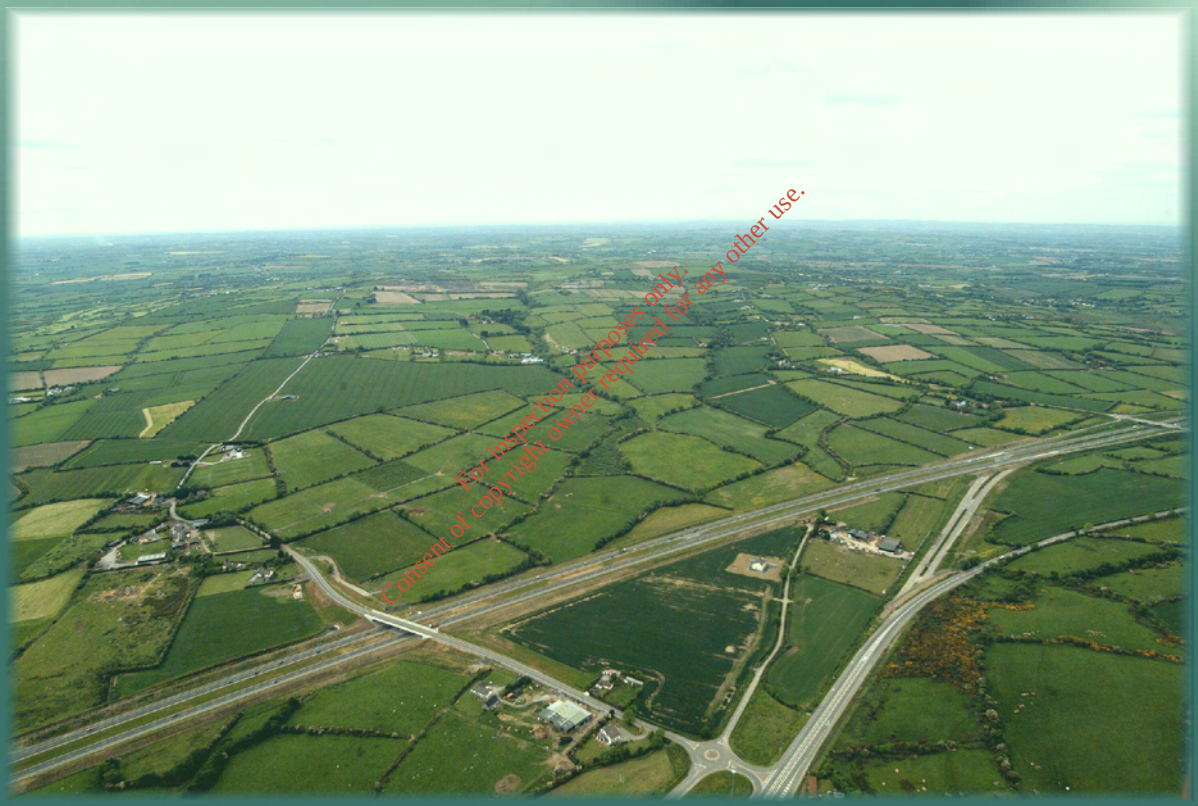
Fingal County Council
Comhairle Contae Fhine Gall

Fingal Landfill Project



ENVIRONMENTAL IMPACT REPORT
L. Hagen

WASTE MANAGEMENT PLAN
Working for the Dublin Region

September 2006

RPS

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APPENDICES

1 INTRODUCTION

This report has been prepared to consider and assess the likely effects/impacts of the proposed Fingal Landfill on the property of Mr. L. Hagen as part of the Environmental Impact Assessment in particular the likely effects/impacts on views, air quality and noise that the proposed development may have on Mr. Hagen's property. The full reports of these considerations and assessments are contained in the **Appendices** of this report.

2 CONTEXT

Mr. Hagen's property is located approximately 600 meters north of the proposed landfill footprint and approximately 20 meters from the edge of the carriageway for the proposed New County Road. The location of this property is shown on **Figure 1.1**.

3 EXISTING ENVIRONMENT

3.1 LANDSCAPE AND VISUAL

Knockbrack (176m OD) and its associated rounded hills (incl. Nags Head 151m OD) lie to the west of Mr Hagen's property and dominate the surrounding lowlands of North Fingal and are significant visual components of this landscape. The lands around the property are in agricultural use within large field systems.

The landscape character of the study area around Mr. Hagen's property can be described by use of two distinctive landscape character areas described below.

- Elevated agricultural hills, and
- Lowland agricultural landscape

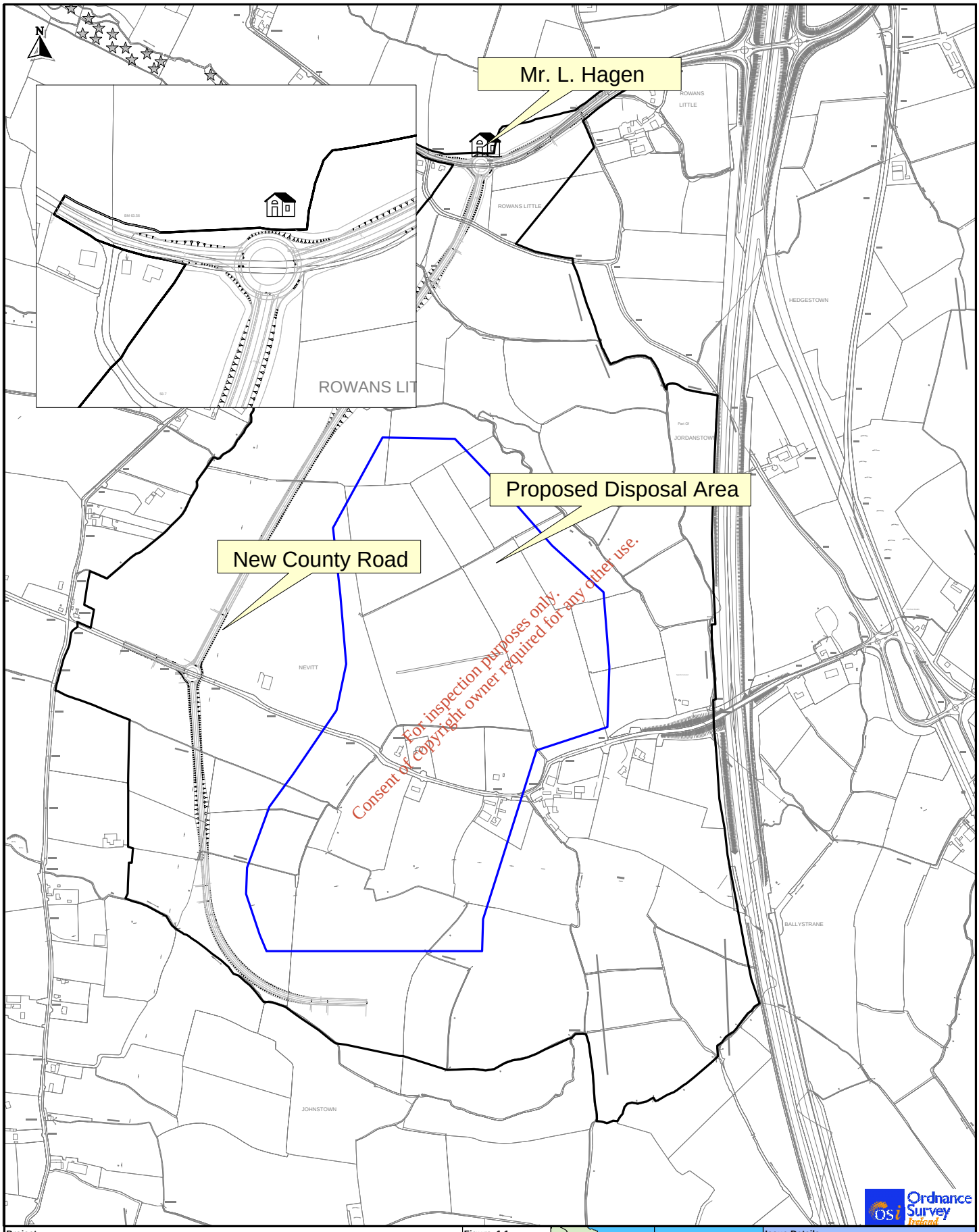
3.2 AIR QUALITY

The M1 motorway runs to the east of Mr Hagen's property and is the major transport link in the area. This busy road experienced on average 41,400 vehicles per day in 2004 (source NRA). This volume of traffic may have an impact on air quality as a result of vehicular emissions. However, as the traffic is relatively free flowing the potential for traffic gridlock and elevated levels of pollution is not considered high.

There are no other major sources of potential air pollution in the area. There is one large quarry to the west, which may generate dust, and other small industries in the area but a large proportion of the land use is agricultural, which may have odour implications.

3.3 NOISE

The existing acoustic environment in the area of Mr Hagen's property is dominated by traffic along existing roads. In the absence of passing traffic on the road outside the residence the M1 is the primary source of background noise.



Project	***Fingal Landfill Project***	**Figure**	**1.1**
Title	**Location Map - L Hagen's Property**		

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Issue Details			
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Approved:	KW		
Scale:	NTS	**Drawing No.**	**Rev.**
Date:	01/09/06	Mi0096	D01

Notes

1. This drawing is the property of RPS Consulting Engineers. It is a confidential document and must not be copied, used, or its contents divulged without prior written consent.
2. All levels are referred to Ordnance Datum, Malin Head.
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4 LIKELY EFFECTS/IMPACTS

4.1 LANDSCAPE AND VISUAL

The property of Mr. Hagen lies north of the proposed Rowans Little Roundabout (**See Figure 1.1**) and the vegetation that is located on the existing roadside south of Mr Hagen's property will be lost during the construction of the proposed roundabout opening views of traffic on the new road. This is the primary visual impact on this property.

For the viewer, Mr Hagen, sensitivity is considered high and the magnitude of resource change is high. The predicted significance of the visual impact without mitigation in place is Substantial Adverse (**See Section 1.2 of Appendix A for description of this rating**). However, with mitigation in place the predicted significance of the visual impact is predicted to be Slight Adverse.

4.2 AIR QUALITY

Pollutant concentrations were modelled at the façade of Mr. Hagen's property under the following scenarios:

- 2005 Existing scenario
- 2008 Do-Minimum scenario (no landfill)
- 2008 Do-Something scenario (landfill goes ahead)
- 2023 Do-Minimum scenario
- 2023 Do-Something scenario

The results of the Design Manual for Roads and Bridges (DMRB) assessment at 'Mr. Hagen's property are presented in **Table '4.1** below.

Table 4.1 Results of DMRB Predictive Modelling of traffic-derived pollutants at Mr. Hagen's property

Scenarios	Traffic Speed km/hr	Carbon Monoxide (mg/m^3)	Benzene ($\mu g/m^3$)	Nitrogen Dioxide ($\mu g/m^3$)	Particulates (PM_{10}) ($\mu g/m^3$)
		Annual Average	Annual Average	Annual Average NO_2	Annual Average
Existing Scenario	50	1.61	0.31	13.31	22.78
2008 Do Minimum	50	1.28	0.28	12.54	21.43
2008 Do Something	20	1.29	0.29	13.02	21.69
2023 Do Minimum	50	1.06	0.27	10.54	20.40
2023 Do Something	20	1.07	0.28	10.85	20.55
EU Standards		10(1)	5(1)	40(2)	40(2)

Notes:
(1) EU Directive 2000/69/EC
(2) EU Directive 1999/30/EC

The existing and predicted pollutant concentrations at Mr. Hagen's property are below the relevant air quality limit values for all scenarios. There will be a decrease in all pollutant concentrations in future years at the property with or without the scheme in place. This is due to planned improvements in engine technology as part of the EU Euro Oil programme. This programme involves voluntary reductions in exhaust emissions from car manufacturers. These reductions are incorporated into the DMRB model in the form of reduced emission factors for future year scenarios. The predicted increase in traffic figures and the decrease in traffic speeds in the vicinity of the property are not significant enough to cause an increase in ground level pollutant concentrations in future years.

There is a minor increase in pollutant concentrations when comparing the Do-minimum and Do-something scenarios in each of the future year scenarios. This is as a result of the additional traffic numbers.

4.3 NOISE

The construction and operation phases of the proposed development have the potential to increase noise levels at Mr. Hagen's property.

In Ireland, there are no statutory guidelines relating to noise limits for construction activities. These are generally controlled by local authorities and commonly refer to limiting working hours to prevent a noise nuisance. A publication from the National Road Authority (NRA) *'Guidelines for the treatment of noise and vibration in national road schemes'* 2004, has outlined recommended noise levels for construction noise.

Although these refer to road projects, they have been developed in line with typical construction noise limits on general construction projects used previously in Ireland. The limits outlined represent a reasonable compromise between the practical limitations during a construction project and the need to ensure an acceptable ambient noise level for local residents. As a result, these limits have become the most acceptable standard for construction noise limits for EIS assessments to date. **Table 4.2** below details these recommended limits:

Table 4.2: Maximum permissible noise levels at the façade of dwellings during construction

Days and Times L_{Aeg} (1hr)	$L_{Aeq\ (1Hr)}$ dB	$L_{pA\ (max)\ slow}$ dB
Monday to Friday 07:00 to 19:00hrs	70	80_2
Monday to Friday 19:00 to 22:00hrs	60^2	65^2
Saturday 08:00 to 16:30hrs	65	75
Sundays and Bank Holidays 08:00 to 16:30hrs	60^2	65^2

[2] Construction activity at these times, other than that required in respect of emergency works, will normally require the explicit permission of the relevant local authority

The construction phase of the proposed development will include the initial development of the landfill and a new County Road, which will tie in to the existing Rowans Road, just south of Mr Hagen's property. It is assumed for a worst-case scenario that the construction of the landfill will occur approximately 600 meters south of Mr. Hagen's property and the tie in point of the new County Road approximately 20 meters south of Mr Hagen's property. The predicted impact from construction of the road and landfill with a 0.9m barrier (**See Fig 1 of Appendix A for location and Fig 1 of Appendix C**) in place is shown in **Table 4.3** below.

Table 4.3 Construction noise level predictions at Mr. Hagen's property with 0.9m barrier in place

Estimated Construction noise levels at N6 LAeq 1 hour		
Plant	**20 m (Road)**	**600m (Landfill)**
Road sweeper	55	n/a
Dozer	n/a	40
Dumper truck	61	36
Asphalt spreader	61	n/a
JCB	55	30
Tracked Excavator	67	40
Combined Level LAeq 1hour	**68**	**44**

The nature of the construction period and the variety of machinery used should ensure that no construction activity is operational for long periods in a single area. This will therefore result in short term impacts, as construction works will not be constantly in the one place ensuring noise impact at Mr. Hagen's property will reduce from this worst case scenario with time and that the property is not subject to constant stationary noise sources during the construction phase. This will be particularly relevant for the construction of the tie in point of the new County Road.

The operation phase of the proposed landfill will potentially impact Mr. Hagen's property from two accounts;

1. Operations within the licensed facility, and
2. Traffic associated with the landfill.

Table 4.4 summarises the calculated noise levels, which would be expected at 600m (the distance of Mr. Hagen's property from the land-filling activities). This table is based on calculations for the plant typically used on a project of this scale and is based on the BS 5228 standard. As such this table quantifies the predicted noise impact of all plant operating on the site, regardless off task, i.e plant engaged in the landfill operation and plant constructing new landfill cells on the site.

Table 4.4 Operational noise level predictions at Mr Hagen's property

BS5228 Calculations	
Plant	**600m**
3x road sweeper	36
3x Dozer	46
3x Dumper truck	42
3x JCB	36
3x compactor	43
3x standby generator	29
3x Tracked Excavator	45
6x Gas flare engine	45
Combined Level LAeq 1hour	**49**

The combined level of 49dB L_{Aeq} is well below relevant guidance limits as described above and is not expected to cause a significant noise impact to Mr. Hagen's property.

The potential noise impacts from this proposed development during its operational phase will primarily be as a result of increased traffic flows along existing routes within and surrounding the development coupled with the operation of both mobile and stationary site plant. The greatest potential increase in traffic noise will be on the entrance road to the site just south of Mr Hagen's property. **Table 4.5** shows the predicted noise levels from traffic with and without the proposed landfill development

Table 4.5 Predicted noise levels from traffic at Mr. Hagen's property

L_{A10} 18Hour Values								
	2005 Base year	**2008 Do Something**	**2009 Do Nothing**	**2009 Do Something**	**2024 Do Nothing**	**2024 Do Nothing Courtlough***	**2024 Do Something**	**2024 Do Something Courtlough***
Mr. Hagen's property	61	50	65	65	66	67	64	65

* Indicates the upgrade of the Courtlough Interchange

Mr. Hagen's property will experience, in the worst case, a slight change in noise level between the Do Nothing and Do Something Scenarios, in the order of a 1dB increase, which is considered negligible. It should be noted that this 1dB increase is attributable to the impact of the Courtlough interchange and not due to the proposed landfill.

5 MITIGATION

5.1 LANDSCAPE AND VISUAL

It is proposed to carry out landscape planting to reduce the level of visual impact caused by the proposed development and to assist in blending the development with its surroundings.

A detailed landscape-planting scheme will be carried out during Stage 1 and Stage 2. Screen planting will be used on landscape berms, with woodland between the berms and site boundary, assisting in blending the development with its surroundings.

All trees and hedgerows on site to be retained shall be protected in accordance with BS 5837: 2004 "Trees in Relation to Construction". All trees and hedgerows to be retained shall be protected with 1200mm high chestnut pale fencing to BS 1722 Part 4. Fencing shall be erected before construction works commence. In particular all trees to be retained on the sites boundary shall be well protected to minimise visual intrusion.

A landscape management plan shall be prepared to insure the healthy establishment of all trees and shrubs within the proposed development and the replacement of any dead or dying plants after the first year's growth.

5.2 AIR QUALITY

No mitigation measures are required for the potential impacts on air.

5.3 NOISE

It is proposed that various practices be adopted during construction, including:

- Limiting the hours during which site activities, which may give rise to a noise nuisance, are permitted by the waste licence.

Furthermore, it is envisaged that a variety of practicable noise control measures will be employed. These will include:

- Selection of plant with low inherent potential for generation of noise and/or vibration.
- Siting of plant away from sensitive receptors where possible.

In addition, it is proposed that a 0.9 m noise barrier be constructed at the edge of the roundabout to the south of Mr. Hagen's property, for 60m either side of the roundabout. This barrier will be of permanent construction so as to provide noise mitigation throughout both the construction and operational phases of the proposed development.

6 RESIDUAL IMPACTS

6.1 LANDSCAPE AND VISUAL

After 15 years of growth the proposed planting will help to integrate the new road into the existing urban landscape. Tree planting will have achieved a height of 4 to 5m in height. In general the visual impacts are reduced but slight wintertime impacts will remain.

6.2 AIR QUALITY

There are no air quality residual impacts as a result of the proposed alterations to the local road network at the junction of Rowans Road and the New County road.

6.3 NOISE

With the construction of the 0.9 meter noise barrier and the landscape berms the overall noise impact from the proposed facility on Mr Hagen's property will be of low significance from an acoustic standpoint.

APPENDIX A

[Landscape and Visual]

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FIGURES

APPENDICES

1.0 VISUAL IMPACT ASSESSMENT

1.1 Introduction

This report considers and assesses the potential landscape and visual impact/effect of the proposed landfill development in Fingal on the landscape and visual resources of the L. Hagen property at Rowans Little.

1.2 Methodology

The methods used in this assessment are derived from the 'Guidelines for Landscape and Visual Impact Assessment' (GLVIA) by The Landscape Institute and Institute of Environmental Management and Assessment (2002) and the DOE Landscape and Landscape Assessment Guidelines (June 2000). The guidelines recommend baseline studies to describe, classify and evaluate the existing landscape and visual resource focusing on its sensitivity and ability to accommodate change of the type associated with landfill developments of the type proposed.

Visual Assessment Criteria

The following describes the key criteria used in the visual assessment.

Viewer Sensitivity: Viewer sensitivity is a combination of the sensitivity of the human receptor (ie resident; commuter, tourist; walker; recreationist, or worker) and viewpoint type or location (ie house, workplace, leisure venue, local beauty spot, scenic viewpoint, commuter route, tourist route or walkers' route).

Category	Typical criteria
High sensitivity	eg users of an outdoor recreation feature which focuses on the landscape; valued views enjoyed by the community; tourist visitors to scenic viewpoint.
Medium sensitivity	eg users of outdoor sport or recreation which does not offer or focus attention on landscape; tourist travellers.
Low sensitivity	eg regular commuters, people at place of work (excluding outdoor recreation).

Magnitude of Visual Resource Change: the magnitude of change in visual resource or amenity results from the scale of change in the view with respect to the loss or addition of features in the view and changes in the view composition, including proportion of the view occupied by the proposed development. Distance and duration of view must be considered. Other vertical features in the landscape and the backdrop to the development will all influence resource change.

Category	Criteria
High	Where changes to the view significantly alter (negative or beneficial) the overall scene or cause some alteration to the view for a significant length of time.
Medium	Where some changes occur (negative or beneficial) in the view, but not for a substantial part of the view or for a substantial length of time.
Low	Where only a minor alteration to the view occurs (negative or beneficial) not for a significant length of time.
No change	No discernible deterioration or improvement in the existing view.

Significance of Visual Impact: Significance of visual impact can only be defined on a project by project basis. The principal criteria for determining significance are magnitude and sensitivity of the receptor. A higher level of significance is generally attached to large scale or substantial effects on sensitive receptors.

Where visual sensitivity has been predicted as high or medium, and the magnitude of change as High, the resultant impact will be significant. Where the magnitude of change has been predicted as High or Medium and the visual sensitivity has been predicted as High then the resultant impact will be significant in terms of assessment.

The following table illustrates significance of visual impact as a correlation between viewer sensitivity and visual resource change magnitude.

Table 1.1 Significance of Visual Impact

Magnitude of Visual resource change	**Visual Sensitivity**		
	Low	**Medium**	**High**
No change	No change	No change	No change
Low	Slight	Slight / moderate	Moderate
Medium	Slight / moderate	Moderate	Moderate / substantial
High	Moderate	Moderate / substantial	Substantial

1.3 Receiving Environment

The proposed landfill development is located immediately west of the M1 motorway between Nags Head and The Five Roads. A County Road (Nevitt Road) that extends between the R108 and the remaining R132 in an east to west direction crosses the middle part of the site. The proposed site is located on the gentle east facing side slopes of Knockbrack Hill which rise to 176 m OD. Knockbrack and its associated rounded hills (Nags Head 151m OD) dominate the surrounding lowlands of North Fingal and are significant visual components of this landscape. Agricultural use has a large proportion of arable activity within large field systems. Field boundaries are defined by low well-maintained hedgerows and trees that provide enclosure and restrict views. Elevated views across the site are available to the Dublin Bay and Mountains. Below the Nevitt Road the side slopes give way to level lowland which contains a gently undulating almost flat landscape crossed by the M1. Housing is largely confined to the County Roads that criss-cross the surrounding landscape. Views are available from the remaining R132, the M1 and the County Roads that surround the site.

The landscape character of the study area can be described by use of two distinctive landscape character areas described below.

- Elevated agricultural hills
- Lowland agricultural landscape

***Elevated Agricultural Hills**:* The western part of the study area consists of the gentle side slopes of the Knockbrack Hill. Knockbrack Hill has two summits the second being Nags Head. The summits are landmarks in the surrounding landscape best illustrated by the Nags Head hill top that has a tall mast visible from long distances. A less extensive hill is found east of the M1 above Hedgestown. The hills form a distinctive unit above the surrounding lowlands. The hills have been rounded by glacial action and a patchwork effect is created by strong hedgerows and pastoral fields. Extensive views north, south and east are available from this

landscape. Large field systems with low hedgerows and few trees provide little enclosure. Arable farming is frequent. Housing is scattered throughout but not as frequent as on the lowlands. The elevated agricultural hills landscape character area has high sensitivity to change of the type proposed.

Lowland Agricultural Landscape: East of Nags Head and Tooman the study area consists of a more level lowland dominated by pastoral agriculture. The strong hedgerows combine with the level landscape to provide more enclosure than the side slopes above. This enclosure significantly restricts views across this landscape area. Views across this landscape character area are only available from infrequent prominent elevated positions at M1 overbridges and at locations on the existing R132. Housing is frequent and a prominent roadside feature. The lowland agricultural landscape character area has a low sensitivity to change of the type proposed.

1.4 Impact Assessment

1.4.1 Residential Impacts

Construction and Operational Phases

The landfill will result in changes to the existing site topography resulting in the creation of new bunds/earth mounds and increased site topography levels. It is proposed to have two primary phases to the development, Stage 1 and Stage 2. During Stage 1 the site infrastructure will be constructed including roads and waste handling facilities (See Figure 1.1 2.1 of EIS). Further, the earth mounds to the sites western and eastern boundaries will be constructed and Landfill operations will begin at the sites southern boundary and extend northwards across Nevitt Road in Stage 2. The new roads constructed in Stage 1 are in relatively close proximity to existing roads and therefore follow existing landscape patterns. The new roads will, therefore, result in low levels of change in landscape resource. The landfill will have reached a height of approximately 70 m OD on completion of Stage 1. The construction and operational phases for Stage 1 will alter the overall landscape character to a high level resulting in the loss of existing field patterns and loss of arable and pastoral characters south of the Nevitt Road. Modified landforms will be created.

The visual impacts of the proposal on the L. Hagen residential property have been established through detailed fieldwork and photographic survey. Table 1.2 below summaries the visual impact from the proposed landfill scheme and associated infrastructure on this property. The location of the Hagen property is illustrated in Appendix 1. The site context for the property has been established by site survey work also illustrated in Appendix 1 Photographic Survey. Specific Landscape Mitigation (SLM) has been identified in Section 1.5 and illustrated in Figure 1.1 to address the significant impacts established. The property lies north of the proposed Rowans Little Roundabout. Vegetation located on the existing roadside will be lost opening views of traffic on the new roundabout. The viewer sensitivity is high. The magnitude of resource change is high. The predicted significance of visual impact at Stage 1 is Substantial Adverse. During Stage 2 the change in visual resource described for Stage 1 will remain and the predicted significance of visual Impact is Substantial Adverse.

Table 1.2 Residential Visual Impact Table

	Components of Existing View	Components of Proposed View	Visual Impact (without mitigation)		Residual Impact (with mitigation)	
			Stage 1	Stage 2	Stage 1	Stage 2
139	Rear View of existing garden vegetation and roadside trees	Rear View of existing garden vegetation with roadside trees removed and vehicles on new roundabout visible	Substantial Adverse	Substantial Adverse	Slight Adverse	Slight Adverse

1.5 Mitigation

It is proposed to carry out landscape planting to reduce the level of visual impact caused by the proposed development and to assist in blending the development with its surroundings.

A detailed landscape planting scheme is proposed to be carried out during Stage 1 and Stage 2. The proposed planting specific for the Hagen property is illustrated in Figure 1.1. Screen planting will be used on landscape berms, with woodland between the berms and site boundary, assisting in blending the development with its surroundings.

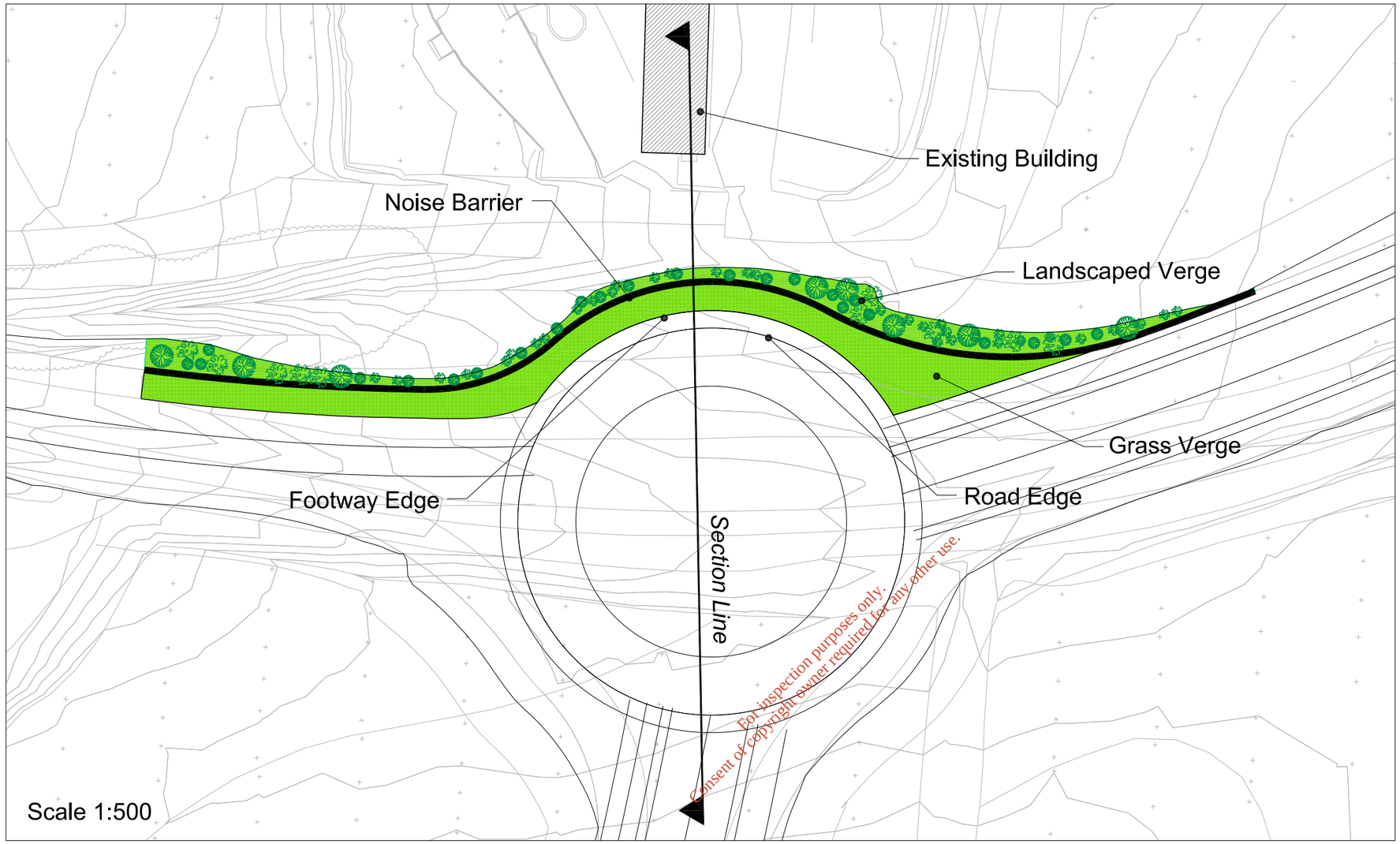
All trees and hedgerows on site to be retained shall be protected in accordance with BS 5837: 2004 "Trees in Relation to Construction". All trees and hedgerows to be retained shall be protected with 1200mm high chestnut pale fencing to BS 1722 Part 4. Fencing shall be erected before construction works commence. In particular all trees to be retained on the sites boundary shall be well protected to minimise visual intrusion.

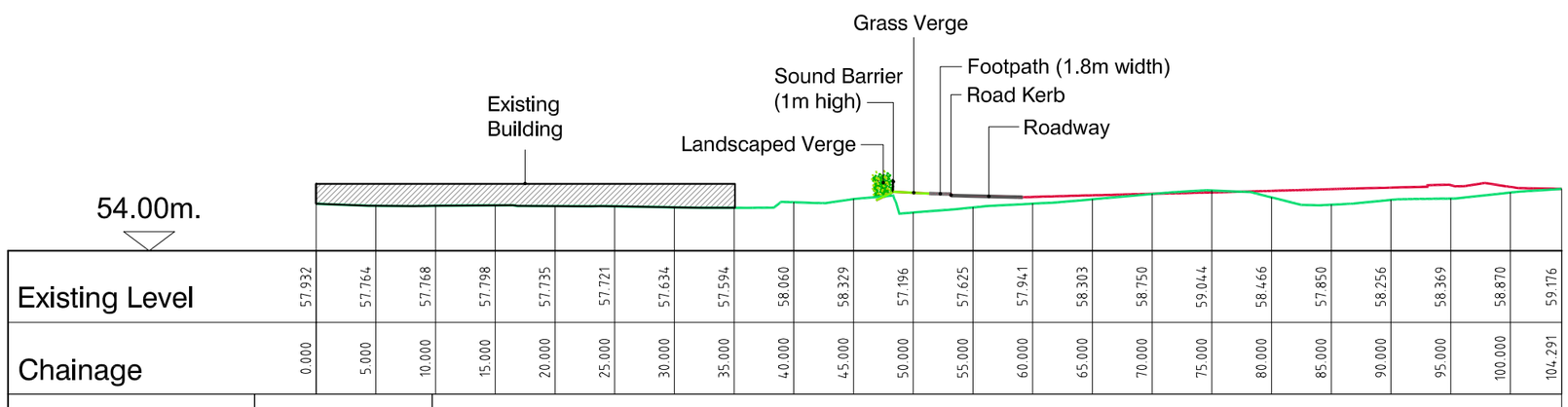
A landscape management plan shall be prepared to insure the healthy establishment of all trees and shrubs within the proposed development and the replacement of any dead or dying plants after the first year's growth.

1.6 Residual Impacts

This section of the report assesses the impact of the proposed development on the visual receptor after the mitigation (described above in Section 1.5 and illustrated in Figure 1.1) has attained 15 years of growth.

After 15 years of growth the proposed planting will help to integrate the new road into the existing urban landscape. Tree planting will have achieved a height of 4 to 5m in height. In general the visual impacts are reduced but slight wintertime impacts will remain. The predicted residual visual impact for the Hagen property is summarised in Table 1.2.





Chainage	Existing Level
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5.000	57.764
10.000	57.768
15.000	57.798
20.000	57.735
25.000	57.721
30.000	57.634
35.000	57.594
40.000	58.060
45.000	58.329
50.000	57.196
55.000	57.625
60.000	57.941
65.000	58.303
70.000	58.750
75.000	59.044
80.000	58.466
85.000	57.850
90.000	58.256
95.000	58.369
100.000	58.870
104.291	59.176

Existing Section

Proposed Section

SE1

Horiz. 1:500 Vert. 1:500

Revision	Date	Description	Drawn	Chkd

STATUS

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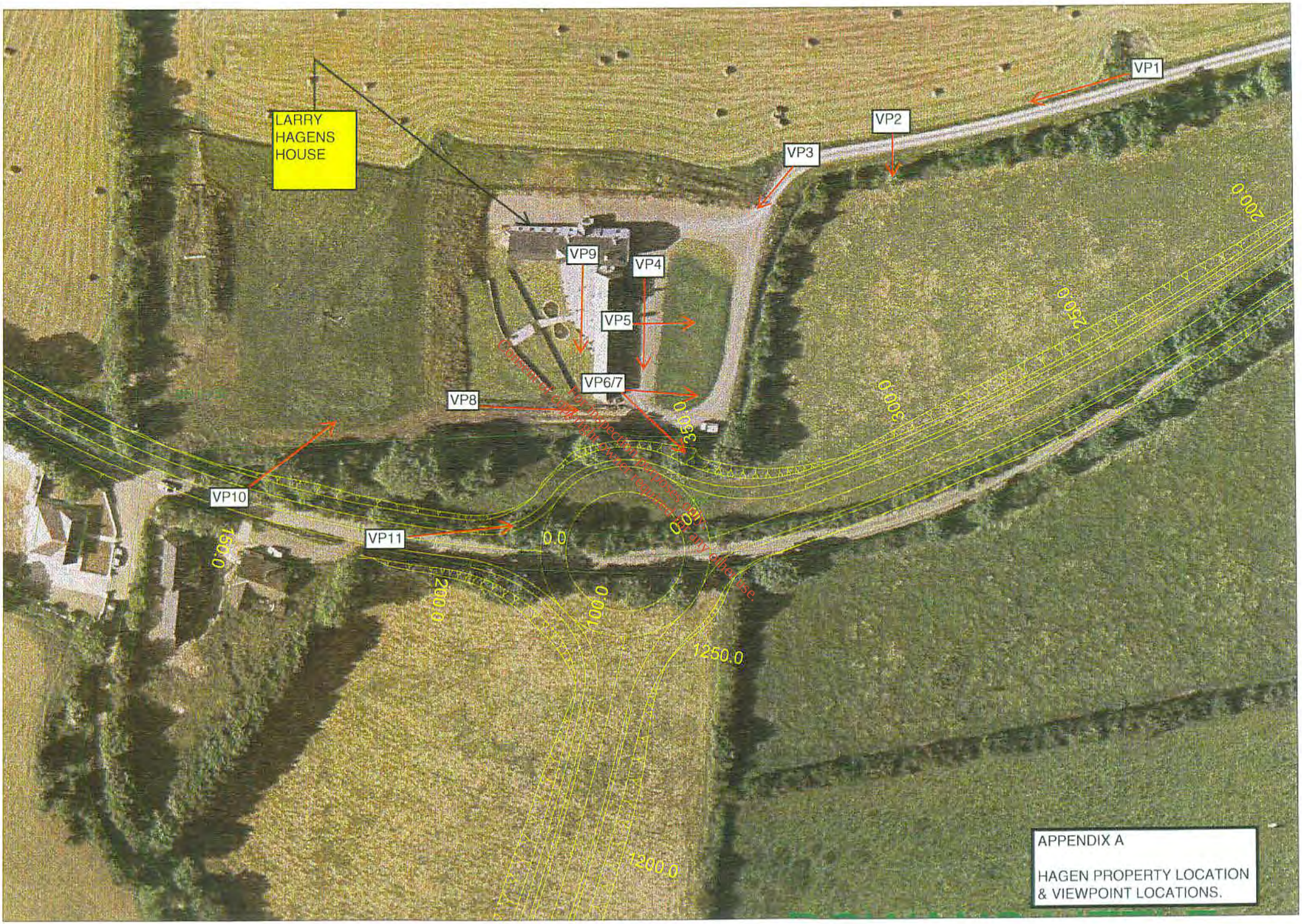
PROJECT
Dublin Landfill

TITLE
Indicative Layout Drawing

SCALE/PAPER SIZE	DRAWN BY
1:500 @ A3	AB
DATE	CHECKED BY
06.07.11	RH

PROJECT NUMBER	DRAWING NUMBER	REVISION
NI 0724	0724.1.01	

Appendix 1 : Photographic Survey



APPENDIX B

[Air Quality]

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1.1 INTRODUCTION

As part of the air quality assessment for the Environmental Impact Assessment (EIS) for the proposed Fingal Landfill, RPS has assessed the existing air quality and the predicted air quality during the operational phase of the project at the sensitive receptor (property of L. Hagens) located on the junction of Rowan Road and Tooman Road.

1.2 METHODOLOGY

The existing and predicted ground level concentrations of traffic derived pollutants as a result of the operational phase of the development have been modelled using the procedure outlined in the UK Design Manual for Roads and Bridges (DMRB), Volume 11, Air Quality (February 2003). The DMRB is a UK screening model used to predict potential adverse air quality impacts from road schemes.

The screening model uses a 'worst case' scenario and contains a number of conservative assumptions which deliberately overestimate emissions. Firstly, the emission factors for each pollutant are biased to overestimate the actual emission rate (but without generating unrealistically high results). Additionally, wind speeds are assumed to be 2m/s, which is lower than that typically found in Ireland. As a number of features of the procedure are designed to overestimate likely pollution levels, it can be assumed with some confidence that a project will not produce air pollution problems if none are identified by this method. The traffic figures used in the model predictions have been derived from the traffic impact assessment for the EIS.

1.3 PREDICTED IMPACT

Pollutant concentrations were modelled at the facade of the property under the following scenarios:

- 2005 Existing scenario
- 2008 Do-Minimum scenario
- 2008 Do-Something scenario
- 2023 Do-Minimum scenario
- 2023 Do-Something scenario

An average speed on each link of 50 km/hr was used for the existing scenario and the future year Do-minimum scenario as there is currently no roundabout at the junction To simulate worst-case conditions, an average speed of 20 km/hr was used in the model for the Do-Something scenario with the roundabout in place.

For the model predictions, background data from the EPA monitoring station at Mountrath, for 2004 has been used. This is an EPA monitoring station in a suburban location and would be expected to have higher background concentrations than the rural site in Fingal.

.

The results of the DMRB assessment at R1 (L. Hagens property) are presented in Table 1 below.

Table 1 Results of DMRB Predictive Modelling of traffic-derived pollutants at Receptor 1

Scenarios	Traffic Speed km/hr	Carbon Monoxide (mg/m^3)	Benzene ($\mu g/m^3$)	Nitrogen Dioxide ($\mu g/m^3$)	Particulates (PM_{10}) ($\mu g/m^3$)
		Annual Average	Annual Average	Annual Average NO_2	Annual Average
Existing Scenario	50	1.61	0.31	13.31	22.78
2008 Do Minimum	50	1.28	0.28	12.54	21.43
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2023 Do Minimum	50	1.06	0.27	10.54	20.40
2023 Do Something	20	1.07	0.28	10.85	20.55
EU Standards		**10**[(1)]	**5**[(1)]	**40**[(2)]	**40**[(2)]

Notes:
(1) EU Directive 2000/69/EC
(2) EU Directive 1999/30/EC

The existing and predicted pollutant concentrations at R1 are below the relevant air quality limit values for all scenarios. There will be a decrease in all pollutant concentrations in future years at R1 with or without the scheme in place. This is due to planned improvements in engine technology as part of the EU Euro Oil programme. This programme involves voluntary reductions in exhaust emissions from car manufacturers. These reductions are incorporated into the DMRB model in the form of reduced emission factors for future year scenarios. The predicted increase in traffic figures and the decrease in traffic speeds in the vicinity of R1 are not significant enough to cause an increase in ground level pollutant concentrations in future years.

There is a minor increase in pollutant concentrations when comparing the Do-minimum and Do-something scenarios in each of the future year scenarios. This is as a result of the additional traffic numbers.

1.4 RESIDUAL IMPACT

There are no air quality residual impacts as a result of the proposed alterations to the local road network at the junction of Rowans Road and Tooman Road.

1.5 CONCLUSION

In summary, the assessment model predicts that concentrations of traffic derived pollutant at the façade of the receptor at the junction of Rowans Road and Tooman Road will remain significantly below the Air Quality Standards limit values during the operational phase of the proposal. The net impact of the proposed development on air quality at R1 will be imperceptible.

APPENDIX C

[Noise]

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1 NOISE IN THE EXISTING ENVIRONMENT

1.1 CONTEXT

This report assesses and describes the noise impacts associated with the proposed Fingal landfill development on the property of Mr. L. Hagen. The noise assessment has been made using the following methodologies:

- Construction noise impact has been assessed in accordance with BS5228 *'Noise and Vibration Control of Construction and Open Sites' (1997).*

- Guidance relating to the operation of the site has been made with reference to the EPA: *Guidance note for noise in relation to scheduled activities and W.H.O guidelines.*

1.2 NOISE CRITERIA

The operation of the proposed landfill will be controlled by the Environmental Protection Agency under an operating waste licence. In order to assess the operating levels of the site, the following criteria and regulatory bodies have been referenced which may be considered applicable to the operation of the landfill in question:

- **Environmental Protection Agency EPA: *Guidance note for noise in relation to scheduled activities***
  This document states that ideally, if the total noise level from all noise sources is taken into account, the noise level at the sensitive locations should be kept below an L_{Aeq} value of 55dB (A) by daytime and 45dB (A) by night. Audible tones and impulsive noise at sensitive locations at night should be avoided. In some particularly quiet areas, such as pastoral, rural settings, where background noise levels are very low, lower noise limits may be more appropriate.

- **Environmental Protection Agency (EPA): *Guidance notes for Noise*:**
  This document suggests usual range of values allowed for industrial activities is 55dBL_{Aeq} during the day and 45dB (A) by night. These values relate to noise levels at the nearest noise sensitive locations or at the boundary of the premises.

- **World Health Organisation (WHO) *Guidelines for Community Noise 1999*:**
  This document recommends that to protect the majority of people from being seriously annoyed during the daytime, the outdoor sound level from steady, continuous noise should not exceed 55dB L_{Aeq} on balconies, terraces and in outdoor living areas.

In summary, operational noise levels for the landfill should be limited to 55dB L_{Aeq} during day time hours and 45dB L_{Aeq} during night time hours in line with the above guidance documents.

1.3 VIBRATION CRITERIA

There is no published Irish guidance relating to vibration during construction activities. However common practice is to use guidance from two internationally recognised standards,

- Building Research Establishment (BRE) Digest 353 (July 1990): *Damage to structures from ground borne vibration, and:*

- British Standard BS 7385 (1993); *Evaluation and measurement for vibration in buildings Part 2: Guide to damage levels from ground borne vibration.*

In order to ensure that there is no potential vibration damage during construction, the National Roads Authority recommends that vibration from road construction activities be limited to the values set out in

Table 1.1. These guidelines are the de facto construction vibration limits as used in the industry in Ireland, as no legislative limit exists. These values have been derived through consideration of the various standards outlined above.

Table 1.1: Allowable Vibration during Road Construction in Order to Minimise the Risk to Building Damage:

Allowable Vibration Velocity (Peak Particle Velocity) at the Closest Part of any Sensitive Property to the Source of Vibration, at a Frequency of		
Less than 10Hz	10 to 50 Hz	50 to 100Hz (and above)
8 mm/s	12.5 mm/s	20 mm/s

1.4 "DO NOTHING" IMPACT

If the proposal were not to go ahead there would be no noise impact from this proposed Landfill facility on Mr L Hagen's property. However as this area has seen considerable development over the last number of years it is likely that noise from traffic will increase in the future. The current (base year) traffic study based noise level is 61db L_{A10} 1hr at location N6 which is Mr L. Hagen's property.

1.5 PREDICTED IMPACT

The predicted noise impact of this development will occur during both the construction and operational phases of the project.

1.5.1 Construction phase

The construction phase of the proposed development has the potential to increase noise levels at Mr L Hagen's property. Impact from the construction phase will depend on the number and type of equipment used during the development and the distance between construction plant and Mr Hagen's property.

The construction stage of the project will include the construction of the first three landfill cells plus the County road as outlined above. It is envisaged that construction works associated with the site development will involve some if not all of the following pieces of machinery during site preparation and construction works;

- Dozer
- Tracked Excavator
- Dump Trucks
- Standby Generator
- Road Sweeper
- Road Lorries

Predicted noise levels have been estimated using the methodology described in BS: 5228: *Noise and Vibration on construction and open sites*. Predictions are based on a $L_{Aeq1hour}$ value with all machinery listed above operating for a continual period of 1 hour. This may be considered a worst-case scenario as machinery may not work simultaneously; it is also extremely unlikely that all plant will operate in the same place at the same time, which is assumed herein.

In Ireland, there are no statutory guidelines relating to noise limits for construction activities. These are generally controlled by local authorities and commonly refer to limiting working hours to prevent a noise nuisance. A publication from the National Road Authority (NRA) *'Guidelines for the treatment of noise and vibration in national road schemes'* 2004, has outlined recommended noise levels for construction noise.

Although these refer to road projects, they have been developed in line with typical construction noise limits on general construction projects used previously in Ireland. The limits outlined represent a reasonable compromise between the practical limitations during a construction project and the need to ensure an acceptable ambient noise level for local residents. As a result, these limits have become the

most acceptable standard for construction noise limits for EIS assessments to date. Considering the baseline noise levels measured at N3 as seen in Table 1.5 (the nearest surveyed noise location to L Hagen's property), these values are considered a reasonable target. Table 1.2 below details these recommended limits:

Days and Times L_{Aeq} (1hr)	$L_{Aeq\ (1Hr)}$ dB	$L_{pA\ (max)\ slow}$ dB
Monday to Friday 07:00 to 19:00hrs	70	80[2]
Monday to Friday 19:00 to 22:00hrs	60[2]	65[2]
Saturday 08:00 to 16:30hrs	65	75
Sundays and Bank Holidays 08:00 to 16:30hrs	60[2]	65[2]

Table 1.2: Maximum permissible noise levels at the façade of dwellings during construction

[2] Construction activity at these times, other than that required in respect of emergency works, will normally require the explicit permission of the relevant local authority

The National Roads Authority considers that the noise levels in Table 1.2 above are typically deemed acceptable. However the NRA stipulates that: *"these values are indicative only, it may be appropriate to apply more stringent limits in areas where pre-existing noise levels are low".* The baseline levels obtained during the survey are typical of a semi-rural setting and hence Table 1.2 is considered appropriate.

Table 1.3 below summarises the calculated noise levels from the construction phase, which would be expected at the property of L. Hagen (N6).

The nature of the construction period and the variety of machinery used should ensure that no construction activity is operational for long periods in a single area. This will therefore result in short term impacts, as construction works will migrate ensuring noise impact at Mr. Hagens property will reduce from this worst case scenario with time and that the property is not subject to constant stationary noise sources during the construction phase. The plant involved in road works has been assessed at 20m and that involved in cell construction at 600m as these processes may be simultaneous.

Estimated Construction noise levels at N6 LAeq 1 hour		
Plant	**20 m (Road)**	**600m (Landfill)**
Road sweeper	55	n/a
Dozer	n/a	40
Dumper truck	61	36
Asphalt spreader	61	n/a
JCB	55	30
Tracked Excavator	67	40
Combined Level LAeq 1hour	**68**	**44**

Table 1.3 Construction noise level predictions.

It is considered that the transient and temporary nature of the construction of the road will mean that it not cause significant noise disturbance to L Hagen's property for prolonged periods of time, and will be within guidance limit values as described above in Table 1.3. This temporary noise impact is tempered by a 0.9m noise barrier between Mr. Hagen's property and the roundabout.

With regard to vibration it is considered that the any potential impact will be minimised by adherence by the contractor to the guidance as described in section 1.4.

1.5.2 Operational Phase

1.5.2.1 Operational Phase mobile plant

Impact from the operation of the site will depend on the number and type of equipment used during the development. It is envisaged that regular works associated with the site operations will involve some if not all of the following pieces of machinery:

- Dozer
- Tracked excavator
- Dump Trucks
- Site Tractor
- Road Sweeper
- Standby Generator
- Landfill Compactor
- Gas Engines

Predicted noise levels have been estimated using the methodology described in BS: 5228: *Noise and vibration control on construction and open sites*. Predictions are based on a $L_{Aeq1hour}$ value with all machinery listed below operating for a continual period of 1 hour. Additionally, calculations are based on minimum distances between site activities and the nearest noise sensitive locations not including any site screening.

Table 1.4 summarises the calculated noise levels, which would be expected at 600m (the distance of Mr. L. Hagen's property from the land-filling activities). This table is based on calculations for the plant typically used on a project of this scale and is based on the BS 5228 standard. As such this table quantifies the predicted noise impact of all plant operating on the site, regardless off task, i.e plant engaged in the landfill operation and plant constructing new landfill cells on the site.

BS5228 Calculations	
Plant	**600m**
3x road sweeper	36
3x Dozer	46
3x Dumper truck	42
3x JCB	36
3x compactor	43
3x standby generator	29
3x Tracked Excavator	45
6x Gas flare engine	45
Combined Level LAeq 1hour	**49**

Table 1.4 Operational noise level predictions.

The combined level of 49dB L_{Aeq} is well below relevant guidance limits as described above and is not expected to cause a significant noise impact to Mr. Hagen's property.

1.5.2.2 Traffic

The potential noise impacts from this proposed development during its operational phase will primarily be as a result of increased traffic flows along existing routes within and surrounding the development coupled with the operation of both mobile and stationary site plant. The greatest potential increase in traffic noise will be on the entrance road to the site.

Results of the noise impact of road traffic at N3 and N6 (L Hagen's house) can be found in Table 1.5 below. In this table the Do Nothing (no landfill/County road) and the Do Something (Landfill and County Road), scenarios have been assessed using AADT traffic figures from the traffic study. These

figures have been assessed using the U.K.'s Department of Transport (Welsh Office) *Calculation of Road Traffic Noise* Methodology (1988).

L_{A10} 18Hour Values								
	2005 Base year	2008 Do Something	2009 Do Nothing	2009 Do Something	2024 Do Nothing	2024 Do Nothing Courtlough*	2024 Do Something	2024 Do Something Courtlough*
N3	70	69	69	70	70	70	71	71
N6	61	50	65	65	66	67	64	65

Table 1.5: Results of Road Traffic Study in L_{A10} 18Hour Values

(* indicates the upgrade of the Courtlough interchange)

Mr. Hagen's property (N6) will experience, in the worst case, a slight change in noise level between the Do Nothing and Do Something Scenarios, in the order of a 1dB increase, which is considered negligible. It should be noted that this 1dB increase is attributable to the impact of the Courtlough interchange and not due to the Landfill.

2 MITIGATING ADVERSE IMPACTS OF NOISE

Noise from the construction phase of the project will result in a slight increase in noise levels at L Hagen's property during this stage of the development

With regard to construction activities, all plant items used during the construction phase should comply with standards outlined in 'European Communities (Construction Plant and Equipment) (Permissible Noise Levels) Regulations, 1998. Reference should be made to BS5228: Noise control on construction and open sites, which offers guidance on the control of noise from construction activities.

It is proposed that various practices be adopted during construction, including:

- Limiting the hours during which site activities, which may give rise to a noise nuisance, are permitted by the waste licence.

Furthermore, it is envisaged that a variety of practicable noise control measures will be employed. These will include:

- Selection of plant with low inherent potential for generation of noise and/or vibration.
- Siting of plant away from sensitive receptors where possible

In addition, it is proposed that a 1m noise barrier be constructed at the edge of the roundabout to the south of Mr. Hagen's property, for 60m either side of the roundabout. This barrier will be of permanent construction so as to provide noise mitigation throughout both the Construction and Operational phases of the proposed development.

2.1 OPERATIONAL PHASE

2.1.1 Building services plant

The operational phase of the development is not anticipated to significantly increase noise on L Hagen's property. With regards to noise from possible services plant there are various practicable measures, which may be taken to ensure noise will not cause any disturbance to nearby residences:

- Siting of extraction fans at roof level to reduce ground level noise disturbance

- Duct Mounted attenuators on the atmosphere end of all acoustically offending air moving plant
- Splitter attenuators or acoustic louvres providing free ventilation to internal plant areas
- Solid barriers screening external ground level plant from sensitive receptors
- Anti vibration mounts on reciprocating plant.

2.1.2 Plant and mobile machinery

With respect to the noise impact potential of the site plant, mitigation measures will include maintaining efficient operation of mobile plant and limiting operating times to those as laid down in the waste licence. Maintenance steps will include:

- Ensuring all covers are securely fastened to the machines
- Selecting machines with mufflers installed and ensuring these are maintained in good condition (no holes) and are bolted firmly to the side of the engine
- Ensure throttle control is in good working order and regulates the revs of the machine in a smooth manner.
- Ensure plant is free running and are well maintained.
- Ensuring machines are not left running idle.

2.1.3 Traffic Noise

With respect to traffic noise, it is recommended a noise barrier be constructed of 120m length, and 0.9m height to the north of the roundabout at the entrance to the site to mitigate the noise impact to noise sensitive receptor N6(Mr. L. Hagen's property). Additional measures include maintenance of the road surface and the implementation of strict speed limits.

3 RESIDUAL IMPACTS

3.1 CONSTRUCTION PHASE

Due to the nature of the activities undertaken on a large construction site, there is potential for generation of high levels of noise, if noise control measures above are not adhered to. Therefore, it is usual to limit the times during which it is permissible to carry out noisy construction work in order to minimise the impact on nearby noise sensitive locations. Predicted noise levels at L Hagen's property for this phase of the development are within recommended limits. Permissible construction times and durations will be set down in the Waste License. Hence the noise and vibration impact of this phase of the development should be kept to a minimum.

3.2 OPERATIONAL PHASE

Noise impacts as a result of the operational stage of the development are not anticipated to be significant at L Hagen's property if control measures as described in this document are adhered to. In this setting, mobile plant noise, building services plant noise, and stationary plant noise when managed as described above will not cause significant noise disturbance and will be within the limits outlined in section 1.4. The potential noise impact of increased traffic will not cause any significant impact if the mitigation measures recommended herein are adopted. The results of the associated traffic study can be seen in Table 1.5 above.

The overall noise/vibration impact from the proposed facility on Mr L Hagen's property is considered to be of low significance from an acoustic standpoint.