auckland Council** for certification. The objective of the IFMP is to avoid and mitigate effects on indigenous bats and lizards and manage pest animal species across the Site. The IFMP shall be prepared by a suitably qualified and experienced ecologist. The IFMP shall include the following:

  - Lizard management:
    - Lizard surveys are to be conducted in the 48 hour period before any vegetation removal, and any lizards present should be relocated to an appropriate alternative habitat by suitably experienced and qualified ecologists;
    - Protocols to be followed in the event of accidental lizard discovery;
  - Long-tailed bat management:
    - Bat surveys are to be conducted prior to the felling of any mature woody vegetation on the Site over 8m in height, and measures shall be employed to minimise roost removal and mortality or injury to long-tailed bats by an appropriately qualified and experienced ecologist; and
    - 15 cavity bearing or large indigenous trees shall be planted around the Site outside of the extraction area. These trees shall be eco-sourced from the local ecological district and comprise of 30% puriri and a mixture of totara, kōwahi, and rimu to provide long-term alternative roosting sites for long tailed bats.
  - Animal pest control:
    - How possums, rats and rabbits will be controlled across the Site, using such methods as, but not limited to, poisoning and trapping. The plan shall detail control methods in the covenanted areas, the restored areas and the areas of the Site that are not being excavated.
  - Roles and responsibilities associated with fauna management of the Site.

- The consent holder shall implement the IFMP for the duration of the consent.

Management of Archaeological sites

- No earthworks will occur within 10m from the edges of the archaeological sites identified as Q10/516 and Q10/526 with the NZ Archaeological Association (NZAA). The 10m buffer shall be marked out and a temporary fence erected.
- Any vegetation clearance and topsoil stripping that occurs within 20m of the archaeological sites identified as NZAA Q10/516 and NZAA Q10/526 shall be monitored by a suitably qualified and experienced archaeologist.
- Prior to the commencement of sand excavation activities on the Site and after the removal of vegetation, the extent of site NZAA Q10/528 shall be investigated through an archaeological survey undertaken by a suitably qualified and experienced archaeologist.
- Prior to the commencement of sand excavation activities on the area shown in Annexure B to these conditions and after the removal of vegetation, an archaeological survey of the south running ridge shown in Annexure B shall be undertaken by a suitably qualified and experienced archaeologist.

- In the event that an archaeological site, koiwi tangata (human remains), a Maori cultural artefact/taonga tuturu, or a protected New Zealand object (as defined in the Protected Objects Act 1975) is uncovered, the consent holder shall cease work immediately within 20m of the discovery and shall secure the area. The consent holder must contact the Council, tangata whenua, Heritage NZ, and NZ Police (if koiwi are discovered) and wait for and enable the site to be inspected by the relevant authority or agency. The consent holder shall not recommence works until all statutory requirements are complied with.

Cultural Values

- Prior to any excavation activities commencing on the Site, the consent holder will invite Tangata Whenua to undertake a karakia or blessing over the Site.
- If accidental discovery protocols are triggered under Condition X, the consent holder will invite Tangata Whenua to undertake karakia and other cultural ceremonies and activities at the discovery site.
- The consent holder will invite Tangata Whenua to provide cultural induction for contractors before they commence work on the Site.
- If a significant accident or other health and safety incident occurs on the Site, the consent holder will invite Tangata Whenua to undertake cultural ceremonies and activities at the accident site.

Staged Five Yearly Ecological Mitigation and Restoration Plan

- Prior to excavation occurring in any of the five year excavation areas identified for the Site, the consent holder shall submit an Ecological Mitigation and Restoration Plan (EMRP) to [Role] Auckland Council for certification. The objective of the EMRP is to avoid, remedy or mitigate any effects arising from the clearance of indigenous vegetation and non-indigenous riparian vegetation, stream modification and sedimentation and instability. The EMRP will be prepared by a suitably qualified and experienced ecologist. The EMRP shall include the following:

    - The proposed areas to be excavated and measures to address work staging and site stability.
    - Riparian restoration and fencing, the number and type of plants to be used in each restoration area covered by the plan, and a five-year plan for the maintenance of each restored area. Indigenous plant material specified shall be sourced from the local ecological district.
    - Any wetland recreation and restoration where applicable. As a minimum, the consent holder will create and/or restore 0.36 ha of wetland and 2.5 ha of indigenous riparian vegetation.

- The EMRP for years 1-5 shall include the restoration and enhancement of the stream margins and wetland on the northern stream on the Site, the southern stream on the Site and the southern tributary stream downstream of the wash plant. It shall also include the cutting in and planting of the new access through the Site and the planting along the northern boundaries of the Site.
- The EMRP for years 6-10 shall include the restoration and enhancement of the stream margins of the middle stream on the Site.
- The consent holder shall implement the relevant EMRPs for the duration of the consent.

Staged Land Rehabilitation Plan

- Prior to excavation occurring in any of the five year excavation areas identified for the Site, the consent holder will submit a Land Rehabilitation Plan to Council for certification. The objective of each Land Rehabilitation Plan is to avoid, remedy and mitigate the visual, natural character and ecological effects of the activity within each area and, in particular, to recreate a natural-appearing final landscape. Each EMRP shall be prepared to demonstrate how the rehabilitation concept and ultimate site development shown in the plan at **Annexure C** to these conditions will be achieved.

- Each Land Rehabilitation Plan shall include at least the following:

    - Finished land contours and levels,
    - Volumes of topsoil to be respread,
    - The nature of the finished vegetation to be established in the area,
    - How any overland flows over this finished area will be directed and managed to remain sediment free for the remaining life of the consent.

- Each Land Rehabilitation Plan must be fully implemented within 24 months of extraction ceasing in the relevant five year excavation area.
- Once the excavation of the area identified to be excavated in years 11-15 has been completed, the Land Rehabilitation Plan submitted to Council shall identify the low point of the land and demonstrate how this low point will be landscaped to form a wetland area of at least 0.36ha in area in accordance with Condition X. The Plan shall include a planting plan which will describe the type, number and spacing of the plants to be established in this area. The plants shall be native wetland species that would naturally occur in wetlands in the area.

Sediment and Erosion Control

- Prior to earthworks commencing on the Site, an Erosion and Sediment Control Plan (ESCP) shall be submitted to Council for certification. The purpose of the ESCP shall be to minimise the potential for sediment generation and sediment yield, and minimise effects on freshwater environments in the vicinity of the Site. The ESCP shall be in general accordance with the design principles set out in the ESCP submitted with the application and Auckland Council's Erosion and Sediment Control Guide for Land Disturbing Activities in the Auckland Region (GD05).
- The consent holder may review and update the ESCP on an annual basis and any changes to the ESCP shall be submitted to Council for certification in accordance with Condition X.
- The consent holder shall implement the ESCP for the duration of the consent.

Dust Management Plan

- Prior to earthworks commencing on the Site, a Dust Management Plan (DMP) shall be submitted to Council for certification. The purpose of the DMP shall be to avoid, remedy or mitigate adverse effects of dust discharges arising from the sand extraction activity. The DMP shall be prepared by a suitably qualified and experienced expert and shall be in general accordance with the Draft DMP submitted with the application. The consent holder shall implement the DMP for the duration of the consent.

Annual Method Statement and Compliance Report

- The consent holder shall submit an Annual Method Statement and Compliance Report to the Consent Manager, Auckland Council for certification on each anniversary of the granting of this consent. Each Report shall detail the following matters:

    - Plans for quarrying over the next 12 months including overburden removal and rehabilitation in accordance with the Staged Land Rehabilitation Plan prepared under Condition X;
    - Details of maintenance activities in respect of erosion and sediment controls structures undertaken in the previous 12 months, and maintenance activities proposed over the next 12 months;
    - Any updates to the ESCP, including calculations to confirm the plan is in accordance with GD05 for all proposed earthworks over the next 12 months;
    - Details of the vegetation clearance plan to be undertaken and confirmation that all vegetation clearance works will be undertaken in accordance with the EMRP prepared under Condition Y.
    - Details of lizard relocation measures undertaken in the previous 12 months, and confirmation of any lizard relocation measures required in the next 12 months in accordance with the IFMP prepared under Condition Z.

- Details of bat management measures undertaken in the previous 12 months, and confirmation of any bat management measures required the next 12 months in in accordance with the IFMP prepared under Condition Z.
- Details of pest management activities undertaken in the previous 12 months, and details of the next 12 months pest management activities in accordance with the IFMP prepared under Condition Z.

Operational Noise

- The noise level from activities within the Site, when measured at the notional boundary of any dwelling within any land zoned Rural – Rural Coastal Zone existing at the time of consent shall not exceed the following limits:

	Noise Limit (dB)	
Time	**L_{Aeq}**	**L_{Amax}**
Monday to Saturday 7am-10pm Sunday 9am-6pm	55	-
All other times	45	75

- Noise levels shall be measured and assessed in accordance with the requirements of New Zealand Standard NZS 6801:2008 “Acoustics – Measurement of Environmental Sound” and New Zealand Standard NZS 6802:2008 “Acoustics - Environmental Noise”.

9 Conclusion

JHNZ proposes to establish an activity to extract high quality silica sand from a site located at 353 McLachlan Road, Kaukapakapa. The sand will be transported to the existing manufacturing plant at Penrose to be made into material utilised in the building construction market. The extraction of the resource is a high priority for the Auckland Region due to the limited availability of the resource and the high need for these particular building products.

The objectives and policies of the AUP:OP identify as a priority providing for mineral extraction activities to support Auckland's continuing development, while requiring those activities avoid, remedy and mitigate significant adverse effects. The ability to extract silica sand from this location for manufacture and use in the Auckland construction market is a more efficient and cost effective way to manufacture these materials than importing the sand from Australia, or having to relocate the manufacturing plant overseas closer to other supplies of the silica sand resource.

The adverse effects of the sand extraction activity, particularly visual and ecological effects, will be less than minor. The site will be rehabilitated in five year stages following the completion of extraction areas in that area. The rehabilitation will include natural land contouring and the establishment of mānuka and kānuka on steeper slopes.

Early in the extraction phases, the margins of the four streams that pass through the site will be planted, protected and enhanced, improving the freshwater ecological connections to the coast. The native rush land area that will be removed, will be replaced with an area more than triple its size in the new lowest area of the site. No plant or animal species that are threatened or endangered will be put at risk by the activity.

JHNZ's proposal also includes upgrade works to McLachlan Road. Until these works are complete, pilot vehicles will precede any truck and trailer units on McLachlan Road going to and from the site. These measures will more than mitigate any adverse effects from trucks on McLachlan Road associated with the proposal.

Dust effects from the extraction activity itself will be negligible due to the large particle size and dampness of the sand resource, the topography of the surrounding landscape, and the proposed mitigation measures. Dust effects generated by 10 truck movements per day on the unsealed part of McLachlan Road will be minimal, particularly given the existing rural road environment.

Overall, this AEE demonstrates that the proposal meets both of the section 104D of the RMA gateway tests, one of which must be passed for non-complying activities to be able to be approved. The proposal is consistent with the objectives and policies of the AUP:OP and with the mitigation proposed, adverse effects on the environment will be less than minor.