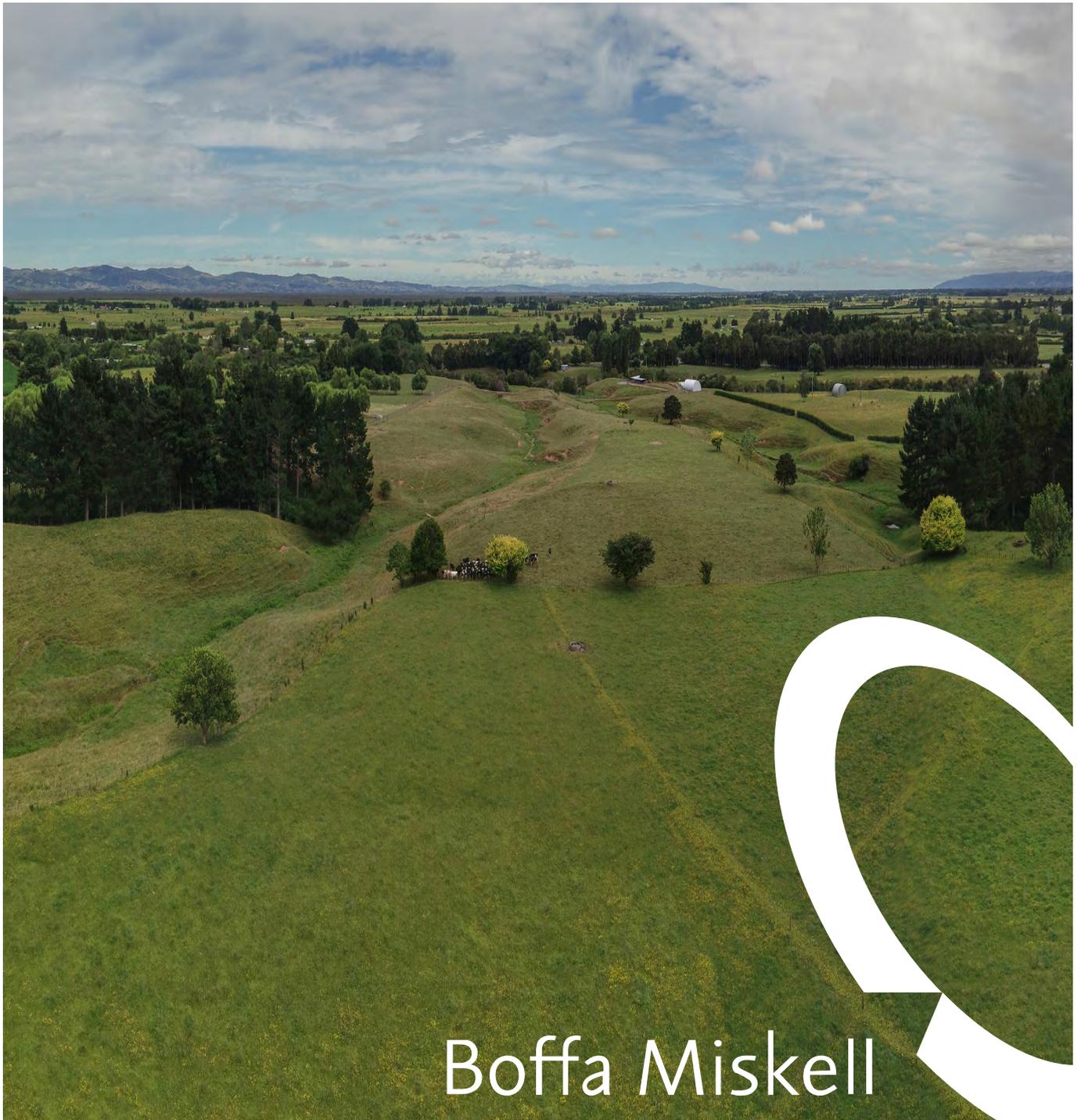


Tirohia Landfill, Phase C

Landscape and Visual Effects Assessment
Prepared for Waste Management NZ Limited

16 June 2020



Boffa Miskell

Document Quality Assurance

Bibliographic reference for citation: Boffa Miskell Limited 2020. <i>Tirohia Landfill, Phase C: Landscape and Visual Effects Assessment</i> . Report prepared by Boffa Miskell Limited for Waste Management NZ Limited.		
Prepared by:	John Goodwin Landscape Architect Partner Boffa Miskell Limited	
Reviewed by:	Thomas Lines Landscape Architect Associate Principal Boffa Miskell Limited	
Status: FINAL	Revision / version: 8 (Rev1)	Issue date: 16 June 2020
Use and Reliance This report has been prepared by Boffa Miskell Limited on the specific instructions of our Client. It is solely for our Client's use for the purpose for which it is intended in accordance with the agreed scope of work. Boffa Miskell does not accept any liability or responsibility in relation to the use of this report contrary to the above, or to any person other than the Client. Any use or reliance by a third party is at that party's own risk. Where information has been supplied by the Client or obtained from other external sources, it has been assumed that it is accurate, without independent verification, unless otherwise indicated. No liability or responsibility is accepted by Boffa Miskell Limited for any errors or omissions to the extent that they arise from inaccurate information provided by the Client or any external source.		

Template revision: 20150331 0000

File ref: A18328_001_LVA_FINAL_V8_Rev_1_20200616 .docx

Cover photograph: Dome Valley Forest, © Jason Mazey, Boffa Miskell, 2019

CONTENTS

Glossary	1
1.0 Introduction	2
2.0 Methodology	2
3.0 Location, Site Description and Context	7
4.0 Statutory Context	8
5.0 The Project	9
Landfill Staging	10
Recommended Avoidance and Mitigation Measures	11
6.0 Visual Catchment and Viewing Audiences	12
7.0 Assessment of Landscape Effects	14
8.0 Visual Effects	16
SH26 South	16
SH26 Central	18
SH26 North	18
Paeroa – Tahuna Road	19
Tukaki Road	19
Awaiti Road	20
Rail Trail Walkway / Cycleway	20
Summary of Visual Amenity Affects	21
9.0 Review of HDP Matters	22
10.0 Conclusion	23

Appendices

Appendix 1: Landscape and Visual Effects Assessment Methodology

Appendix 2: Graphic Supplement

Appendix 3: Landfill Visibility Analysis Table

Appendix 4: Visual Illustrations and Simulations

Glossary

General Terms	Definition
Tirohia Landfill, Phase C	Project name, encompassing the landfill cell itself as well as all ancillary activities.
Waste Management NZ Limited or WMNZ	Company name of applicant.
Tirohia	The site is located at Tirohia.
WMNZ's landholding	The entire WMNZ landholding at Tirohia.
Project site	The areas where works are anticipated associated with the project.
Landfill cell footprint	The area directly impacted by the landfill cell itself within the project site.

1.0 Introduction

- 1.1 This report sets out an assessment of the potential landscape (including any natural character) and visual amenity effects of the proposed landfill cell ('the project') which will be located in the WMNZ landholding ('the landholding') situated at Tirohia in the Hauraki District within the Waikato Region. In November 2018 Boffa Miskell Ltd. ("BML") was engaged by Waste Management NZ Limited ("WMNZ") to undertake some initial landscape and visual analysis at the proposed new landfill cell site prior to undertaking this assessment.
- 1.2 In undertaking this assessment, the author and peer reviewer have visited the landholding and its surrounds (which together are considered the 'receiving environment') to understand its existing condition and its physical and visual relationship to the surrounding environment, as well as the context, character, visual catchment and viewing audiences within the wider area.

2.0 Methodology

Overview

- 2.1 This assessment has been undertaken and peer reviewed by NZILA registered landscape architects with reference to the Quality Planning Landscape Guidance Note¹ and its signposts to examples of best practice, which include:
 - Best Practice Note 10.1, Landscape Assessment and Sustainable Management, New Zealand Institute of Landscape Architects (2010).
 - Guidelines for Landscape and Visual Impact Assessment 3rd Edition, Landscape Institute (UK) and IEMA (2013).
- 2.2 Boffa Miskell has undertaken the following steps in preparing this assessment:
 - Familiarisation of the project and receiving environment;
 - Desktop analysis of the landholding and receiving environment;
 - Two site visits to conduct on-site analysis and drone photography, to verify visual catchment and viewing audience, and to take photos from publicly accessible locations within the receiving environment;
 - Preparation of context plans, site plans, visibility analyses and visual simulations;
 - Survey of existing vegetation within the landholding to ascertain its growth rate and function in screening views of the project site and proposed landfill cell;
 - Assessment of landscape and visual effects.

¹ <http://www.qualityplanning.org.nz/index.php/planning-tools/land/landscape/landscape-assessment>

Familiarisation of the Project and Receiving Environment

Desktop Analysis of the Receiving Environment

2.3 Prior to conducting the assessment, a desktop study was completed which included a review of the relevant information relating to the landscape and visual aspects of the project. This information included:

- A review of the statutory context of the landholding and surrounding area;
- A review of existing landscape assessments undertaken within the receiving environment;
- Preparation and review of base map data (such as contours and aerial photography);
- Review of project drawings prepared by Tonkin & Taylor Limited;
- Review of project visibility through the preparation of Zone of Theoretical Visibility (“ZTV”) analysis.

Review of Statutory Context

2.4 The statutory context of the landholding and its environs was undertaken in preparation for this assessment. This included a review of relevant landscape sections of the Waikato Regional Policy Statement (“WRPS”) and Hauraki District Plan (“HDP”).

Review of Existing Landscape Assessments

2.5 A number of landscape assessments have been undertaken in the area surrounding the site. These include, the Matamata Piako District Preliminary Visual and Landscape Study undertaken in 1992 which is outside the WMNZ landholding but contains a description of much of the receiving environment; the Hauraki District Landscape Assessment (“HDLA”) (September 2006), and the Waikato Regional Landscape Assessment (“WRLA”) prepared in February 2010, both of which include the WMNZ landholding.

2.6 As well as identifying landscape types across the region and districts these assessments have identified Outstanding Natural Features and Landscapes (“ONFL”) and Outstanding Natural Landscapes (“ONL”). The HDLA has also identified District Amenity Areas and the WRLA High Amenity Natural Features and Landscapes. The Hauraki District Amenity Areas have been incorporated in to the HDP but the WRLA High Amenity areas have not been incorporated into the Waikato Regional Plan. To assist in understanding the landholding and surrounding landscape character and values, a review of these has been undertaken, and a summary of the relevant findings from each assessment is provided below.

Waikato Regional Landscape Assessment (2010)

2.7 This assessment identified eight landscape types, two of which contain and surround the site. These are the Hauraki Plains to the north and west of the site and the Eastern Ranges to the east and south which provide a transition to the more prominent Kaimai Ranges beyond.

2.8 The assessment also identified ten ONFL’s and fifteen High Value Amenity Natural Features and Landscapes. There are no features identified on or adjacent to the landholding, with the nearest being the Kaimai Range ONFL to the east of the existing landfill site both approximately 4 kms away, as depicted on **Figure 1 in Appendix 2**.

Hauraki District Landscape Assessment (2006)

- 2.9 The landholding is located within the southern part of Landscape Unit 5 (Foothills of the Coromandel Range) with no identified ONL's or other areas of landscape value identified in the Hauraki District Plan. As a result of this assessment there is a district ONL and a District Amenity Landscape both of which are located approximately 4kms east of the landfill cell site; and another District Amenity Area approximately 14km west of the landfill cell site beyond SH27.

Matamata Piako District Preliminary Visual and Landscape Study (1992)

- 2.10 As outlined above this assessment covers land to the southwest of the site which includes a large part of the project receiving environment. This area has been identified as Intensively Farmed Plains (to the southwest) and Kopuatai Peat Dome Hauraki Plains (to the west). None of the characteristics assigned to these areas have been identified as ONFL's or other high value landscapes in the Matamata Piako District Plan ("MPDP").

Review of Project Drawings

- 2.11 Project drawings have been included as part of the AEE. The drawing sets that are most relevant to the landscape and visual aspects of the project are located in **Volume 3 - drawings** and should be referred to and reviewed alongside this assessment. Drawings relevant to this assessment are contained and attached in **Appendix 2**.

Preparation of a Zone of Theoretical Visibility Analysis

- 2.12 To determine the potential visual catchment and viewing audiences of the Project, a Zone of Theoretical Visibility Analysis (ZTV) was undertaken (. The ZTV analysis was generated by using a 3D landform model of the project², and utilising 76 elevation points to determine the extent of visibility. In determining the extent of visibility, the base model includes existing above ground data such as vegetation and structures within the site and surrounding area based on 2007 LIDAR information.
- 2.13 The resulting zone of visibility is shown across a colour band, with green illustrating a small number of points being visible, and pink illustrating a large number of points being visible. These areas of visibility are seen together with distance bands which have been offset from the outer edge of the landfill cell.

On-Site Analysis of the Receiving Environment

- 2.14 Following the desktop study, in order to further understand both the landholding, the surrounding context and the extent of visibility, an initial site visit was undertaken on 16 January 2019. This focused on gaining an understanding of the physical impact the project would have on the landscape within the WMNZ landholdings, and the confirmation of the potential viewing audiences. The site visit also included visiting key publicly accessible off site areas to the west, north and east, to select representative viewpoints and take photographs. A list of these viewpoints is detailed in **Section 6** of this report. Photographs have been taken from publicly accessible land only, such as public roads and the Hauraki Rail Trail walkway / cycleway and illustrate the existing condition of the landholding and its surrounding context. A second site visit took place on 11 June 2019 to review the existing height of vegetation on the site in order to predict conservative growth rates between 2007 (when the LIDAR data was generated) and 2019.

² Provided by Tonkin & Taylor

Visual Analysis and Visual Simulations

- 2.15 The Landfill Visibility Analysis (Appendix 3) and the Visual Illustrations and Simulations (Appendix 4) have been prepared to provide a greater understanding of the project, its extent of visibility within the visual catchment, and predicted visual effects at various stages / time periods over the life of the project. The visual simulations have been prepared in accordance with the NZILA Best Practice Guideline for Visual Simulations³. To provide an accurate understanding of the project, the visual simulations depict the project at a range of moments in time, throughout the operating life of the landfill cell. Two approaches for this have been undertaken in order to understand the visibility of the project.
- 2.16 Eight viewpoint photographs have been selected to illustrate the change to the view and potential visual effects of the project. From each viewpoint the various stages of the project have been depicted on a photograph using a different colour for each stage of the landfill cell representing key points in time. The associated height and duration of operation at each stage is as follows:
- Stage 1 – up to RL40m (Year 1-2);
 - Stage 2 – up to RL50m (Year 3-4);
 - Stage 3A – up to RL50m (Year 5-6);
 - Stage 3B - up to RL60m (Year 7-8);
 - Stage 4 – up to RL78 - the maximum height of the landfill cell (Year 9-10.5);
 - Completed landfill cell – up to RL78m with cap and cover soil (Year 11 onwards).
- For each of these viewpoints, on the same image that the landfill cell stages are shown, the height of the proposed mitigation planting (where visible) has also been depicted at 3 heights associated with the above stages. These heights (as outlined below) assume planting of fast-growing species, such as eucalyptus, acacia melanoxylon, and/or poplar in 2020 with the landfill cell operation beginning in 2025. The heights at various stages are as follows:
 - 5-7m high – Stage1;
 - 10-12m high – Stage 2;
 - 13-15m high - Stage 3B, Stage 4 and Completed landfill cell.
 - In addition, from each of the eight viewpoints, various stages of the landfill cell (depending on the visibility from each viewpoint) and the final completed landfill cell following capping and grassing has been depicted and rendered in a single frame view.

Assessment of Effects

- 2.17 The Boffa Miskell methodology used for Landscape and Visual Assessments is attached in **Appendix 1** of this report. In summary, the assessment of the significance of effects identified within this assessment is based upon a seven-point scale which includes very low; low; moderate-low; moderate; moderate-high; high; and very high ratings.
- 2.18 Landscape and visual effects result from natural or induced change in the components, character or quality of a landscape. Usually these are the result of landform or vegetation modification or the introduction of new structures, activities or facilities into

³ http://www.nzila.co.nz/media/53263/vissim_bpg102_lowfinal.pdf

the landscape. The process of change itself, i.e. the construction process and/or activities associated with the project, also carries its own visual impacts distinct from those generated by a completed project.

- 2.19 The type of natural character, landscape and visual effects generated by any particular project can therefore be:
- positive (beneficial), contributing to the visual character and quality of the environment;
 - negative (adverse), detracting from existing character and quality of environment; or
 - neutral (benign), with essentially no effect on existing character or quality of environment.
- 2.20 The degree to which natural character, landscape and visual effects are generated by a project depends on a number of factors. These include:
- The degree to which the project contrasts, or is consistent, with the qualities of the surrounding landscape;
 - The proportion of the project that is visible, determined by the observer's position relative to the object viewed;
 - The distance, foreground and background context within which the project is viewed;
 - The area or extent of visual catchment from which the project is visible;
 - The number of viewers, their location and situation (static or moving) in relation to the view;
 - The predictable and likely known future character of the locality; and
 - The quality of the resultant landscape, its aesthetic values and contribution to the wider landscape character of the area.
- 2.21 Change in a landscape does not, of itself, necessarily constitute an adverse landscape or visual effect. Landscape is dynamic and is constantly changing over time in both subtle and more dramatic transformational ways. These changes are both natural and human induced. What is important in managing landscape change is that adverse effects are avoided or sufficiently mitigated to ameliorate the effects of the change in land use.
- 2.22 The effects covered in this assessment include:
- Physical effects derived from changes to the landscape elements within the project site, and resultant changes to the landscape character (including natural character) of the site in relation to the wider landscape context.
 - Visual effects resulting from the physical changes that arise in the composition of available views, and how these affect the overall visual amenity;
- 2.23 The main elements of the project that could give rise to landscape and visual effects are:
- The new landfill cell and the method in which it will be constructed over its estimated 10.5 year duration. This is in relation to the main viewing audiences and the way in which the expanding landform element would be seen within the local and wider landscape context;
 - The temporary topsoil and clay stripping landform which is to be placed adjacent to the western boundary of the site for the duration of the filling and then used as final cover;

- The location, nature and extent of the stockpile areas, in addition to the staged timing of these and their degree of visibility;
 - Physical changes to watercourses, wetlands and landform beyond the landfill cell footprint; and
 - The location and extent of existing vegetation (to be retained and removed) and proposed new vegetation.
- 2.24 To determine the level of landscape and visual effects, both the sensitivity of the landscape or viewing audience and magnitude of change resulting from a proposed development are considered. The sensitivities of the viewing audiences to visual change vary, however residential and recreational viewing audiences are generally considered to be more sensitive to change, while travelling and working viewing audiences are less sensitive.
- 2.25 For each of the effects, a level of effect rating has been given. This rating is based upon the assumption that all mitigation measures proposed in **Section 5** of this report have been fully adopted as part of the project.
- 2.26 The Project site adjoins two private properties – one to the west and the other to the east, and residents in those properties that are likely to be affected have been assessed (along with others in the area) based on a survey from within the site and the nearest publicly accessible location, and with reference to the desktop analysis methods as outlined earlier in this report.

3.0 Location, Site Description and Context

Refer Appendix 2, Figures 1 to 6 for relevant plans associated with this section of the report.

- 3.1 The WMNZ landholding is 184ha of mixed-use land located to the east of State Highway 26 (SH 26) at Tirohia, which is a small settlement approximately 6 km south of Paeroa and 13 km north of Te Aroha. The landholding extends from SH 26 east to include two landscape character areas:
- i. an area of low-lying flat land which is part of a wider landscape type that extends across the Hauraki Plains to the west; and
 - ii. an area of elevated foothill country (up to 200m above sea level (a.s.l.) that connects with the Kaimai Ranges to the east.
- 3.2 The low-lying land is largely in pasture with groups of exotic pine trees and other shelter belt vegetation typical of Waikato farmland. Part of this area is also used for ancillary activities, such as, composting / stormwater ponds / workshops, stockpile area, Renewable Energy Centre, and site access road, associated with the existing landfill which is located within a former quarry within the foothills to the east. Also, within this area is a privately owned, small parcel of land (approximately 1.4ha) that is located south of the gravel yard and northwest of the compost area as depicted on the **Figure 4 in Appendix 2**.
- 3.3 The lower farmland area also contains a number of unfenced and degraded watercourses, including the Owihakatina Stream, which drains water from the hill country through the property connecting to the Waihou River. As these watercourses on the site are grazed by cattle and contain only limited riparian vegetation their existing natural character values are very low. The Waihou River extends north through the Hauraki Plains to the Firth of Thames.

- 3.4 The hill country and the existing landfill is surrounded by a pine plantation and areas of regenerating native vegetation both within the site and in the foothills further to the southeast. The site of the proposed landfill cell is at the base (western edge) of the hill country located on gently sloping land that transitions to the flatter part of the low lying farmland which extends to SH 26. Beyond the foothills to the east and forming a backdrop to views is the Kaimai Ranges, which in some views includes Te Aroha.
- 3.5 Within the foothills area of the WMNZ property is the existing Tirohia Landfill, located in a previously worked out quarry. This contains a number of remnant benches and faces from the former quarry as well as the ongoing operation of the landfill which includes haul roads, a distinctive blue liner, landfill material, as well as daily and permanent cover. The existing landfill and quarry remains are a distinctive visual element in views from the west of the property.
- 3.6 The site is generally surrounded by farming and forestry land use similar to those occurring with the WMNZ property, with pastoral farming/maize cropping on the low lying land to the north, south and west; and grazing, forestry and native vegetation to the east. The low-lying land also contains a large number of watercourses which include a large area of uninhabited wetland between Awaiti Road and SH 27 to the west. The wetland area has high ecological and landscape values and has protection status in both the regional and district plans.
- 3.7 Adjacent to the north-western corner of the WMNZ property near the entrance to the landfill site is the Tirohia Primary School, and to the west across SH 26 on Tukaki Road is a local marae (Tirohia Komiti Marae) which is zoned for Marae Development in the HDP. Also, adjacent and nearby to the WMNZ property, are two Urupa as depicted on **Figure 4 in Appendix 2**.
- 3.8 Apart from a few small landholdings around Tukaki Road the balance of the farmland surrounding the property is generally relatively large holdings typical of dairy farm units.

4.0 Statutory Context

- 4.1 The site and majority of land surrounding the site is zoned 'Rural' in the Hauraki HDP and the MPDP. These rural zones are almost exclusively farming areas and most of the land in the Rural Zone is in pasture or under cultivation for crops such as maize. The Rural Zone is of a generally open character, with buildings mainly limited to dwellings and farm buildings directly associated with rural production activities. There are no ONL's or high value amenity landscapes in the vicinity of the WMNZ landholding that could be affected by the Tirohia Landfill, Phase C project.
- 4.2 The site is subject to a 'Quarry Resource Area' overlay and a 'Quarry Reverse Sensitivity Area' overlay which prevents any lifestyle lots being located within these areas.
- 4.3 The development of a new landfill cell within the Rural Zone requires consent from HDC as a discretionary activity. As part of its consideration, with regards to landscape and visual effects, Council will have regard to the following:⁴
- The degree to which buildings, other structures and activities will adversely affect the rural landscape characteristics, particularly in relation to the open rural character.

⁴ Under the Hauraki District Plan as part of its consideration the Council is required to have regard to the General Activity Assessment Criteria at 5.1.7.1.

- Whether features of the proposal including the location, design, and colour of buildings and structures, the planting of trees and shrubs, and the shaping of earth avoid, remedy or mitigate any adverse effect on the existing landscape.
- The extent to which existing native bush, or other vegetation which contributes to visual amenity and / or biodiversity values (as assessed against the criteria in 6.2.5.8), is retained and the reasons why any clearance is proposed.
- Whether any exploration, mining, earthworks and/or tracks and driveways necessary to accommodate the activity would create a significant adverse visual impact, particularly in an Outstanding Natural Landscape Area and/or District Amenity Landscape Area.
- The extent to which exterior storage areas of vehicles, equipment, machinery, materials, waste etc. is located, or suitably screened from neighbouring properties and any public road or place, to avoid, remedy or mitigate any detriment to amenity.
- Whether the activity and any buildings and structures are of a scale and intensity which are in keeping with the character and amenity values of the existing rural environment.

4.4 These matters are discussed in **Section 9.0** below.

5.0 The Project

- 5.1 A full description of the project is provided in the AEE, however in summary, the project comprises the construction of a 3 million cubic metre landfill to provide for the disposal of municipal solid waste for a period of approximately 10.5 years. The development of a landfill is essentially a construction project, with operating hours of 7am – 5pm Monday to Friday and 7am – 1pm Saturdays. Daily cover will be placed at the end of each day and stripped back every morning to expose the working face of the landfill cell. During the life of the project it is anticipated that earthworks and landfill operations machinery such as trucks, diggers and bulldozers will be present within the project footprint.
- 5.2 The landfill cell will be developed in phases, with one phase being filled with waste while the next phase is being prepared. The activities of the project fall into three general categories:
- Initial construction activities.
 - Ongoing operational and phase development activities.
 - Closure and aftercare activities.

Initial Construction Activities

- 5.3 Initial construction activities occur prior to the landfill cell accepting its first waste. Initial construction activities may be undertaken over a period of one or more construction seasons prior to the landfill accepting waste, with a construction season generally being defined as the period from October one year to May the following year.
- 5.4 Initial construction activities will include:
- Diversion of existing watercourses and the construction of permanent site stormwater controls downstream of the landfill cell and any other stormwater controls required for initial earthworks (e.g. at stockpile areas).

- Construction of the main site access road and the borrow access road to the stockpile areas.
- Formation of base grades for Stage 1 of the landfill cell, construction of the toe bund, low permeability liner system and leachate collection system.
- Formation of the Western Bund, Stockpile 1 and Topsoil Stockpile.

Ongoing Operational and Phase Development Activities

5.5 During the operational period, construction activities will be undertaken as required to develop each landfill stage so that it is ready to accept waste when required. Wherever possible, soils required for operation of a stage will be taken from the footprint of the next or subsequent stages to minimise earthworks movements and the need for further stockpiling of soils.

5.6 Ongoing operational and phase development activities include:

- Waste filling.
- Placement of daily cover and intermediate cover as required. This may also include stockpiling soils close to where they may be required.
- Formation of Stockpile 2 and the continued filling of Stockpile 1 and Topsoil Stockpile.
- Stormwater management and maintenance works.
- Construction of the next landfill phase (detailed under a separate heading below), and other required construction work.
- Subsequent removal of stockpiles to achieve capping.
- A landfill gas (“**LFG**”) management system will be installed progressively as the landfill cell is developed, to be connected to the existing energy centre where the LFG will be utilised to generate electricity or burnt off in a flare. Visible emissions from LFG flares are very rare (water vapour, light, steam or smoke). It is anticipated that only a shimmer (heat haze) may be visible within the WMNZ landholding.

Closure and Aftercare Activities

5.7 Closure activities include, placing the final capping layer on completion (it is intended that the remainder of the material in the stockpiles will be used for this purpose), establishing any final landscaping, and removing or modifying facilities and infrastructure during the aftercare period.

5.8 Aftercare activities include maintenance of the cap and stormwater systems, management and maintenance of the leachate and landfill gas management systems and ongoing site and environmental monitoring (including vegetation maintenance where required).

Landfill Staging

5.9 A conceptual plan has been prepared to show the expected staging of the development of the landfill cell. This is shown in the project drawings in Volume 3. Technical Report C (Engineering Report) provides some supporting commentary on the landfill cell staging and is summarised below:

- **Stage 1:** Excavation of the northwest portion of the basegrade and construction of the toe bund. Waste filling to progress from the northern edge, adjacent to the access road, towards the south-western side of the stage;
- **Stage 2:** Excavation and filling the southern half of the remaining basegrade floor and sidewall up to the bench. Waste filling of this stage will help create a visual screen for Stage 3;
- **Stage 3:** Located to the north of Stage 2, this stage will complete construction of the floor of the landfill and sidewall up to the bench. Stage 3A is the fill required to reach the same elevation as Stage 2. Stage 3B is filling placed on top of both Stages 2 and 3A to raise the waste level above the height of the mid-sidewall bench. This will occur prior to construction of Stage 4. An alternative access route via the north-eastern corner of the landfill cell may need to be developed during Stage 3
- **Stage 4:** Filling of the basegrade side wall above the bench to complete the landfill cell footprint. This could be constructed over two seasons but is more likely to be constructed all at once. Development of this stage will allow waste filling to continue on top of Stage 3B as well as on the Stage 4 area up to final cap level.
- **Completed Landfill Cell:** The final capping system will be constructed progressively once filling in any area has been brought up to final level. It is intended that the landfill cell cap will be established with grass and / or shallow rooting vegetation.

Recommended Avoidance and Mitigation Measures

5.10 Following review of the project and the anticipated change to the receiving environment, there are a number of measures which have been recommended to mitigate the landscape and visual effects, both during operation and post closure when the landfill cell is complete. These measures have been incorporated as part of the proposal and have been considered when assessing the potential landscape and visual effects resulting from the Tirohia Landfill, Phase C project.

- Retention of as many of the existing pine trees as practicable within each of the two clusters to the north and west of the toe of the landfill footprint as depicted in **Figures 4 and 5 in Appendix 2** as these trees provide a vegetative context and some screening from more distant views to west and north west of the site.
- Retention of existing trees along the western boundary of the project site and planting of additional trees to provide screening from the southwest as depicted on **Figure 6 in Appendix 2**. An 8m wide planting strip is to be fenced and planted with a mix of fast growing tree species such as Eucalyptus, Acacia melanoxylon (Australian Blackwood) and Poplar to achieve optimum screening.
- Planting fast growing native trees in an 8m wide strip along the western and southern boundary of the property (in the finger of land) to the southwest of the project site i.e. adjacent to SH26, as depicted in **Figure 6 in Appendix 2**. This is to provide screening of the landfill cell for travellers heading in a northerly direction on SH26; and for residents in two dwellings at 6119 SH26
- Planting of trees adjacent to the front entrance of the farm access to screen views through a gap in the existing vegetation.
- Planting on top of the western bund to enhance the screening potential of this landform element.

- Retention of all other existing trees above 8m in height within the low land area of the WMNZ landholding to maintain and enhance the potential screening provided by the existing vegetation on site.
 - Native revegetation of the (up to) 15m high cut batter slope where the landfill cell joins the hill slope to the southwest to mitigate adverse landscape and visual effects of this landform modification.
 - Native revegetation of the margins of the stream diversions, the balance of these watercourses, within the site to mitigate the landscape effects of these modifications and in time enhance landscape character.
 - Establishment of grass or shallow rooting vegetation on the landfill's final cap to integrate its appearance with the existing spurs within and adjacent to the site which extend from the foothills to the low lying farmland.
 - Lighting will consist of existing lights used around the entry and along the accessway and moveable lights on the landfill cell if required. These will be down facing to minimise glare, light spill and skyglow to meet the permitted standards of the zone.
- 5.11 Technical Report G covers the proposed ecological mitigation planting in more detail. This planting will augment the proposed screen and amenity planting outlined above and in the long term enhance the landscape character of the site.

6.0 Visual Catchment and Viewing Audiences

- 6.1 **Figure 7 in Appendix 2** contains a visibility analysis of the proposed landfill cell. This is based on the extent of visibility of 76 points placed at various locations and elevations on the top of the proposed landfill landform.
- 6.2 Due to the topography of the site relative to the balance of the WMNZ landholding there would be almost no visibility from locations to the east due to the elevated topography and associated vegetation. Visibility is therefore largely restricted to an approximate 180° area from the north, the west, and around to the south-west. From locations beyond the site, visibility of the majority of the landfill cell would be obscured to a large extent by existing vegetation within the WMNZ property and surrounding landscape, particularly from the majority of nearby viewing locations within 500-1,000m of the landfill cell where there is a cluster of smaller size landholdings with attendant dwellings. Beyond 1,000m and out to 4 km the extent of visibility increases as the landscape is more open (i.e. there are fewer trees obscuring views towards the site) with larger landholdings and fewer dwellings.
- 6.3 In addition to the coloured visibility analysis, **Appendix 3** contains a plan depicted the location of drone photography relative to the viewpoint simulations, and photographs oriented towards the viewing audience at various heights above the landfill site to represent the height of the landfill cell at various stages. These are RL20 (during Stage 1 filling) RL40 (at the completion of Stage 1) and RL55 (at the completion of Stage 3B). Also, within **Appendix 3** is a visibility analysis at RL50 towards the end of stage 3B (**Figure 5**) and a table which identifies dwellings within an approximate 3-4 km radius from where there would be the potential to view the landfill cell. Due to the location of points at a higher elevation the majority of these would currently been seen from locations further to the west, reinforcing the conclusion that from these more distant locations views of the landfill would be greater than from closer locations.

- 6.4 In order to more accurately determine the predicted visibility, we have undertaken a detailed analysis of the existing vegetation around each dwelling and the likely extent of visibility of the proposed landfill cell. As outlined in the table in **Appendix 3 (Figure 7)** the potential level of visibility from each of the 62 houses and associated properties identified in the visual catchment has been assessed. The visibility of the landfill cell has been determined by the number of points visible with Low visibility being 1-24 points, Moderate visibility being 25-50 points, and High visibility being 51-76 points.
- 6.5 Based on this analysis and as outlined in the summary table, visibility of the landfill cell from the majority of dwellings is nil or low, with there being moderate visibility from 4 dwellings (between 1.2 and 3.8 km away) and high visibility from 1 dwelling (3.7 km away from the landfill cell). This reinforces the results of the coloured visibility figure as described above. It can be assumed that the lower levels of the landfill cell would also be less visible, and that visibility becomes more extensive as construction reaches the higher elevation and later stages. In addition, the landfill cell would be visible from the privately owned property within the site, although this does not contain a dwelling and does not form part of the viewing audience for this assessment.
- 6.6 In addition to the above analysis from private properties, site survey from public roads has reinforced the above understanding of the extent of visibility, and photographs from SH 26, Paeroa – Tahuna Road, Awaiti Road and Tukaki Road have verified the desktop analysis. From 8 locations on these public roads, photographs have been used to show the extent of visibility of the various stages of the landfill cell. A summary of this is outlined in the table below:

Table 1: Assessment Viewpoints and Visibility of Landfill Stages

VP No	Location	Distance from landfill cell footprint (approx.)	Direction of View	Reason for selection	Stage 1 Visibility	Stage 2 Visibility	Stage 3B Visibility	Stage 4 and Final Landform Visibility
1	SH 26 – Opposite No. 6199	750m	North-East	Only area with a clear view of landfill cell footprint when travelling north on SH26; representative of views from 3 nearby dwellings.	Western bund and mitigation screen planting only	No	Yes	Yes
2	SH 26 – Opposite No. 6306	500m	South-East	Glimpse view opposite site and entrance to farm-house within property.	Mitigation screen planting only	No	No	No
3	SH 26 – Opposite No. 6433	1450m	South	Only area with a view of upper part of landfill cell footprint on SH26 travelling south.	No	No	Yes	Yes
4	Paeroa – Tahuna Road – Opposite No. 1596	1450m	East	Clear front-on view of upper part of landfill footprint from Paeroa-Tahuna Road approaching SH26 intersection.	Western bund and mitigation screen planting only	No	Yes	Yes
5	Tukaki Road – Outside Marae land	1000m	East	Largely obscured but views of Stage 4 landfill activities from outside Marae land; may be representative of views from Marae land.	Upper part of western screen planting only	No	Yes ⁵	Yes
6	Tukaki Road – Opposite No. 41	850m	East	Largely obscured but potential for views of Stage 4 landfill activities driving towards SH26; representative of view from adjacent dwelling.	Upper part of western screen planting only	No	No	Yes ⁶
7	Awaiti Road – Opposite No. 1014	2200m	East	More distant view of landfill footprint from Hauraki Plains driving towards Tirohia; representative of view from adjacent dwelling.	Yes – limited to northern end of landfill, western bund and mitigation screen planting.	Yes	Yes	Yes
8	Hauraki Rail Trail	1250m	South-East	View representing recreational cyclists and walkers using rail trail.	No	No	Yes	Yes

7.0 Assessment of Landscape Effects

7.1 As outlined in **Section 2.0** of this assessment report, landscape effects are generated by changes to the physical elements within the project site and changes to the landscape character of the site and wider area, as a result of the proposed landfill cell. This includes changes to landform, hydrology, vegetation and the land use of the site, and may be generated by the landfill cell itself, stormwater management devices, stockpiles, access roads and planting. These elements are depicted in **Figure 4 and 6 in Appendix 2**.

⁵ Views of Stage 3B would be limited to a small gap in existing vegetation

⁶ Views of Stage 4 and final landform limited to small gaps in existing vegetation

- 7.2 The landfill cell is located to the north-west of the foothills on the site connecting to the existing landform at approximately RL 85m. This will create a new landform element that will 'read' in the landscape as a broadly rounded spur.
- 7.3 The landfill cell footprint covers an area of approximately 17.5ha and will require the diversion of existing degraded watercourses (Southern Diversion and Northern Diversion) within the footprint area. These will be diverted to the outer perimeter of the landfill cell to connect with the existing watercourses further downstream. The margins of these new watercourses will be revegetated with NZ native plant species and fenced to protect from stock grazing and to maintain / enhance ecological values and for amenity / aesthetic purposes.
- 7.4 Prior to landfilling, the topsoil and subsoil will be stripped and used to create a temporary landform bund and topsoil stockpile along the western boundary of the site. This bund and stockpile will provide soil for the final cover once the landfill cell is completed to its final contour and form. The bund will extend up to RL40m and will be grassed and planted with quick growing species to augment the screen planting within an 8m strip along the western boundary. Two other temporary stockpiles will be created on existing level areas within the project site. Stockpile 1 is to be located at the northern end of the topsoil stockpile up to a maximum RL25m and Stockpile 2 is to be located north of the Northern Stream Diversion at a maximum RL31m. Both stockpiles are up to approximately 8m above existing GL.
- 7.5 In addition to the above elements there will be a stormwater pond and potentially wetlands located to the north-west of the landfill cell to manage water run-off from the landfill and surrounding land. Two accessways to the landfill will be provided from the existing hard stand / compost area to the north-east – one to the lower northern part of the fill area and the other to the more elevated southern part.
- 7.6 These elements will create changes to much of the lower lying land currently used for farming purposes.
- 7.7 Once the landfill cell is completed the landform bund and stockpiles will be removed while the stormwater pond and wetlands will continue to provide management of run-off from the landfill cell surface. The landfill cell will be capped and grassed returning the landform to a similar surface character to the existing farmland.
- 7.8 Based on the above changes the key landscape effects are:
- i. the change to the landform character of part of the site;
 - ii. alteration to the location of watercourses in the upper part of the low lying area of the site;
 - iii. removal of a few isolated farm trees and an area of pine forest at the bottom of the foothills;
 - iv. revegetation of watercourse riparian margins with native plant species.
 - v. revegetation of cut slopes and batters associated with the landfill cell tie-in with the foothills; and
 - vi. planting of exotic amenity trees to provide additional screening of landfill activities from off-site locations and to provide long term shelter to the farm.
- 7.9 Based on the above changes it is considered that the adverse effects on the landscape elements and character of the landfill cell site and immediately surrounding farmland during the construction and 10.5 year filling period would be **moderate**. This is primarily due to the modification to the natural landform and the contrasting non- rural construction activities associated with the landfill activity across the majority of the area currently characterised by pastoral farming. However, following removal of the temporary stockpiles and restoration of these areas to pasture, the completion of the

landfill capping and grassing, along with the retention of the riparian and other amenity planting, the adverse landscape effects are considered to be **very low**. This is due to the ability to return the land to pastoral farming with an improved vegetative character and an additional landform feature that would be generally in keeping with the surrounding spurs along this part of the foothills.

- 7.10 In relation to the effects on the landscape character of the wider area it is considered that once the final landform is grassed and established it will be seen as a logical extension to the foothills, much like the existing spurs which are clearly visible from the west and part of the character of this transitional landscape between the Kaimai Ranges and the Hauraki Plains. **Figure 8 in Appendix 2** is an elevation plan which depicts the final landform in relation to the surrounding foothills and low-lying farmland. The long term effects on landscape character are therefore assessed as being **neutral**.

8.0 Visual Effects

Refer Appendix 4, Drawings VS1.1 VS8.4 for relevant images and simulations associated with this section of the report

- 8.1 This section of the assessment considers the anticipated effects on visual amenity. To understand the visual amenity effects throughout the life of the project, these effects are considered from a number of off-site viewpoints during the 4 main landfill cell stages as outlined below. It is considered that these stages represent the key visual changes anticipated throughout the duration of the project. These effects are assessed based on the assumption that the mitigation measures outlined above have been successfully implemented and maintained.
- 8.2 As outlined above in **Section 2.16** of this assessment report, the visual effects have been assessed from 8 viewpoints for each of the 4 landfill cell stages (Stage 1, Stage 2, Stage 3B, Stage 4), and the Final Completed Landfill Cell.

SH26 South

Refer Viewpoint 1 for representative view

- 8.3 This viewpoint is representative of views from an approximate 500m length of SH 26 when travelling in a northerly direction towards Paeroa, as well as views from three dwellings and driveways / roadside frontages on the western side of the road looking east.
- 8.4 For drivers the view is an oblique / transitory / fleeting one while for residents it is a more static or focused view as residents look northeast from their dwellings or exit their property onto SH 26. As such, the level of effects is considered to be different for these two audiences.
- 8.5 The existing view is across farmland which includes pastoral grassing and maize crops. Roadside power poles and some trees within adjoining farmland provides some screening and context of the rural character. Much of the proposed landfill cell site is obscured by vegetation along the western boundary apart from the upper slopes of the site which are in pine forest. The existing landfill and quarry benches and slopes are visible beyond and at a higher elevation than the proposed landfill cell site and form a recognisable element in these views. The character of these quarried benches and soil coloured elements contrast with the darker colour of the pine and native regenerating vegetation.

- 8.6 Once the existing landfill is completed, the existing background of this will change as depicted in the visual simulations in **Drawing VS1.2 - 1.4 in Appendix 4.**

Stage 1

- 8.7 As depicted in **Drawing VS1.1** the planting along the western boundary of the project site and in the immediate foreground adjacent to SH26 will be visible prior to any other activity occurring on the site as it is scheduled to be implemented in 2020. Once construction begins, parts of the western bund would be visible between existing vegetation and above the proposed boundary planting. Following this, the Stage 1 landfill activities would be screened by these landform and vegetative elements and would not be visible from VP1 and locations in this vicinity.
- 8.8 Based on this sequence of activities, it is considered the adverse visual effects during this stage would be **very low**.

Stage 2

- 8.9 Due to the foreground screen planting Stage 2 of the landfill cell would be obscured from this view, as depicted in **Drawing VS1.1**. From the property immediately to the north (6221 SH26), once the landfill activities reach a height of approximately RL 40-45m they would be visible above the western bund and growing project site boundary vegetation. This is due to this property being located beyond the SH22 screen planting depicted in **Drawing VS1.1**.
- 8.10 For those travelling on SH 26 this is expected to generate **neutral** effects however, for residents in 6221 SH 26 these adverse effects are considered to be **very low**, as the view from inside the property adjacent to the front of the house is largely screened by a fence and the existing vegetation within the project site would also obscure much of the landfill activities.

Stage 3B

- 8.11 As the landfill cell continues to get higher at elevations above RL 50m up to RL 60m the filling activities would become more visible above the western screen bund and the boundary planting. **Drawing VS1.2** provides a simulated view of the landfill cell during this stage.
- 8.12 At this stage it is considered that the visual effects for travellers on SH 26 would continue to be **neutral** and for residents in 6221 SH26 adjacent to VP1 there would be **low** adverse effects.

Stage 4

- 8.13 As the landfill extends above RL55m and up to its maximum elevation of RL78m the activities would become more prominent as they rise above the intermediate landform bund and vegetation. **Drawing VS1.3** provides a simulated view of the landfill cell during this stage, which could include trucks accessing the landfill face via the southwestern access route. For the duration of this stage which is expected to be in the order of 2.5 years, while views would be screened from the specific viewpoint on the roadside, from No.6221, it is considered the adverse visual effects would be **moderate-low**.

Completed Landfill Cell

- 8.14 Once the landfill cell is capped and grassed, as depicted in **Drawing VS1.4**, the visual effects from this and adjacent private properties are considered to be **neutral** as the landform will be seen in the context of the foothill spur in the foreground and will have a very similar character to other elevated grassed landforms in the area.

SH26 Central

Refer Viewpoint 2 for representative view

- 8.15 This view is a very oblique and fleeting one from SH 26. It is located on the boundary of the site adjacent to the farm entrance to the property. There are no dwellings or residents that would have a view that is represented by this viewpoint location. As such it represents a fleeting view for passengers travelling on SH 26 who would be looking obliquely towards the site.
- 8.16 The existing view along this stretch of the road is characterised by existing maturing vegetation which consists of Eucalyptus, mixed conifers and exotic specimen trees. Through a narrow gap in these trees, views through to the foothills and landfill cell footprint area are afforded.
- 8.17 From this location views of each stage of the landfill cell would potentially be visible for a short duration (i.e. a matter of seconds) from within vehicles travelling along the highway. However, proposed planting across along the farm accessway to close the gap would screen these views in a short timeframe so that the landfill activities are not visible from this location. This proposed screen planting is depicted in the Mitigation Screen Planting Plan **Figure 6** and its height after 5 years is shown on **Drawing VS2.1**.
- 8.18 Based on the implementation of this planting in 2020 and the landfill activities beginning in 2025 the visual effects from this location would be **neutral**.
- 8.19 **Drawing VS2.2** depicts the final landform from this location should the screening vegetation be removed to open up views from SH29.

SH26 North

Refer Viewpoint 3 for representative view

- 8.20 This viewpoint is located on SH 26 to the north of the site approximately 1450m from the proposed landfill cell. The existing view is representative of travellers in a vehicle heading south towards Te Aroha for a distance of approximately 200m. It is also representative of residents exiting their property opposite at 6433 SH 26, however views from the house are not afforded.
- 8.21 The existing view consists of open paddocks, shelterbelts and amenity trees on the low lying land and forestry and grazing land on the foothills. The existing landfill, including the blue liner, and resultant change to the landform is clearly visible from this location as a contrasting element in the middle distance of the foothills.

Stages

- 8.22 Stages 1 and 2 of the landfill cell operation would not be visible from this location due to the intervening vegetation, both within the site and within farmland to the north, obscuring views of these lower level activities (**refer to Drawing VS3.1**).
- 8.23 During the upper level of Stage 3 (as depicted in **VS3.1 and VS3.2**) the landform would become visible through small gaps in the existing vegetation. Adverse visual effects during this stage are considered to be **very low**.

- 8.24 Stage 4 activities would be visible over a portion of the landfill cell above the existing vegetation. While continued growth of existing vegetation may screen the majority of this phase of the operation, it is expected that some of the landfill cell would still be visible as depicted in **Drawing VS3.3**. Due to the distance of the view, the orientation of the working face away from the view, the nature of the viewing audience and the limited amount of the landfill cell visible, the adverse visual effects are considered to be **low**.
- 8.25 Once the completed landfill cell is grassed the visual effects, as depicted in **Drawing VS3.4**, would be **neutral**.

Paeroa – Tahuna Road

Refer Viewpoint 4 for representative view

- 8.26 This viewpoint location is on the Paeroa – Tahuna Road, directly oriented towards the site approximately 1.5 km from the landfill cell footprint. It is representative of travellers heading towards SH 26 and from a nearby house at No. 1596 Paeroa – Tahuna Road.
- 8.27 The existing view takes in the entire western end of the foothills landscape which is characterised by a mix of pastoral grazing, forestry and native vegetation. The existing landfill and remnant quarry faces are a relatively prominent contrasting element as part of this foothills feature. The landscape between the viewpoint and the site is flat and contains a mix of paddocks, shelterbelts and trees with a range of farm buildings also visible.
- 8.28 Based on the Stage Visibility image in **Drawing VS4.1**, the western boundary planting and bund would be visible, however Stages 1 and 2 of the landfill cell operation would not as they would be obscured by existing vegetation both within the site and in the middle ground of the view. It is therefore considered that **very low** effects would be bought upon these viewing audiences.
- 8.29 Once the Stage 3B landfill activities begin to rise above approximately RL 50 these and the Stage 4 activities would be visible from this viewpoint. These activities would be seen in front of the completed existing landfill and remaining visible quarry benches and would be seen against the landform and pine forest background on the foothills as depicted in **Drawings VS4.2 and VS4.3**.
- 8.30 Based on the distance, existing context of the view (which will continue to include remnant quarry benches), the generally transient viewing audience and relatively short duration of effects it is considered that the adverse visual effects from this location during Stages 3B would be **low** and during Stage 4 up to **moderate-low**.
- 8.31 Once the landfill cell is completed and grassed the visual effects would be **neutral** and the landform would be seen as similar to the existing spurs extending west from the foothills (refer to **Drawing VS4.4**).

Tukaki Road

Refer Viewpoints 5 and 6 for representative view

- 8.32 These two viewpoints are from 2 separate locations on Tukaki Road, within 200m of each other. Viewpoint 5 is outside the entrance to the local Tirohia Komiti Marae land and Viewpoint 6 is outside the house at 41 Tukaki Road.
- 8.33 The existing view from these locations is across paddocks, pasture/maize with trees in the foreground and the foothills as a backdrop. From both of these locations part of the existing landfill and associated remnant quarry benches are visible.

- 8.34 From these locations Stages 1 and 2, as depicted in **Drawing VS5.1 and VS6.1**, will be obscured from view apart from some of the planting along the western boundary and therefore effects would be **neutral**. A small part of Stage 3B and Stage 4 may be visible above the intervening vegetation on the site and in the foreground of the view and this is depicted in **Drawings VS5.2 and VS5.3** and **Drawing VS6.2**. The amount of Stage 4 visible would be dependent on growth rates of the existing vegetation over the next 10 years before this stage of the fill activity is reached in circa 2030.
- 8.35 Based on the existing view of the landfill / quarry and the amount of the landfill cell visible, the adverse visual effects from these locations is considered to be **low** during Stage 3, **up to moderate-low** during Stage 4 and the final stages of filling and **neutral** following the completion of the grassing of the landfill cell.

Awaiti Road

Refer Viewpoint 7 for representative view

- 8.36 This viewpoint is from Awaiti Road travelling southeast towards Paeroa-Tahuna Road and SH26. It is approximately 2.2km from the proposed landfill cell which is located at an oblique angle to the direction of travel. The view is representative of a number of dwellings on the western side of Awaiti Road i.e. Nos. 1014, and 1026 Awaiti Road. There are also more distant views from Awaiti Road and from dwellings and properties along this road out to approximately 4km from the project site. Due to the speed of travel, views from the road are less sensitive than those from the adjacent dwellings which may afford static views of the landfill cell to the east.
- 8.37 The view from this location and others along this road are often expansive and looking south-east contain Mt Te Aroha, the Kaimai Ranges as well as foothills which include the WMNZ property. The existing view is a pleasant rural one across paddocks with the existing landfill and adjacent quarry benches as obvious detractors.
- 8.38 From this location, based on **Drawing VS7.1**, the northern part of Stage 1 as well as part of the western screen bund and adjacent planting would be visible. Parts of the Stage 2 landfill cell operation would also be visible extending above the intervening trees on site and around Tirohia. This is simulated in **Drawing VS7.2**. Due to the distance and existing context of the view the adverse visual effects for these stages is considered to be **very low** for travellers and **low** for residents.
- 8.39 The majority of Stage 3B and all of the northern face of Stage 4 of the landfill cell would be visible from this and other nearby locations extending above the existing intervening vegetation as simulated on **Drawings VS7.3 and VS7.4**. These stages would be seen in the context of the more elevated remnant quarry benches / faces that would remain visible above the rehabilitated existing landfill and the wide, open nature of the plains and hills beyond. Based on the greater extent of visibility it is considered the adverse effects for the travelling public would be up to **low** for the Stage 3B activities and **moderate-low** for the residents in the adjacent two properties. Similarly, due to the distance to the landfill cell, the vegetative foreground context and remaining detractors in the view the same level of adverse effects are anticipated during Stage 4 for the travelling public and residents respectively i.e. **low** and **moderate-low**.
- 8.40 The final landform once completed and grassed will result in **neutral** visual effects as depicted in **Drawing VS7.5**.

Rail Trail Walkway / Cycleway

Refer Viewpoint 8 for representative view

- 8.41 This viewpoint is from the existing rail trail when travelling south. It is approximately 1250m from the proposed landfill cell. Due to the speed of travel (i.e. walking / cycling)

and recreational activity being undertaken, the viewing audience is considered to be more sensitive than those on high speed roads.

- 8.42 The view from this location and others along the trail is often expansive and looking south-east may contain Mt Te Aroha, the Kaimai Ranges and foothills which include the WMNZ property. The existing view is a pleasant one across paddocks with the existing landfill, blue liner and adjacent quarry benches as obvious detractors.
- 8.43 From this location, as depicted in **Drawing VS8.1**, Stages 1 and 2 of the landfill cell operation would be obscured by intervening vegetation and would not be visible, resulting in neutral effects on these viewing audiences.
- 8.44 Parts of the northern face of Stage 3B and Stage 4 of the landfill cell would be visible from this and other locations along the trail extending above the existing intervening vegetation. These have been simulated in **Drawings VS8.2 and VS8.3**. These stages would be seen in the context of the more elevated and larger scale rehabilitated existing landfill and remnant quarry benches / faces beyond.
- 8.45 Based on the existing context of views in this vicinity, the sensitivity of the viewing audience, the duration of the activities and the distance involved, the adverse visual effects associated with Stages 3B and 4 of the landfill cell, are considered to be **moderate to low**.
- 8.46 The final landform once completed and grassed, as depicted in **Drawing VS8.4**, will result in **neutral** visual effects.

Summary of Visual Amenity Affects

8.47 A summary of the anticipated level of visual effects is provided in **Table 2** below:

Table 2: Summary of Visual Effects

VP #	Location	Stage 1	Stage 2	Stage 3B	Stage 4	Final Landform
1	SH 26 South	Very Low	Low	Mod-Low	Mod-Low	Neutral
2	SH26 Farm Entry to Site	Neutral	Neutral	Neutral	Neutral	Neutral
3	SH26 North	Neutral	Neutral	Very Low	Low	Neutral
4	Paeroa -Tahuna Road	Very Low	Very Low	Low	Mod-Low	Neutral
5 / 6	Tukaki Road	Neutral	Neutral	Low	Mod-Low	Neutral
7	Awaiti Road	Neutral,	Low	Mod-Low	Mod-Low	Neutral
8	Hauraki Rail Trail	Neutral	Neutral	Mod-Low	Mod-Low	Neutral

Note: Ratings include the anticipated adverse effects from adjacent private properties.

8.48 As outlined in the above table the anticipated level of visual effects range from Low / Very Low adverse or in many cases Neutral for the early stages (Stages 1, 2 and 3A) of the landfill cell operation, over the first 4 to 5 years, to Moderate-Low adverse from private property residential and public walking/cycling locations for the later stages of the landfill cell (Stage 3B and 4) at a range of distances between approximately 700m and 2.2km from the landfill cell. From all locations once the final landform is completed and grassed it is considered that the visual effects will be Neutral.

9.0 Review of HDP Matters

- 9.1 In relation to the relevant landscape and visual amenity provisions identified in the Hauraki District Plan, the following is a summary of the key matters to be considered and a response to each:

Effects on Landscape Rural Character and Mitigation of These

- 9.2 The proposed landfill cell operation will alter the rural landscape characteristics on the site for the duration of the project – estimated to be 10.5 years. While there are no built structures associated with the activity the landfill cell operation, including vehicle movements and modifications to landform through temporary stockpiles, will adversely affect the open flatness and existing rural character of the site.
- 9.3 Once the landfill cell is completed and grassed and the temporary stockpiles removed, the landscape character will be rehabilitated to a similar state as currently exists with a new landform, wetlands, enhanced riparian margins and additional amenity planting, all in keeping and enhancing the existing landscape elements and rural characteristics on the site.

Clearance of Existing Vegetation

- 9.4 No clearance of native bush is to occur as part of the landfill project. A few small exotic specimen trees and an area of semi-native pine will be removed within the landfill cell footprint and to accommodate the southern stream diversion, but these are not considered to add to the visual amenity of the site or surrounding area to any more than a very limited extent.

Impact on Outstanding Natural Landscape and Amenity Landscape Areas

- 9.5 There are no ONL's or amenity landscapes that have been identified within the WMNZ landholding or within the surrounding landscape where the project could have any effect on the values associated with these features.

Screening of Activities

- 9.6 The existing vegetation, proposed western bund and planting along the boundaries of the site, will screen the majority of the activities associated with the landfill cell during Stages 1 and 2 of the project. During Stages 3B and 4 vehicles accessing the landfill cell will be visible from around VP 1 and VP 7 for approximately 28 months. This activity will be seen against the existing rehabilitated landfill and associated quarry benches and although it will result in adverse visual effects, these are not considered to affect the wider amenity of the area to any more than a limited extent.

Scale and Intensity of Activity

- 9.7 While the activity will utilise a substantial area of the low lying farmland on the site for the duration of the landfill cell operation, once the landform is complete it will blend into the existing character of the foothill landscape and maintain the amenity values of the rural environment.

10.0 Conclusion

- 10.1 The project is predominantly located in a working landscape that accommodates farming, landfill and forestry practices. These land uses will provide an ever-changing context that the proposed landfill cell will be seen against. While the landfill cell activities may be noticeable as the landform expands in height and scale during the 10.5 year life of the operation, the other activities and wider landscape context will diminish both landscape character and visual amenity effects for both transient and more permanent viewing audiences.
- 10.2 Landscape effects resulting from the proposal are largely confined to the pastoral area at the base of the foothills and while there will be extensive modification through the landfill activities, alteration to existing watercourses, and bunding and stockpiling of soil, the later activities are temporary and only for the life of the operation. Other activities such as planting the riparian margins of the watercourses and any wetlands will be positive improvements to the landscape. Once the landfill cell is completed, grassed and returned to rural use with pastoral farming activities the ongoing effects on the physical elements within the site will be largely beneficial and on the wider landscape character, neutral.
- 10.3 Viewing audiences will be affected throughout various stages of the project and the level of effect will vary as the project evolves. Visual effects on viewing audiences during site establishment will be minimal as existing vegetation on site will obscure these activities apart from the western bund which is placed to provide early screening of landfill activities. As the project progresses, the later stages (i.e. Stages 3B and 4) will become more visible and temporarily increase adverse visual effects. Screen planting established along the western boundary, adjacent to SH26 and the farm access drive will assist in obscuring portions of the visible fill. Furthermore, orienting the working face towards the foothills, progressive hydroseeding, capping and vegetation establishment across the operational stages will manage visual effects and contribute to the integration of the project post closure.
- 10.4 The greatest level of adverse visual effects is from around one dwelling located adjacent to VP1 on SH 26 and two dwellings near VP7 on Awaiti Road. From these locations Moderate-Low adverse visual effects are predicted to occur during Stage 3B and for short duration periods during Stage 4, when the uncapped portion of the landfill cell may be visible. For the remainder of the time the adverse effects on these residents is expected to be low and once completed neutral.
- 10.5 Many viewing audiences in the surrounding area will experience no effects as the project will not be visible. Those that will attain views will experience neutral to low effects during site establishment and the first two stages of operation. For most, these effects will remain as low throughout the life of the project, however up to moderate-low adverse effects will affect a limited number of viewing audiences surrounding 5 of the 8 viewing locations. These effects would only peak in periods when uncapped fill is observable, during stages 3 and 4, and for the remainder of the time low effects would occur.
- 10.6 Overall, the long term outlook for the majority of viewing audiences in views towards the proposed landfill cell will remain characterised by the completed and grassed existing landfill, the remnant quarry faces, maturing vegetation within and surrounding the site, forestry clearance and potential replanting on upper slopes, and the farming activities both within the Hauraki Plains and the foothills.

Appendix 1: Landscape and Visual Effects Assessment Methodology

Introduction

The Boffa Miskell Ltd landscape and visual effects assessment (LVA) process provides a framework for assessing and identifying the nature and level of likely effects that may result from a proposed development. Such effects can occur in relation to changes to physical elements, the existing character of the landscape and the experience of it. In addition, the landscape assessment method may include an iterative design development processes, which includes stakeholder involvement. The outcome of any assessment approach should seek to avoid, remedy or mitigate adverse effects (see **Figure 1**). A separate assessment is required to assess changes in natural character in coastal areas and other waterbodies.

This outline of the landscape and visual effects assessment methodology has been undertaken with reference to the **Quality Planning Landscape Guidance Note**⁷ and its signposts to examples of best practice, which include the **UK guidelines for landscape and visual impact assessment**⁸ and the **New Zealand Landscape Institute Guidelines for Landscape Assessment**⁹.

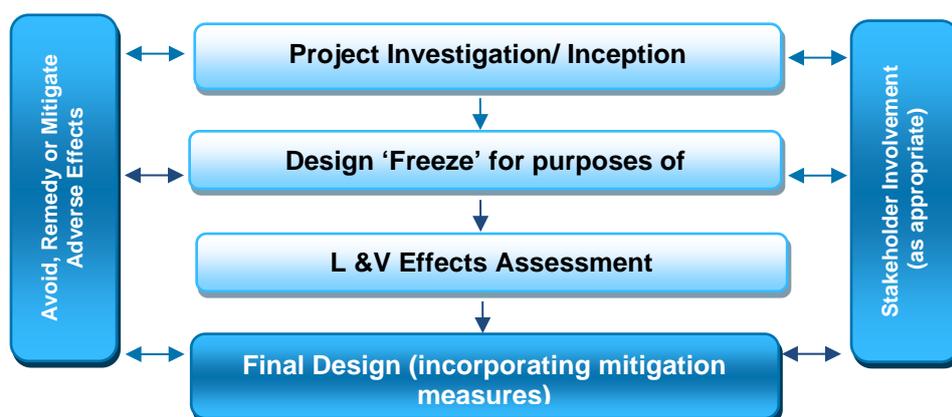


Figure 1: Design feedback loop

When undertaking a LVA, it is important that a **structured and consistent approach** is used to ensure that **findings are clear and objective**. Judgement should be based on skills and experience and be supported by explicit evidence and reasoned argument.

While landscape and visual effects assessments are closely related, they form separate procedures. The assessment of the potential effect on the landscape forms the first step in this process and is carried out as an effect on landscape elements, features and on landscape character. The assessment of visual effects considers how changes to the physical landscape affect the viewing audience. The types of effects can be summarised as follows:

⁷ <http://www.qualityplanning.org.nz/index.php/planning-tools/land/landscape>

⁸ Landscape Institute and Institute of Environmental Management and Assessment (2013) Guidelines for Landscape and Visual Impact Assessment, 3rd Edition (GLVIA3)

⁹ Best Practice Note Landscape Assessment and Sustainable Management 10.1, NZILA

Landscape effects: *Change in the physical landscape, which may affect its characteristics or qualities.*

Visual effects: *Change to views which may affect the visual amenity experienced by people.*

The policy context, existing landscape resource and locations from which a development or change is visible, all inform the 'baseline' for landscape and visual effects assessments. To assess effects, the landscape must first be **described**, including an understanding of the **key landscape characteristics and qualities**. This process, known as landscape characterisation, is the basic tool for understanding landscape character and may involve subdividing the landscape into character areas or types. The condition of the landscape (i.e. the state of an individual area of landscape or landscape feature) should also be described together with, a judgement made on the value or importance of the potentially affected landscape.

Landscape Effects

Assessing landscape effects requires an understanding of the landscape resource and the magnitude of change which results from a proposed activity to determine the overall level of landscape effects.

Landscape Resource

Assessing the sensitivity of the landscape resource considers the key characteristics and qualities. This involves an understanding of both the ability of an area of landscape to absorb change and the value of the landscape.

Ability of an area to absorb change

This will vary upon the following factors:

- Physical elements such as topography / hydrology / soils / vegetation;
- Existing land use;
- The pattern and scale of the landscape;
- Visual enclosure / openness of views and distribution of the viewing audience;
- The zoning of the land and its associated anticipated level of development;
- The scope for mitigation, appropriate to the existing landscape.

The ability of an area of landscape to absorb change takes account of both the attributes of the receiving environment and the characteristics of the proposed development. It considers the ability of a specific type of change occurring without generating adverse effects and/or achievement of landscape planning policies and strategies.

The value of the Landscape

Landscape value derives from the importance that people and communities, including tangata whenua, attach to particular landscapes and landscape attributes. This may include the classification of Outstanding Natural Feature or Landscape (ONFL) (RMA s.6(b)) based on important biophysical, sensory/ aesthetic and associative landscape attributes, which have potential to be affected by a proposed development. A landscape can have value even if it is not recognised as being an ONFL.

Magnitude of Landscape Change

The magnitude of landscape change judges the amount of change that is likely to occur to areas of landscape, landscape features, or key landscape attributes. In undertaking this assessment, it is important that the size or scale of the change is considered within the

geographical extent of the area influenced and the duration of change, including whether the change is reversible. In some situations, the loss /change or enhancement to existing landscape elements such as vegetation or earthworks should also be quantified.

When assessing the level of landscape effects, it is important to be clear about what factors have been considered when making professional judgements. This can include consideration of any benefits which result from a proposed development. **Table 1** below helps to explain this process. The tabulating of effects is only intended to inform overall judgements.

Contributing Factors		Higher	Lower
Landscape (sensitivity)	Ability to absorb change	The landscape context has limited existing landscape detractors which make it highly vulnerable to the type of change resulting from the proposed development.	The landscape context has many detractors and can easily accommodate the proposed development without undue consequences to landscape character.
	The value of the landscape	The landscape includes important biophysical, sensory and shared and recognised attributes. The landscape requires protection as a matter of national importance (ONF/L).	The landscape lacks any important biophysical, sensory or shared and recognised attributes. The landscape is of low or local importance.
Magnitude of Change	Size or scale	Total loss or addition of key features or elements. Major changes in the key characteristics of the landscape, including significant aesthetic or perceptual elements.	The majority of key features or elements are retained. Key characteristics of the landscape remain intact with limited aesthetic or perceptual change apparent.
	Geographical extent	Wider landscape scale.	Site scale, immediate setting.
	Duration and reversibility	Permanent. Long term (over 10 years).	Reversible. Short Term (0-5 years).

Table 1: Determining the level of landscape effects

Visual Effects

To assess the visual effects of a proposed development on a landscape, a visual baseline must first be defined. The visual 'baseline' forms a technical exercise which identifies the area where the development may be visible, the potential viewing audience, and the key representative public viewpoints from which visual effects are assessed.

The Sensitivity of the viewing audience

The sensitivity of the viewing audience is assessed in terms of assessing the likely response of the viewing audience to change and understanding the value attached to views.

Likely response of the viewing audience to change

Appraising the likely response of the viewing audience to change is determined by assessing the occupation or activity of people experiencing the view at particular locations and the extent to which their interest or activity may be focussed on views of the surrounding landscape. This relies on a landscape architect's judgement in respect of visual amenity and the reaction of people who may be affected by a proposal. This should also recognise that people more susceptible to change generally include: residents at home, people engaged in outdoor recreation whose attention or interest is likely to be focussed on the landscape and on particular views; visitors to heritage assets or other important visitor attractions; and communities where views contribute to the wider landscape setting.

Value attached to views

The value or importance attached to particular views may be determined with respect to its popularity or numbers of people affected or reference to planning instruments such as viewshafts or view corridors. Important viewpoints are also likely to appear in guide books or

tourist maps and may include facilities provided for its enjoyment. There may also be references to this in literature or art, which also acknowledge a level of recognition and importance.

Magnitude of Visual Change

The assessment of visual effects also considers the potential magnitude of change which will result from views of a proposed development. This takes account of the size or scale of the effect, the geographical extent of views and the duration of visual change, which may distinguish between temporary (often associated with construction) and permanent effects where relevant. Preparation of any simulations of visual change to assist this process should be guided by best practice as identified by the NZILA¹⁰.

When determining the overall level of visual effect, the nature of the viewing audience is considered together with the magnitude of change resulting from the proposed development.

Table 2 has been prepared to help guide this process:

Contributing Factors		Higher	Lower	Examples
The Viewing Audience (sensitivity)	Ability to absorb change	Views from dwellings and recreation areas where attention is typically focussed on the landscape.	Views from places of employment and other places where the focus is typically incidental to its landscape context. Views from transport corridors.	Dwellings, places of work, transport corridors, public tracks
	Value attached to views	Viewpoint is recognised by the community such as an important view shaft, identification on tourist maps or in art and literature. High visitor numbers.	Viewpoint is not typically recognised or valued by the community. Infrequent visitor numbers.	Acknowledged viewshafts, Lookouts
Magnitude of Change	Size or scale	Loss or addition of key features in the view. High degree of contrast with existing landscape elements (i.e. in terms of form scale, mass, line, height, colour and texture). Full view of the proposed development.	Most key features of views retained. Low degree of contrast with existing landscape elements (i.e. in terms of form scale, mass, line, height, colour and texture). Glimpse / no view of the proposed development.	- Higher contrast/ Lower contrast. - Open views, Partial views, Glimpse views (or filtered); No views (or obscured)
	Geographical extent	Front on views. Near distance views; Change visible across a wide area.	Oblique views. Long distance views. Small portion of change visible.	- Front or Oblique views. - Near distant, Middle distant and Long distant views
	Duration and reversibility	Permanent. Long term (over 15 years).	Transient / temporary. Short Term (0-5 years).	- Permanent (fixed), Transitory (moving)

Table 2: Determining the level of visual effects

Nature of Effects

In combination with assessing the level of effects, the landscape and visual effects assessment also considers the nature of effects in terms of whether this will be positive (beneficial) or negative (adverse) in the context within which it occurs. Neutral effects can also occur where landscape or visual change is benign.

It should also be noted that a change in a landscape does not, of itself, necessarily constitute an adverse landscape or visual effect. Landscape is dynamic and is constantly changing over time in both subtle and more dramatic transformational ways; these changes are both natural and human induced. What is important in managing landscape change is that adverse effects are avoided or sufficiently mitigated to ameliorate the effects of the change in land use. The aim is to provide a high amenity environment through appropriate design outcomes.

¹⁰ Best Practice Guide: Visual Simulations BPG 10.2, NZILA

This assessment of the nature effects can be further guided by **Table 3** set out below:

Nature of effect	Use and Definition
Adverse (negative):	The activity would be out of scale with the landscape or at odds with the local pattern and landform which results in a reduction in landscape and / or visual amenity values
Neutral (benign):	The activity would be consistent with (or blend in with) the scale, landform and pattern of the landscape maintaining existing landscape and / or visual amenity values
Beneficial (positive):	The activity would enhance the landscape and / or visual amenity through removal or restoration of existing degraded landscape activities and / or addition of positive elements or features

Table 3: Determining the Nature of Effects

Cumulative Effects

During the scoping of an assessment, where appropriate, agreement should be reached with the relevant local authority as to the nature of cumulative effects to be assessed. This can include effects of the same type of development (e.g. wind farms) or the combined effect of all past, present and approved future development¹¹ of varying types, taking account of both the permitted baseline and receiving environment. Cumulative effects can also be positive, negative or benign.

Cumulative Landscape Effects

Cumulative landscape effects can include additional or combined changes in components of the landscape and changes in the overall landscape character. The extent within which cumulative landscape effects are assessed can cover the entire landscape character area within which the proposal is located, or alternatively, the zone of visual influence from which the proposal can be observed.

Cumulative Visual Effects

Cumulative visual effects can occur in combination (seen together in the same view), in succession (where the observer needs to turn their head) or sequentially (with a time lapse between instances where proposals are visible when moving through a landscape). Further visualisations may be required to indicate the change in view compared with the appearance of the project on its own.

Determining the nature and level of cumulative landscape and visual effects should adopt the same approach as the project assessment in describing both the nature of the viewing audience and magnitude of change leading to a final judgement. Mitigation may require broader consideration which may extend beyond the geographical extent of the project being assessed.

Determining the Overall Level of Effects

The landscape and visual effects assessment concludes with an overall assessment of the likely level of landscape and visual effects. This step also takes account of the nature of effects and the effectiveness of any proposed mitigation. The process can be illustrated in Figure 2:



¹¹ The life of the statutory planning document or unimplemented resource consents.

Figure 2: Assessment process

This step informs an overall judgement identifying what level of effects are likely to be generated as indicated in **Table 4** below. This table which can be used to guide the level of landscape and visual effects uses an adapted seven-point scale derived from NZILA's Best Practice Note.

Effect Rating	Use and Definition
Very High:	Total loss of key elements / features / characteristics, i.e. amounts to a complete change of landscape character in views.
High:	Major modification or loss of most key elements / features / characteristics, i.e. little of the pre-development landscape character remains and a major change in views. <u>Concise Oxford English Dictionary Definition</u> <i>High: adjective- Great in amount, value, size, or intensity.</i>
Moderate- High:	Modifications of several key elements / features / characteristics of the baseline, i.e. the pre-development landscape character remains evident but materially changed and prominent in views.
Moderate:	Partial loss of or modification to key elements / features / characteristics of the baseline, i.e. new elements may be prominent in views but not necessarily uncharacteristic within the receiving landscape. <u>Concise Oxford English Dictionary Definition</u> <i>Moderate: adjective- average in amount, intensity, quality or degree</i>
Moderate - Low:	Minor loss of or modification to one or more key elements / features / characteristics, i.e. new elements are not prominent within views or uncharacteristic within the receiving landscape.
Low:	Little material loss of or modification to key elements / features / characteristics. i.e. modification or change is not uncharacteristic or prominent within views and absorbed within the receiving landscape. <u>Concise Oxford English Dictionary Definition</u> <i>Low: adjective- 1. Below average in amount, extent, or intensity.</i>
Very Low:	Negligible loss of or modification to key elements/ features/ characteristics of the baseline, i.e. approximating a 'no change' situation and a negligible change in views.

Table 4: Determining the overall level of landscape and visual effects

Determination of “minor”

Decision makers determining whether a resource consent application should be notified must also assess whether the effect on a person is less than minor¹² or an adverse effect on the environment is no more than minor¹³. Likewise, when assessing a non-complying activity, consent can only be granted if the s104D ‘gateway test’ is satisfied. This test requires the decision maker to be assured that the adverse effects of the activity on the environment will be ‘minor’ or not be contrary to the objectives and policies of the relevant planning documents.

These assessments will generally involve a broader consideration of the effects of the activity, beyond the landscape and visual effects. Through this broader consideration, guidance may be sought on whether the likely effects on the landscape or effects on a person are considered in relation to ‘minor’. It must also be stressed that more than minor effects on individual elements or viewpoints does not necessarily equate to more than minor effects on the wider landscape. In relation to this assessment, moderate-low level effects would generally equate to ‘minor’.

The third row highlights the word ‘significant’ which has particular reference to the NZCPS and Policy 13 and Policy 15 and where on the effects-spectrum ‘a significant’ effect would be placed.

<u>Less than Minor</u>		<u>Minor</u>	<u>More than Minor</u>			
Very Low	Low	Moderate – Low	Moderate	Moderate-High	High	Very High
					Significant¹⁴	

Table 5: Determining minor effects for notification determination and non-complying activities

¹² RMA, Section 95E

¹³ RMA Section 95D

¹⁴ To be used only about Policy 13(1)(b) and Policy 15(b) of the New Zealand Coastal Policy Statement (NZCPS), where the test is ‘to avoid significant adverse effects’.

