# Chouet Headland Development Framework

## Appendix 2

Supplementary Planning Guidance October 2021

Development & Planning Authority

# Appendix 2: Research required as part of the Environmental Impact Assessment

### Environmental Impact Assessment and reporting

Proposals for quarrying at Chouet headland would be considered a Schedule 1 type of development and will require an Environmental Impact Assessment in accordance with The Land Planning and Development (Environmental Impact Assessment) Ordinance 2007.

Some environmental information and research has already been undertaken by one of the landowners (Ronez) for the site and published in a report entitled *'Chouet Headland, Environmental Appraisal of Establishing a Quarry'* by their agents SLR (see copy enclosed). This research has been reviewed by Agriculture, Countryside and Land Management Service (ACLMS) who consider that further research is required to prepare a valid Environmental Statement to accompany a planning application for quarrying at this site (see copy of letter dated 9th September 2021 enclosed). It is expected that further research will be carried out in the areas highlighted by ACLMS to allow an approriate assessment of the site and any proposal for quarrying.

If a planning application for quarrying is received, the information submitted will be thoroughly assessed against the requirements of the Planning Law and Ordinances and considered appropriately by the Authority. Further consultation on the detailed proposal including the environmental assessment will be undertaken with all relevant statutory consultees at that stage.

States of Guernsey
Agriculture, Countryside and Land Management Services

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9 September 2021

Dear Sir/ Madam,

**Technical opinion to inform the Chouet Headland Development Framework.**

This opinion has been prepared on behalf of Agriculture, Countryside and Land Management Services ("ACLMS") - the authority within the States of Guernsey responsible for the protection and enhancement of the natural environment – following a technical review of the Environmental Appraisal submitted by Ronez Limited (the 'Applicant') in support of the proposed development of land at Chouet Headland, Vale for the extraction and processing of granite to produce aggregates (the 'Development').

This opinion sets out the additional research and information ACLMS would expect to be provided during the detailed planning phase for the Development to ensure that any potential effects on the natural environment are adequately characterised, assessed and mitigated; as required under the Land Planning and Development (Environmental Impact Assessment) Ordinance, 2007 (the "EIA Law").

This technical opinion has been prepared by a qualified Ecologist and Environmental Impact Assessment (EIA) subject matter expert and has taken account of relevant EIA regulation, the type, scale and strategic significance of the proposed Development, the nature of the receiving environment, and recognised good practice guidance on the preparation of EIA and Environmental Statements.

**EIA regulation**

It is acknowledged that the proposed Development constitutes an "EIA Development" and "Schedule 1 Development", as described in the Land and Planning Development (Environmental Impact Assessment) Ordinance 2007 (the "EIA Ordinance"); and therefore an EIA should be carried out and Environmental Statement submitted as part a detailed planning application for the proposed Development.

It is of the opinion of ACLMS that the information presented in the Environmental Appraisal does not support that the Development would be "*so minor a nature that it is incapable of having a*

*significant adverse effect on the quality of the environment, use of natural resources or biological diversity*"; section 2(2) of the EIA Law does therefore not apply to the proposed Development and an EIA is required to inform the detailed planning process.

It is appreciated that under section 2(2) of the EIA Law the DPA shall issue an opinion in writing to the Applicant specifying the matters that the EIA should address, and the level of detail required ("Scoping Opinion"). This letter provides a summary of the research and technical information which ACLMS would expect to see requested by the DPA in the Scoping Opinion to ensure that any potential effects on the natural environment are given appropriate consideration in the EIA.

This technical opinion should not be construed as implying that ACLMS agrees with the information provided or conclusions reached in the Environmental Appraisal.

Comments included in this technical opinion are without prejudice to any later opinions provided by ACLMS - for example on submission of a Scoping Report or Environmental Statement for the proposed Development.

**Environmental Appraisal**

The level of technical information presented in the June 2021 Environmental Appraisal ("Environmental Appraisal") is considered appropriate for a high-level appraisal of potential environmental effects to inform the Chouet Headland Development Framework.

The Environmental Appraisal does not demonstrate adequate research, technical content and impact assessment process for it to be considered an Environmental Statement nor demonstrate that an EIA has been carried out for the proposed Development.

There are shortcomings in the Environmental Appraisal, particularly regarding the characterisation of the biodiversity value of the Chouet Headland site and the potential effects of the proposed Development on the natural environment and air quality, which ACLMS shall expect to see addressed in the EIA for the proposed Development. On this basis, further revision of the Environmental Appraisal is not warranted to inform the approval of the Development Framework.

**Scope of an EIA**

It is not clear from the Environmental Appraisal which phase(s) of the proposed Development have been taken through the appraised process reported within the document. A precautionary approach has therefore been applied to any conclusions made on the potential environmental effects of the proposed Development.

As per EIA good practice, the scope of the EIA will be expected to include any works or phase(s) of the proposed Development which are intrinsically linked - for example, if the commercial viability of the Development is dependent upon Phase 1 and Phase 2 achieving planning approval, then both phases should be assessed in the same EIA to support the planning application process for Phase 1 and/ or Phase 2.

**Project information**

It is acknowledged that during the early stages of the project - when the Environmental Appraisal was produced - project information would have been limited; as reflected in the content of project information presented in the Environmental Appraisal.

The EIA shall however need to include a clearly defined EIA scope with project information clearly linked to a particular phase and schedule of works. If certain project information is not yet available,

realistic worst case design assumptions should be used to inform the EIA – e.g. a realistic worst case number of HGV movements per day along a specified route(s) between Les Vardes Quarry and Chouet Headland during the transition phase, or a worst case assumption on whether any proposed access roads may require widening.

**Assessment methodology**

A technical review of the assessment methodology and conclusions reached in the Environmental Appraisal was not possible due to a lack of supporting evidence in or appended to the report. A precautionary approach has therefore been applied to any conclusions made on the potential environmental effects of the proposed Development. It has also not been possible to validate statements such as the Environmental Appraisal is "*in essence [..] an extended summary of the EIA".*

As per industry guidance on good EIA practice[1] the Environmental Statement in support of the proposed Development shall be expected to include a description of the EIA methodology, including the significance and likelihood criteria applied to each topic.

As per the Island Development Plan, ACLMS shall expect to see evidence to support that any proposed mitigation identified as part of the EIA has followed a sequential approach to avoid, minimise, restore or off set the impacts…[]..and as per the IDP "o*nly where the first three stages have been thoroughly tested will off setting be considered".*

**Topics to be addressed in an EIA**

It is recognised that a focussed and timely EIA shall be a high priority for this project due to its strategic significance. This opinion responds to this need by highlighting the key topics that ACLMS shall expect to see taken through Scoping and into an EIA to adequately address any potential significant adverse effects on the natural environment and designated sites - as follows:

- **Air quality** – the Environmental Appraisal references IAQM guidance and that "on this basis […] there are not considered to be any features of specific sensitivity to dust within the L'Ancresse Common SSS". The EIA and Environmental Statement should provide adequate detail on the applicability of such guidance for Guernsey and present any conclusions in the context of the site and the local importance of habitats and species and designated sites within the air quality study boundary for the Development.
- **Biodiversity and designated sites** – a detailed ecological impact assessment (EcIA) should be carried out in accordance with the good practice guidelines such as The Chartered Institute of Ecology and Environmental Management CIEEM) standards. Any reference to significance ratings of potential impacts should demonstrate a conservative approach to reflect the limited availability of data within the Guernsey Biological Records Centre and the lack of wildlife and natural environment protection law in Guernsey for species which are afforded legal protection in other neighbouring jurisdictions. The ecological impact assessment should be peer reviewed by an ecological expert(s) with specialist knowledge of flora and faunal species in a national and local context to ensure the appropriateness and robustness of the surveys and assessment carried out, and to provide an independent appraisal of the data used to inform the assessment. See below sub-section on appropriate surveys.

[1] IEMA (2016) EIA Guide to Shaping Quality Development. Published by IEMA.

- **Climate change** – the EIA Scoping phase should either scope out (with justification) any potential impacts on or from climate change, or the EIA should adopt good practice guidance to identify any potential effects of the Development on climate change nature-based solutions including the integrity of ecological networks required to maintain resilience to climate change.
- **Water and soil quality** - the EIA Scoping phase should either scope out (with justification) any potential impacts on or from historical landfilled waste at Mont Cuet, including the migration of landfill gas and leachate at lower levels, and any potential impacts of blasting or the siting of a quarry on the integrity of the Mont Cuet landfill cells and associated water pressures.

**Biodiversity Surveys & Research**

It is noted that 2020 updates have been carried out for the 2017/18 Phase 1 Habitat survey and over-wintering birds surveys. Equivalent updates should be carried out for the 2017/18 breeding bird, reptile and bat surveys to inform the EIA. Or alternatively, ACLMS should be consulted with and provided with adequate evidence and technical rationale to support a case to not update said out of date surveys.

It has not been possible for ACLMS to assess the methodologies applied to the surveys carried out to inform the Environmental Appraisal as the full survey reports have not been appended to the Environmental Appraisal.

Any ecological surveys used to inform the EIA should be carried out in accordance with guidance produced by the Chartered Institute of Ecology and Environment, Management (CIEEM) and reports to British Standard BS42020:2013; with a specific focus on priority species, including the identification of nationally and locally important species – e.g. an extended Phase 1 Habitat survey and appropriate Phase 2 surveys would be expected to inform a robust EIA for the proposed Development.

**Biodiversity Net Gain**

Should the Applicant wish to apply voluntary Biodiversity Net Gain to the proposed Development, appropriate guidance should be sought from ACLMS and generic guidance such as CIEEM BNG Guidance[2].

**Conclusion**

On the (limited) information presented in the Environmental Appraisal, ACLMS does not anticipate any major significant environmental effects to the natural environment which could not be adequately controlled through a mitigation hierarchy approach at EIA and detailed planning. This statement is however contingent on the Environmental Statement and supporting Compliance Document being reviewed and approved by a suitably qualified EIA specialist prior to the DPA granting planning permission for the proposed Development.

We trust that this information has been helpful. If you require further information or if you have any queries, please email at aclms@gov.gg.

[2] https://cieem.net/resource/biodiversity-net-gain-good-practice-principles-for-development-a-practical-guide/

Kind regards

Alex Herschel

(On behalf of ACLMS)

# CHOUET HEADLAND

**Environmental Appraisal of Establishing a Quarry**

Prepared for: **Ronez Limited**

Client Ref:

RONEZ
PART OF THE ISLANDS' FOUNDATIONS

SLR Ref: 403.06370.00001
Version No: FINAL ISSUE
February / 2020 (Updated June 2021)

SLR

# BASIS OF REPORT

This document has been prepared by SLR with reasonable skill, care and diligence, and taking account of the manpower, timescales and resources devoted to it by agreement with Ronez Limited (the Client) as part or all of the services it has been appointed by the Client to carry out. It is subject to the terms and conditions of that appointment.

SLR shall not be liable for the use of or reliance on any information, advice, recommendations and opinions in this document for any purpose by any person other than the Client. Reliance may be granted to a third party only in the event that SLR and the third party have executed a reliance agreement or collateral warranty.

Information reported herein may be based on the interpretation of public domain data collected by SLR, and/or information supplied by the Client and/or its other advisors and associates. These data have been accepted in good faith as being accurate and valid.

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This document may contain information of a specialised and/or highly technical nature and the Client is advised to seek clarification on any elements which may be unclear to it.

Information, advice, recommendations and opinions in this document should only be relied upon in the context of the whole document and any documents referenced explicitly herein and should then only be used within the context of the appointment.

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## APPENDICES

# 1.0 Introduction

SLR Consulting Limited ('SLR') has been appointed by Ronez Limited to advise on the potential effects on the environment and local amenity through developing a quarry at the Chouet Headland. This work has been undertaken as part of a formal Environmental Impact Assessment ('EIA') which has been undertaken to assess the likelihood of significant effects by developing the eastern part of the headland.

This document is an Environment Appraisal of the likely effects and in essence is an extended summary of the EIA (not a Non Technical Summary as required under the EIA Ordnance) and has been prepared to inform States of Guernsey Committee for the Environment and Infrastructure as part of their consideration of evaluating the options for the future supply of aggregates to the Island construction sector.

It should be noted that the environmental work commenced in c. 2017 and is ongoing and will be refined following the provision of a Scoping Opinion relating to the development. The detailed assessment work also relates to development in the eastern part of the headland as part of the initial phase of developing the headland to establish a new processing plant site. Notwithstanding this, most of the baseline work undertaken relates to the whole of the headland. However, it is considered that this work will provide a reasonable basis for considering the effects of developing a quarry on the headland as an 'on-Island' source of aggregates.

## 1.1 Quarrying on Guernsey

The granite trade started in the late 18th century. At its peak in 19th Century there were over 250 active quarries within Guernsey. Today there is one active quarry on Guernsey (Les Vardes Quarry) located in the north of the island at St Sampson. The origins of the quarry at Les Vardes are understood to date back a couple of hundred years. It was operated during WW II and abandoned afterwards. The quarry was reopened by Ronez in 1961 and has been operated continuously ever since. Permission for a north-western extension to the quarry containing about 750,000 tonnes of reserve was granted in 2010. There are no further feasible extensions to Les Vardes Quarry.

The quarry works granite deposits from the Bordeaux Northern Diorite formation to produce a range of aggregate products which are supplied to the local construction market, either as 'dry stone' or used in the manufacture of concrete or asphalt.

The quarry has sufficient reserves to sustain production for around six to seven years. Notwithstanding this, over half of the consented reserves lie underneath the processing plant within the southern part of the quarry void and so cannot be accessed until the plant is dismantled.

It is therefore important to source new reserves of granite if supplies of aggregates and related products (concrete, asphalt etc.) are to continue to be available to the island construction sector from an on-island source.

## 1.2 The Chouet Headland

The Chouet Headland is located at the north-western tip of Guernsey, some 5.6km to the north of St Peter Port, immediately to the west of Mont Cuet landfill site. To the north, west and south the headland is surrounded by sea. To the south is Ladies Bay whilst to the south-east is L'Ancresse Common (within which is the Royal Guernsey Golf Club).

The eastern part of the headland comprises five linear agricultural fields orientated in an east to west fashion with clearly delineated boundaries formed by low vegetated stone walls. To the east of the fields is a road (Rue des Grands Camps) and ancillary land associated with the Mont Cuet landfill site. To the south-west of the fields

is a residential property (bungalow), whilst to the north-west is an old quarry which is being used for recycling/processing green (garden) waste.

The western part of the headland is more open and without any formal structure, comprising an area of coastal grassland on the higher ground surrounded by scrub, bare ground, old quarries and historic buildings, including 18C Pre-Martello tower and associated magazine, batteries and WWII fortifications. The grassland area is used by a model aeroplane club and includes benches and picnic tables. On the western edge of the headland, to the north of the largest WWII structure is a building and shooting range associated with a pistol club. The range, which is located within an old quarry, is securely fenced with chain link fencing, with a flagpole located at the north-western corner. On top of the WWII bunker are an array of masts and solar panels within a fenced compound associated with a weather station.

The initial area to be developed as part of the establishment of a new quarry comprises the eastern part of the headland, namely the agricultural fields and property. In addition, an old quarry and the reception are of Mont Cuet landfill would also be used for ancillary operations, whilst an area to the south of the fields would be used to create a landscaped screen mound. An outline of the development is set out in section 1.3 below.

## 1.3 The Development of a Quarry on Chouet Headland

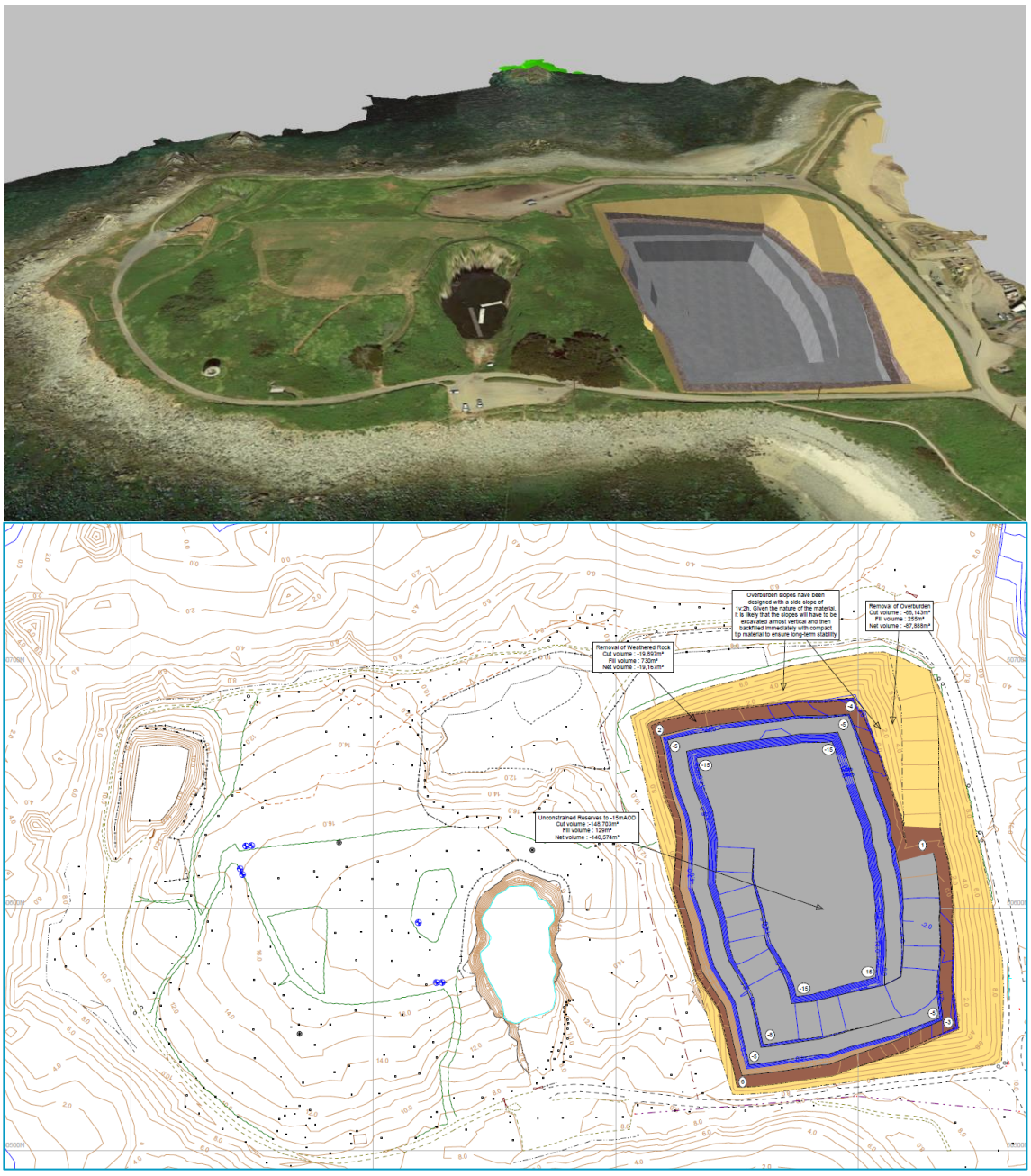
It is anticipated that the Chouet Headland would be developed in three phases, progressively advancing westwards and dovetailing with the completion of Les Vardes Quarry. Operations would commence within the eastern part of the site (which is owned by Ronez Limited) and progressively deepen the mineral working through successive levels, each nominally 10m high, to create a suitable platform below ground level upon which a new processing plant could be erected. During the first phase it is likely that the extracted granite would undergo crushing using a mobile primary crusher located within an old quarry on northern edge of the headland (currently used for green waste recycling). This would make the material more suitable for transporting to Les Vardes Quarry for further processing to produce aggregates using the established plant. Once a suitable platform had been created in the quarry void a new quarry processing plant could be established and the plant at Les Vardes dismantled, allowing the remaining reserves at Les Vardes to be worked, with the extracted rock transported to Chouet for processing.

Following exhaustion of the reserves at Les Vardes Quarry, the workings at the headland would progress into the second phase, extending westwards taking in the old Torrey Canyon Quarry and current green waste tip. The final phase would extend the workings further to the west and include land occupied by a pistol club and model aircraft runway. During this final phase, the quarry would develop to its maximum lateral extent which would allow the workings in Phase 2 to be deepened. At the end of this phase, the plant would be dismantled and the remaining reserves worked, again being processed using a mobile plant.

The design of the quarry would take into account the volume of soils and other deposits (known as overburden) stripped to expose the granite and how this can be beneficially used to help screen the workings to ameliorate both visual and acoustic effects. It would also be necessary to consider what volume of material would need to be retained for final restoration works. Should there be a surplus of such materials then the scheme would need to show how this material can be beneficially used off site. Any overburden not used for screening or other schemes agreed with the States would be placed in the worked out sections of Les Vardes Quarry. As part of the design work consideration would be given to the perimeter treatment of the site to deter access into the working area.

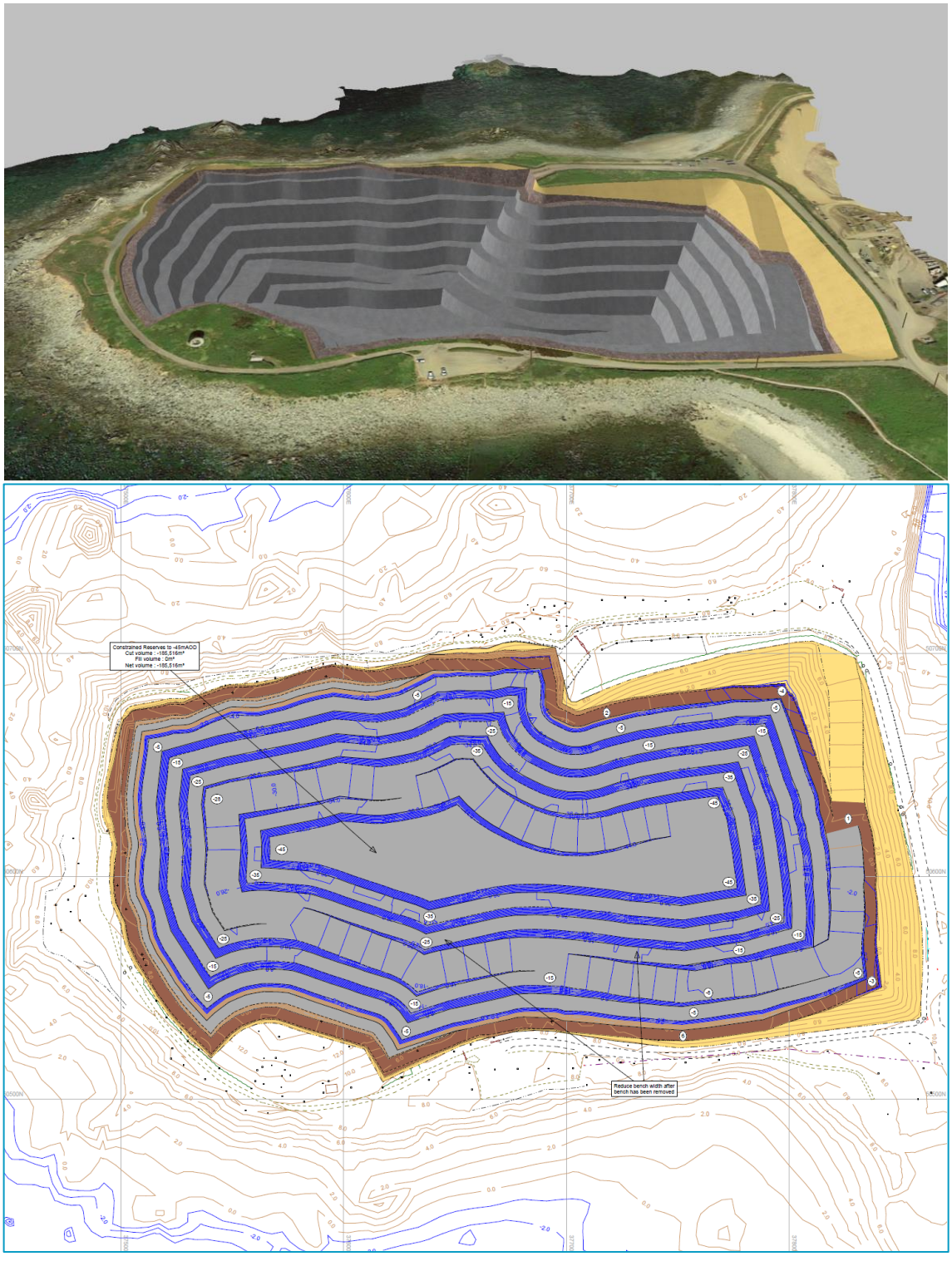
Based on a quarry design work undertaken for Ronez Limited it is anticipated that the first phase of the development could release around 400,000t of saleable rock (allowing for production losses) and so sustain production for around 3 years. After this, the remaining 480,000t of reserves at Les Vardes Quarry would be transported to Chouet for processing, which could last for around 3 to 4 years. Figure 1-1 provides an illustration of how the eastern part could be developed; however, the illustration is not meant to be prescriptive as the final design would be informed by various environmental studies as well as geotechnical considerations.

**Figure 1-1**
**Phase 1 Development within the Headland**




Phase 2 of the development could release a further 685,000t of saleable rock whilst Phase 3 could release and additional 3.05Mt of saleable rock. The overall design of the quarry, allowing for reserves lying underneath the processing plant, could yield in total 4.1Mt. Figure 1-2 illustrates the possible maximum quarry design (again it is not meant to be prescriptive).

**Figure 1-2**
**Maximum Extraction Potential**




In terms of restoration without importing fill materials the quarry void would fill with water over time to create a new waterbody. At this stage it is not possible to be prescriptive over the final restoration scheme and after-use for the quarry. However, the following options present themselves:

- Infill the quarry void with inert waste materials; or

- Allow the void to fill with water for the supply of water; or
- Link the quarry void to the bay to the south and create a marina.

## 1.4 The Environmental Studies

SLR has undertaken a range of baseline studies to be able to characterise the environment of the headland and the immediate surrounding area. These studies comprise the initial part of the EIA work and form the basis against which assessments can be undertaken. The baseline studies include survey and other field work alongside desk based data gathering. In this respect the following surveys have been undertaken:

- Archaeology and Heritage – desk based data gathering and 'walk over' survey of the headland by qualified archaeologist.
- Ecology – an extended Phase 1 habitat survey along with targeted surveys for:
    - Reptile Survey;
    - Bat Survey;
    - Wintering Bird Survey; and
    - Breeding Bird Survey.
- Landscape and Visual – desk based assessment in relation to landscape character and the potential zones of visibility followed by site work to examine potential viewpoints.
- Noise – measuring background noise levels at sensitive receptors around the headland.
- Transport – undertaking traffic counts on local roads and survey of local road network.
- Vibration – gathering of data on recorded vibration levels as a result of blasting operations at Les Vardes Quarry;
- Water Environment – desk based data gathering, groundwater monitoring, walk over survey by qualified hydrogeologist.

## 1.5 Structure of this Report

The following sections in this report address each environmental topic that has been studied; the topics have been addressed in alphabetical order as opposed to any perceived order of importance.

- Section 2 Air Quality Assessment
- Section 3 Archaeology and Cultural Heritage
- Section 4 Ecology
- Section 5 Landscape and Visual Impact
- Section 6 Noise
- Section 7 Transportation
- Section 8 Vibration
- Section 9 Water Environment

## 1.6 SLR Consulting Limited

SLR is a multi-disciplinary environmental consultancy to *inter alia* the minerals, energy and waste management industries, and also provides advice to local authorities together with both nongovernment and government bodies on strategic issues. SLR is a registered Environmental Impact Assessor Member of IEMA and has secured the EIA Quality Mark awarded by IEMA.

In undertaking the environmental assessment work, SLR has drawn upon the expertise of an in-house team of specialists comprising planners, landscape architects and environmental scientists for the technical assessments. SLR has also worked closely with the management teams and technical staff of Ronez Limited, as part of an iterative process, to ensure that the proposed development is practical, feasible and optimises environmental protection.

SLR has a specialist capability in mineral and waste planning. SLR is a member of the 'Institute of Environmental Management and Assessment' (IEMA) with an awarded EIA 'Quality Mark'. The EIA Quality Mark is a voluntary scheme, operated by IEMA through which EIA activity is independently reviewed, on an annual basis, to ensure it delivers excellence in the following areas:

- EIA Management
- EIA Team Capabilities
- EIA Regulatory Compliance
- EIA Context & Influence
- EIA Content
- EIA Presentation
- Improving EIA practice

# 2.0 Air Quality

## 2.1 Baseline

### 2.1.1 Air Quality Review and Assessment

The Office of Environmental Health and Pollution Regulation (OEHPR) prepares air quality screening and assessment reports to provide an overview of the air pollution levels on-island and the local contributors to the measured pollutants.

The most recent 'Screening and Assessment Document' for air quality in Guernsey is the report issued in July 2015, representing the second comprehensive document following the 2010 Air Quality Screening and Assessment. The reports seek to provide a detailed review of air quality monitoring data collected and present trend analysis data. The reports focus on sources and levels of local ambient (outdoor) air pollution in comparison with the standards and objectives set in UK law.

The 2015 Screening and Assessment Document states that ambient air quality has been monitored across the island by the OEHPR since 1992 with strong evidence that generally air quality is good. There is evidence of pollutants that pose notable concern locally and the presence of hotspots where there are localised high concentrations of pollutants.

The 2015 report concluded that over the five year period (2010 to 2014) ongoing compliance with standards (UK AQO) for nitrogen dioxide have been achieved whilst $PM_{10}$ concentrations in the built up industrial area on the south of the Island exceeded the more stringent Scotland AQO in 2014. This area of concern is located approximately 3.5km south of the headland and is not therefore identified as an area that would be affected by the proposed development of a quarry.

### 2.1.2 OEHPR Monitoring Data

The OEHPR currently maintain two permanent monitoring locations; Lukis House monitoring for NOx (and CO) and Bulwer Avenue monitoring for $NO_x$ & $PM_{10}$ (& $SO_2$).

Lukis House station is located on a busy road between St Sampson and St Peter Port, in a built up urban area approximately 5.5km southwest of the headland. Bulwer Avenue is a roadside location in the industrial area of St Sampson, located approximately 3.5km south of the headland.

Given the distance and the location in the built up urban / industrial environments of the permanent automatic monitors, pollutant concentrations are not considered to be representative of the rural locale of the headland. Monitoring data for the two permanent monitors for 2017 is presented below in Table 2-1.

There are no data sources for which to predict background concentrations of $PM_{10}$ or $NO_2$ for the area of the application site and surrounding receptors.

**Table 2-1**
**2017 Automatic Monitoring Data**

| Monitor | Classification (& distance from Site) | $PM_{10}$ | | $NO_2$ | |
|---|---|---|---|---|---|
| | | $PM_{10}$ Annual Mean | No. 24hr exceedances >50µg/m³ | $NO_2$ Annual Mean | No. hrly exceedances >200µg/m³ |
| Bulwer Avenue | Roadside 3.5km from Site | 27 | 0 | 14 | 0 |
| Lukis House | Roadside 5.5km from Site | - | - | 27 | 0 |

**a)** Lukis House monitor monitors for $NO_2$ only

Table 2-1 demonstrates that in the built up urban / industrial areas where SoG consider monitoring of air quality to be required, the UK AQOs have been met during 2017. On this basis, it would be reasonable to assume that $PM_{10}$ and $NO_2$ levels within the rural setting of the application site would be considerably less.

Nitrogen dioxide ($NO_2$) levels are also monitored on a monthly basis using diffusion tubes situated at roadside locations across Guernsey. The annual mean objective level for $NO_2$ of 40µg/m³ is being achieved across each individual monitoring location.

The closest diffusion tube monitoring location to the headland is approximately 2km distant within the residential area of La Passee on the northern coastline. There are no diffusion tubes located in rural areas similar to that of the application site that would be considered to be representative of air quality in the locale of the Site.

### 2.1.3 $PM_{10}$ Monitoring at Les Vardes Quarry

A 3 month monitoring programme was undertaken in 2012 by Aggregate Industries[1] to establish the ambient baseline concentrations of $PM_{10}$ in relation to the extension of operations at Les Vardes Quarry. The monitoring was undertaken at a property to the west of the quarry, representing the closest residence to the extension area.

The results concluded the following:

- the 3 month mean was 24.7 µg/m³, well within the AQO of 40 µg/m³;
- the scheme recorded 2 exceedances of the daily limit of 50 µg/m³;
- easterly winds transported a notable influence of secondary particles from mainland Europe;
- the predominant southwest and westerly winds conveyed considerable concentrations of sea salt, resulting in an addition 15 µg/m³ when compared to data collected from Plymouth and Southampton City Centres; and
- southwest and westerly winds accounted for over 50% of wind within Guernsey.

### 2.1.4 Disamenity Dust Monitoring and Complaints Records

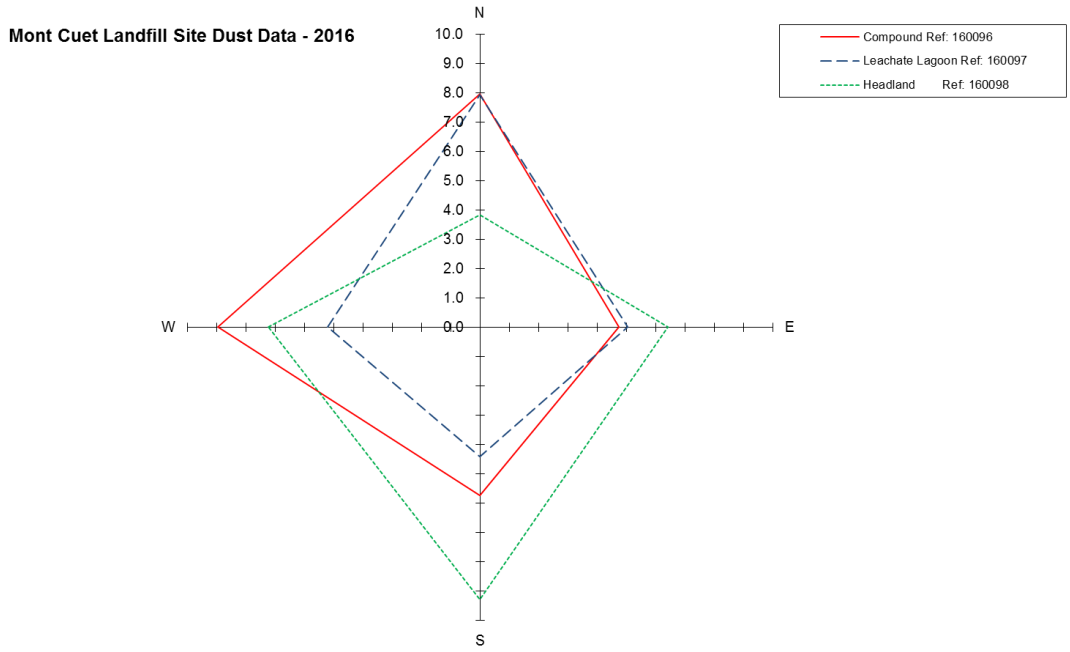
Monitoring of dust levels have been undertaken at the adjacent Mont Cuet Landfill site. Monitoring is undertaken at three locations:

[1] Advance Environmental, 2012. Report on $PM_{10}$ in the vicinity of the Les Vardes Quarry Guernsey. November 2012

- southern boundary ("Leachate Lagoon");
- north western corner ("Headland"); and
- southwestern corner of the operational landfill site. ("Compound").

Dust is monitored by the determination of the 10-day percentage obscuration on samples collected in the directional dust gauges. The 10-day obscuration percentage (TDO) is a measure of the percentage of horizontal area which would be covered by dust during 10 days exposure. The 2016 dust-roses for the three monitors at Mont Cuet landfill site is presented below in Figure 2-1.

**Figure 2-1**
**Mont Cuet Disamenity Dust Monitoring Results (2016)**




Disamenity dust at the compound monitor have strong northerly and westerly components, corresponding with internal infrastructure and onsite areas where vehicle movements are likely to be frequent. The monitor at the headland demonstrates a strong southerly component likely to be attributed to the active filling area. The monitor at the leachate lagoon indicates a northerly component of disamenity dust likely to correspond to the landfill area utilised for stockpiling purposes.

### 2.1.5 Complaints

Given the likely similarity of operations, working techniques and attitude towards environmental management between the current operations at Les Vardes Quarry and the proposed development a review of complaints received in relation to dust in the local area of Les Vardes Quarry has been undertaken. Les Vardes Quarry is located in an area where residential properties of high sensitivity to dust are located within 100m; more than 200 dwellings are located within the IAQM screening distance of 400m. For comparison, for the proposed development at the headland has 4 residential properties located within this distance.

It has been confirmed during discussions with the OEHPR that no complaints in recent years have been received with regard to dust emissions from existing operations undertaken at the working Les Vardes Quarry.

Following discussions with the Waste Services and Environmental Monitoring department of States of Guernsey, it was confirmed that complaints regarding dust from the landfill site are 'rare'. Active dust suppression on site includes a perimeter misting system along the southern boundary of the site and a mobile sprinkler system to dampen down internal roadways.

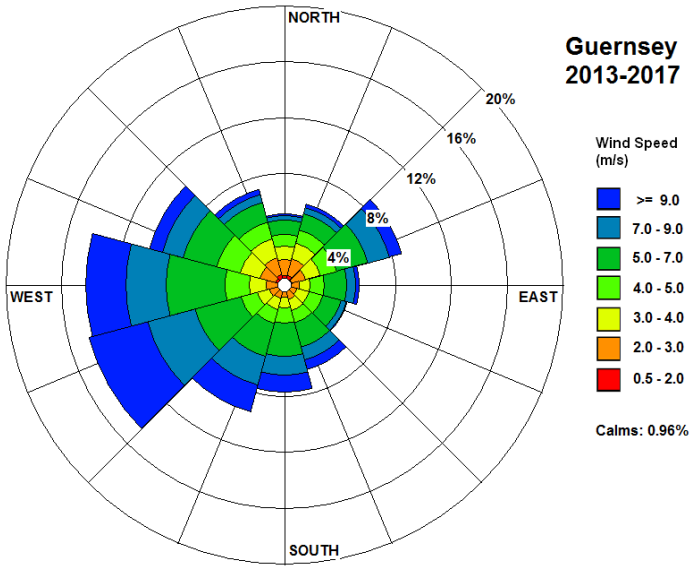
### 2.1.6 Meteorology – Dispersion of Emissions

The most important climatic parameters governing the release and dispersal of fugitive emissions from the proposed development are wind speed, direction and rainfall (for dust emissions):

- wind direction determines the broad direction of dispersal;
- wind speed affects ground level concentrations by increasing the initial dilution of pollutants in the emission. It will also affect the potential for dust entrainment; and
- rainfall naturally supresses dust release.

A five year windrose from Guernsey Airport (located approximately 9km to the south west) is presented in Figure 2-2.

**Figure 2-2**
**Wind Rose of Guernsey Airport Meteorological Station (2013 to 2017)**




The windrose from Guernsey Airport shows that the majority of winds are from the western sectors, with winds from 195° to 315° occurring for approximately 49% of the year. High winds (greater than 5m/s) occur for an average of 56% of the year, with the dominant directions being between 215° to 285°. On this basis, locations to the east and northeast would expect to have the highest potential for impacts from any dust emissions generated by the proposed development.

Relevant rainfall data applicable to the application site has been obtained from the Met Office website[2] of UK mapped climate averages for 1981-2010. The average annual rainfall >1.0mm/day for the area of the site is 130.5 days per year, comprising approximately 36% of the year. As such, the number of days with sufficient rainfall to suppress dust emissions (>0.2mm/day) is expected to be greater still.

[2] Meteorological Office Website http://www.metoffice.gov.uk/climate/uk/averages/key-features-1981-2010, accessed August 2018

**Table 2-2Table 2-2**
**Rainfall (Total) Data: Guernsey Observation Station**

highlights seasonal rainfall variation during the climate period 1981 - 2010. As anticipated, winter months experience an increase in the quantity of rainfall. As such, the potential for dust emissions are higher during the summer months.

**Table 2-2**
**Rainfall (Total) Data: Guernsey Observation Station**

| Rainfall (mm) | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Jan | Feb | Mar | Apr | May | Jun | Jul | Aug | Sep | Oct | Nov | Dec |
| 92.5 | 70.2 | 66.7 | 53.1 | 51.2 | 45.5 | 42.1 | 47.8 | 57.6 | 95.0 | 104.3 | 112.7 |

## 2.2 Appraisal

### 2.2.1 Screening Criteria

The IAQM[3] uses a distance-based screening criteria for both airborne concentrations and deposited dust. It states that dust impacts associated with disamenity effects from hard rock sites are considered to occur mainly within 400m of the operations.

In accordance with the IAQM methodology, if there are relevant receptors within 400m and 1km then further assessment of dust deposition and $PM_{10}$ will be required, respectively.

### 2.2.2 Assessment of Vehicular Emissions

Atmospheric emissions from vehicles related to site proposals are primarily associated with the exhaust emissions from Heavy Duty Vehicles (HDVs). The decision as to whether an assessment of potential impact is required is based upon the screening criteria set out in the EPUK/IAQM guidance.

The primary criteria set out in the EPUK/IAQM to assist in the determination of whether further assessment of vehicle exhaust emissions is required, as presented in Table 2-3.

**Table 2-3**
**EPUK / IAQM Vehicle Emissions Screening Criteria**

| Vehicle Category | Relevant Criterion for Application Site |
|---|---|
| LDVs (vehicles <3.5 tonnes) | >500 AADT additional movements |
| HDVs (vehicles >3.5 tonnes) | >100 AADT additional movements |

In the event that, as a result of the proposed development there is an increase in vehicle movements that exceeds the IAQM/EPUK guidance criteria, further assessment would be undertaken.

[3] Institute of Air Quality Management

### 2.2.3 Sensitive Receptors

The term 'sensitive receptors' includes any persons, locations or systems that may be susceptible to changes in abiotic factors as a consequence of the development. These have been identified as human receptors and ecological receptors sensitive to fugitive dust and vehicular emissions.

#### Human Receptors

The IAQM Guidance states that the majority of impacts from fugitive dust emissions from hard rock quarries are experienced within 400m of the dust generating activity. A desk study was undertaken to identify sensitive receptors within 400m of the application site.

The receptors considered in the assessment of dust amenity impacts are presented within Table 2-4 and on **Drawing CH 1**. Where these are referenced within the report text, they are referred to as R1 – R9. It is noted that the residential property within the headland would demolished as part of the proposals.

**Table 2-4**
**Human Sensitive Receptors**

| Receptor | | Distance / Direction from Development Boundary | | Sensitivity to Dust |
|---|---|---|---|---|
| R1 | Residence Mont Cuet Road | <100m | South | High |
| R2 | Restaurant Mont Cuet Road | <100m | South | High |
| R3 | Residence | 250m | East | High |
| R4 | Residence | <200m | South-east | High |
| R5 | Café | <200m | South-east | High |
| R6 | Golf Club (playing green) | 350m | South-east | Low |
| R7 | Car Park | <50m | West | Low |
| R8 | Golf Club (playing green) | >400m | East | Low |
| R9 | Recreational RC flying area | <100m | West | Low |

#### Ecological Receptors

There are no designated ecological designations within the application site, with isolated areas of the Site of Special Significance (SSS) L'Ancresse Common located within 400m of the development site boundary. L'Ancresse Common is a large area of unenclosed land in the north of Guernsey, which consists mainly of dune grassland and scrub. Areas of the SSS within 400m of the Site include a small area comprising a water body with dense scrub located 190m to the west of the site, and an area of dune grassland located 100m to the south.

The IAQM Guidance states the sensitivity of an ecological receptor to dust emissions should be based on both the value of the habitat (i.e. level of designation) and the sensitivity of features within the areas to dust deposition. The guidance suggests that sites of National importance with designated features with the potential to be affected by dust deposition should be classified as medium in sensitivity.

On the basis of discussions with SLR's ecologist and information provided in Section 4 (Ecology), there are not considered to be any feature of specific sensitivities to dust within the L'Ancresse Common SSS. In accordance with IAQM guidance, the SSS has been classified in the assessment as a receptor of medium sensitivity.

On the basis that the L'Ancresse Common SSS does not have any features with any specific sensitivities to dust, it has been included in the assessment as a receptor of medium sensitivity.

### 2.2.4 Potential Sources of Fugitive Dust

The potential sources of airborne dust emissions are considered to include the following activities:

- site preparation activities (stripping of soils, screen mound formation);
- mineral extraction;
- handing and transfer of material;
- mineral processing;
- storage and stockpiling of material; and
- off-site vehicle movements.

**Table 2-5**
**Residual Source Emission Magnitude**

| Phase | Dust Generating Activity | Justification | Maximum Source Magnitude |
|---|---|---|---|
| Preparation | Construction of ancillary areas | Limited to plant site, stockpiling areas and loading / unloading area (<5,000m$^2$)<br>Minimum stand off to receptors | Small |
| | Soil stripping and overburden removal | Unsurfaced haulage routes<br>Water bowser on site<br>Discrete areas worked<br>Minimum stand off to receptors | Small |
| | Construction of screening mounds | Material potentially dry and high dust potential<br>Located along periphery of site<br>Duration of 3 months for southern mound<br>seeded immediately on completion | Medium |
| | On-site vehicle movements | Unsurfaced haulage routes<br>Water bowser on site | Small |
| Operational Phase | Mineral processing<br>(Plant Site) | Mobile screen and jaw crusher (with incorporated dust suppression system)<br>125,000 tonnes per annum throughput<br>Majority of processing offsite initially (at Les Vardes Quarry) | Small |
| | Mineral stockpiling<br>(Plant Site) | Location at greatest distance from off-site receptors | Small |

| Phase | Dust Generating Activity | Justification | Maximum Source Magnitude |
|---|---|---|---|
| | Soil stripping and overburden removal<br>(Excavation Area) | limited to discrete sections <2.5ha | Small |
| | On-site vehicle movements | 2 x dump trucks for internal transfer<br>Proportion of route above ground would reduce as working depth increases<br>Unsurfaced haulage routes<br>Water bowser on site | Small |
| | Mineral extraction | Single excavator (such as Komatsu PC450 or similar)<br>Sheltering effect as working face deepens<br>Blasting 2-4 times / month<br>Blasting equipment with incorporated dust collection system<br>Excavated mineral of low dust potential | Small |
| | Off-site vehicle movements | Approx. 64 HDV movements per working day (46 AADT)<br>Offsite vehicles restricted to paved roads to access loading area at plant site<br>Minimum of 200m paved road prior to using wheel wash<br>Additional 70m paved road after wheel wash before joining public road network<br>Loads if <75mm particle size sheeted | Medium <200m from Site Access<br>Small >200m from Site Access |

Activities associated with the site preparation phase have the potential to cause a slight adverse effect on receptors R1, R2 and R3. Predicted effects at the remaining receptors and for the operational phase are considered to be negligible.

The stripping of soils and overburden and the construction of the southern screening mound during the preparation phase would be located within 200m of the identified receptors (R1, R2 and R4) for a maximum period of up to 6 months. During this period there would be the potential for slight adverse effect on disamenity in the absence of any additional dust control on site. Following the seeding and subsequent stabilisation of the mound, the potential for dust generation would reduce to negligible.

In terms of the impact assessment of off-site transportation the source of dust emissions that would cause trackout on the local road networks would be the site itself, including the site access road. As such, the potential for trackout would reduce with distance from the quarry as the dust source is reduced.

The dust impact assessment for trackout has identified that there is one receptor (R1, Residence on Mont Cuet Road) where there is potential for a slight adverse effect from trackout. Receptor R1 is located within 10m of the

road for which HDVs would be travelling on route to Les Vardes Quarry, 100m from the site access. However, it should be noted that the effects would be similar to those associated with HGVs visiting the Mont Cuet landfill site.

The overall assessment of effect is considered to be not significant. Additional mitigation has, however, been recommended (see **Appendix 01**) with particular attention to those activities that have been identified as having the potential to cause 'slight adverse' effects on the receptors in the immediate locale.

### 2.2.5 Assessment of Effects and Significance – Vehicular Emissions

The increase in vehicle movements from the headland during the operational phase of extraction would be around 46 HDV movements as AADT[4]. The predicted trip generation is significantly below the EPUK-IAQM screening criteria of 100 HDV AADT movements for which further assessment of emissions would be required. Therefore, consistent with EPUK-IAQM guidance, no further quantitative assessment is required and the impacts of traffic emissions in the local area can be considered 'not significant'.

## 2.3 Conclusions

A qualitative dust impact assessment has been undertaken in order to assess predicted impacts as a result of dust emissions from the proposed development, in line with the IAQM document *Guidance on the Assessment of Mineral Dust Impacts.*

The assessment of $PM_{10}$ effects on human health concluded that air quality would remain well within the UK national air quality standards, with no significant effects predicted.

With regard to disamenity effects from deposited dust, the overall significance of effect of the proposed activities is predicted to be negligible in accordance with IAQM guidance. The assessment takes into account the environmental designed in measures in addition to range of recommended dust controls that would incorporated into the proposed working scheme. A number of mitigation measures in accordance with industry best practice have been recommended for inclusion within the proposed working scheme.

The proposed working of the headland is considered unlikely to cause any adverse effects with regard to dust or air quality. The overall residual impact of the site on $PM_{10}$, suspended dust and deposited dust is considered to be not significant.

All potential dust impacts from the proposed development are considered to be reversible i.e. the risk of impact will cease on completion of the extraction and restoration activities at the site, with no significant impacts on local air quality during the operation or following completion of the development.

[4] Annual Average Daily Traffic

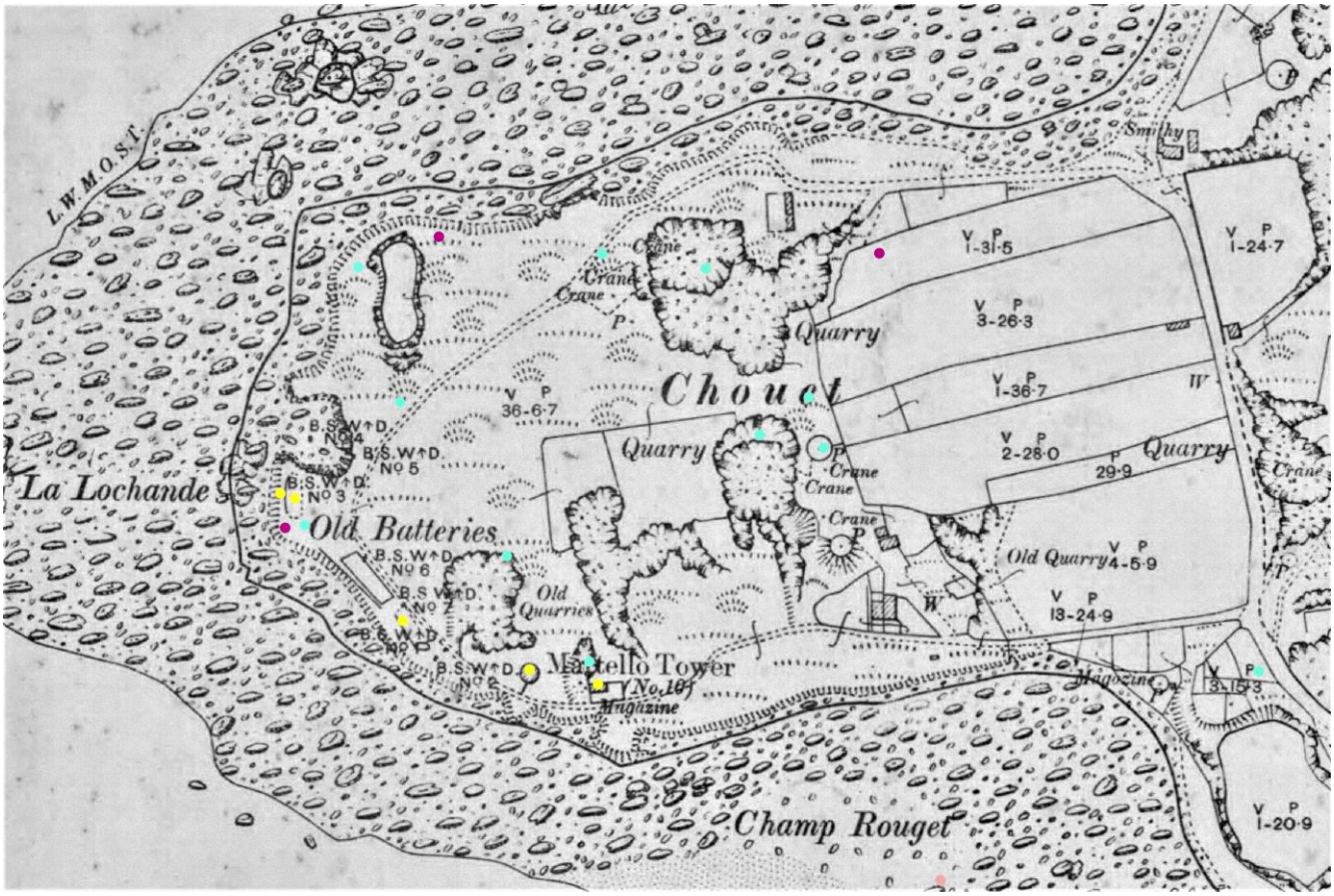
# 3.0 Archaeology and Cultural Heritage

## 3.1 Baseline

Despite historic and recent quarrying activity, the archaeology and cultural heritage in and surround the Chouet Headland is extensive. Many sites, including Registered Buildings and Registered Sites, are mainly within the foreshore zone, with eight sites located within the core of the Headland (Figure 3-1). Many of the sites are considered industrial, associated with recent former quarrying industry (Figure 3-2). Immediately east of the quarrying is a linear field system, constructed of five rectangular east-west plots.

**Figure 3-1**
**List of sites present on the States of Guernsey's Historic Environment Record (HER)**

**Figure 3-2**
**Ordnance Survey map dated 1898 showing the quarried landscape of the Headland and the rectangular plots to the east**




The Chouet Headland is located within the northern part of Vale[5] Parish. The history of this part of Guernsey extends as far back as the Mesolithic period (if not earlier). The neighbouring L'Ancresse Common, much of it used for public recreation, is home to a number of significant Protected Monuments and includes:

- Le Dolmen de Déhus;
- La Varde passage grave;
- Les Fouaillages;
- La Platte Mare, cist-in-circle;
- La Mare es Mauves, cist-in-circle; and
- Martello loophole Tower No. 7 cist-in-circle.

In addition to these sites, the parish also contains a number of archaeological findspots that date from the prehistoric era to the post-medieval period; findspots are recorded on the States of Guernsey Historic Environment Record (HER). The distribution of the prehistoric findspots provides some indication of the

[5] Guernésiais French: Lé Vale, one of the ten parishes of Guernsey

potential density of prehistoric activity within this part of the island. For example, identified within the western section of the Chouet Headland are seven prehistoric findspots.

During the early part of the historical period, Guernsey was under the control of the Duchy of Normandy (William I). At this time much of Vale parish was under the fiefdom of Saint Michael and nearby a Benedictine Abbey was established. Also established within the parish were Vale Castle (also known as the Castle of St Michael) and the Vale Parish Church of St Michel du Vale. It was around these two prominent landmarks that the settlement of Vale became established.

During the medieval and post-medieval periods Vale Parish was involved in external conflict. In 1372 a pretender to the Welsh throne (Owain Lawgoch) attacked Guernsey (on behalf of the French Crown) killing 400 island militia before retreating. Further conflicts between the islands and French continued during succeeding centuries; most notably were the Napoleonic Wars of the late 18$^{th}$ and early 19$^{th}$ century and the German invasion of the island archipelago in 1940. For each event, Vale Parish, and, in particular, the Chouet Headland contains a number of extant buildings and monuments that reflect these military campaigns.

Prior to 1806 Vale Parish formed the island of Le Clos du Valle and land on the Guernsey mainland - Vingtaine de l'Epine. Separating this island from the Guernsey mainland was a narrow tidal channel of water known as the Le Braye du Valle which was drained and reclaimed (filled-in) to create one island. The reclaiming of this stretch of water by the British Government was for defensive reasons. It was during this time that many of the Napoleonic military installations were constructed and in use.

At the beginning of World War II, the German military invaded the Channel Islands. As part of their long-term defence strategy, the Atlantic Wall was constructed. This programme of work involved the fortification of the western and norther coastlines of Guernsey where a possible Allied invasion might occur. Evidence for this massive fortification programme is present along the coastline of Vale Parish, including gun emplacements and tunnels on the Chouet Headland.

Notable military sites within the parish include:

- The site of Vale Castle;
- Fort le Marchant;
- Fort Doyle;
- Fort Pembroke;
- Rousse Tower;
- Eight Guernsey loophole towers (Numbered 4 to 11);
- Beaucette Battery dating from the Napoleonic Wars;
- La Lochande Battery dating from the Napoleonic Wars;
- Nid L'Herbe Battery and Magazine dating from the Napoleonic Wars;
- Portinfer Battery dating from the Napoleonic Wars;
- German fortifications, built during the occupation years 1940-45.

Based on the States of Guernsey's Historic Environment Record (HER), over 7000 sites are recorded; of these 5623 sites are identified on the mainland of Guernsey. The Chouet Headland and the neighbouring L'Ancresse Common boast a rich prehistoric and historic past with a number of extant Neolithic and Bronze Sites dispersed across an open landscape, including those incorporated into the greens and fairways of the Royal Guernsey Golf Club (also known as L'Ancresse Golf Club). A prehistoric presence on the Chouet Headland is the form of

diagnostic worked flint and stone artefacts, referred to in the HER as 'findspots'. The date range for these artefacts extends between the Neolithic (4500-2000 BCE[6]) and Bronze Age (2500 to 900 BCE).

The most obvious and earliest extant monuments present within the Study Area include the Pre-Martello loophole Tower No. 10 (MGU 171) and its associated battery buildings (MGU 449 & 450) and a magazine (MGU 588). The tower and batteries are marked on the Duke of Richmond survey map of 1787 . The magazine building constructed of stone and supporting a slate tiled roof is not marked but it is assumed that the tower could not function effectively with its magazine. Both this building, Pre-Martello loophole Tower and the batteries are located close to the coastal edge, on the southern and western side of the headland and are therefore afforded a high degree of protection from the Development Site, both from direct and indirect impacts.

Based on the Duke of Richmond survey map and late 19th century Ordnance Survey mapping are the field boundaries that belong to the field system that occupies the main part of the development site (SLR 002, Table 2 in **Appendix 02**). The southern-most field[7] of this group is present on the Duke of Richmond survey map, along with a north-south field boundary that later forms the western boundaries to the other four fields appears to be the earliest; although, one could argue that the void between the southern-most field and a section of the northern coastline of the headland were in agricultural use. It is more than likely that elements of the earlier field system survive within the current field boundary alignment.

Intense industrial activity is witnessed on the Ordnance Survey map of 1898 (and its early 20th century successors). On this map (but sometimes difficult to identify within the field) are up to seven quarries (e.g. SLR 001, Table 2 in **Appendix 02**), the [current] historic layout of the five fields, the Pre-Martello loophole Tower and its magazine, the Old Batteries, an ancillary buildings associated with a quarry, locally known as 'Green Waist' Quarry, a series of cranes (and associated stanchions), water pumps and a remnant field system located immediately west of the quarry that currently holds crude oil from the Torrey Canyon (SLR 001); later quarrying has cut into the eastern section of the field. Immediately south and east of the same quarry are a number of buildings including a cottage terrace. The mapping at this time also shows the western side of the headland to be covered by grassland. It is probable that by the end of the 19th century most of the quarrying activity had ceased. Currently five of the seven quarries shown of the 1898 Ordnance Survey map have been backfilled.

There are numerous archaeological sites that arguably have a group value including World War II installations. These sites include the Pre-Martello loophole Tower (and associated magazine, a telephone switching post (MGU 2430) and military magazine building, located south-east of the headland and World War II military installations that occupy the western coastal fringes of the headland (MGU 449, MGU 565, MGU 2434 and MGU 2435). Further sites occupy the northern shoreline of the headland and include MGU 2437 and MGU 6923 (World War II military installation and the prehistoric flint findspot). A further military installation is located outside the headland and lies to the east within the current landfill area (MGU 2469).

One site, which is not visible, stands c. 63m north of the Pre-Martello loophole Tower, between two backfilled quarries, and is at depth of c. 8m below the current ground level. The tunnel system, used for generating electricity was uncovered by the Festung Guernsey Group in 2011 and later reported in detail in their publication *German Tunnels in Guernsey, Alderney and Sark* (2012) (MGU 2439). This roughly H-plan tunnel system housed three 30 KVA generators for use in an emergency should the mains electricity fail.

Archaeological and cultural heritage assets within and surrounding the development site include a number of extant monuments, find-spots and World War II (WWII) structures/features (totalling 27 sites); these sites are present on the island's Historic Environment Record (HER), see **Table 1 in Appendix 02**. In addition to this assemblage, the walkover survey, undertaken by SLR in May 2018 identified a further five sites – see **Table 2 in Appendix 02**.

[6] Before Christian Era
[7] Registered as land parcel C012745

## 3.2 Appraisal

Based on the walkover survey and online and hard-copy documentary sources, the assessments of the effects on archaeology and Cultural Heritage are considered to be largely Minor in relation to developing the eastern part of the headland; this is despite the fact that non-designated sites such as a field system (SLR 002) located within the eastern section of the proposed development site would be removed as part of the initial phase of development (a *preservation-by-record* account of these two sites is recommended - see Mitigation in Section 3.2.2 below). As the quarry develops the other sites that stand within the boundary of the proposed development site will also be affected (see Section 3.2.2 below).

No Protected Monuments would be directly affected through the development of the quarry, as these would be excluded from the footprint of any development works.

### 3.2.1 Archaeological/Cultural Heritage Potential

To summarise the findings of this chapter and to broadly assess the potential for survival or presence of archaeological/cultural heritage assets of the various chronological periods discussed above, the table below outlines the known archaeological and historic evidence that stands within the arbitrary study area.

**Table 3-1**
**Summary of the archaeological potential for Developing Eastern part of Headland**

| Period | Evidence | Potential |
|---|---|---|
| Palaeolithic-Neolithic | Based on various documentary sources, there is no evidence of early prehistoric activity within the curtilage of the proposed development site or within the vicinity. There is, however, a Neolithic presence in the form of several Neolithic findspots including a stone ring (MGU 6284) and stone axe (MGU 3677) from nearby Mont Cuet. To the south of the Headland, on L'Ancresse Common are a number of extant prehistoric sites dated to the Neolithic period; however, dues to the topography of the northern part of the common there is no intervisibility and therefore no indirect impacts. | LOW TO MODERATE |
| Bronze Age - Iron Age | Based on various documentary sources, there is limited evidence of Bronze Age or Iron Age activity within the curtilage of the site or the surrounding landscape including four findspots that have yielded flint artefacts (MGU 565, MGU 2139, MGU 5599, MGU 6923); one of these sites MGU 2139 is located within the field system (SLR 002). | LOW TO MODERATE |
| Romano-British | Based on various documentary sources, there is one findspot that has yielded Roman coins, located outside the proposed development site. | LOW TO MODERATE |
| Early Medieval | Based on various documentary sources, there is no evidence of Early medieval activity within the curtilage of the site or the surrounding landscape. | LOW TO NEGLIGIBLE |
| Medieval | Based on various sources, there is no evidence of medieval activity within the curtilage of the proposed development site, although one cannot dismiss the fact that certain features present on the Duke of Richmond survey map of 1787 may have their origins in the medieval period, including sections of the current field system that stands within the eastern section of the proposed development site. | MODERATE |
| Post-Medieval | Present within the proposed development site boundary are a number of sites that characterise the headland as a post-medieval industrial area (SLR 001, SLR 005), along with an agricultural presence (SLR 002). During and following industrial activity, the headland became the focus for military activity, especially during the late 18$^{th}$/early 19$^{th}$ century and World War II (MGU 171, MGU 449, MGU 450, MGU 588, MGU 830, MGU 2438, MGU 2430 to MGU 2439, MGU 2469 and MGU 6903). Sites MGU 2430, | HIGH |

| Period | Evidence | Potential |
|---|---|---|
| | MGU 2431, MGU 2432, MGU 2434. MGU 2438, MGU 2439 and MGU 6957 inside the curtilage of the proposed development site. | |
| Conservation Areas | The proposed development site does not stand within a designated Conservation Area; however, two Conservation Areas (Vale Church and Les Mielles) stand some way south of the Chouet Headland and are therefore not directly or indirectly affected due to the topography of the landscape between Vale and Chouet Headland. | N/A |
| Protected Buildings | There are no Protected Buildings that stand within the curtilage of the proposed development site. | N/A |
| Protected Monuments | There are no Protected Monuments within the curtilage of the proposed development site; however, a Pre-Martello loophole Tower (and its associated magazine stands west of the Development Site boundary, within States of Guernsey land (MGU 171). Further Protected Monuments stand close by but are not affected by potential indirect impacts that may occur from quarrying operations from the proposed development site | N/A |
| Battlefield sites | There are no Battlefield sites within the curtilage of the site or the proposed development site. | N/A |
| World Heritage Sites | There are no World Heritage Sites within the proposed development site. | N/A |

### 3.2.2 Mitigation

There are no direct impacts to those sites that stand outside the boundary of the proposed development. Several of these including the loophole Tower (No. 10) may be indirectly impacted upon. and therefore a programme of screening and possible boundary realignment to the north of this site would be required in order to protect its setting.

The post-medieval field system (SLR 002), located within the eastern section of the proposed development site would be removed as a result of proposed quarrying operations. It is therefore proposed that the field system is monitored and recorded prior to its removal. In addition, palaeoenvironmental sampling should be undertaken under selective boundaries should *palaeosols* be revealed during the monitoring stage. The *palaeosol* could determine the date of the field system and the probable palaeoclimate/environment during pre-construction, construction and early use.

As part of the mitigation process, several of the gateposts recognised within the field system should be researched as they may have once formed part of a later prehistoric landscape. It is not uncommon for standing stones and menhirs to be utilised in this way.

Archaeological fieldwork would be required to those sites that stand within the boundary of the proposed development site. Sites that will be directly impacted are mainly associated with German World War II activity. Arguably, all are of minor significance but the impact on each will be severe. Directly-impacted sites include: MGU 2139, MGU 2431, MGU 2432, MGU 2434, MGU 2436 AND MGU 2138(?). Site MGU 2439, an electrical generating supply tunnel stands north of the loophole Tower and has previously been recorded by Fustung Guernsey; however, the site would require further recording using CIfA/Historic England building recording standards.[8]

## 3.3 Conclusions

This assessment has followed best practice guidance in undertaking a reasonable and proportionate appraisal of the heritage assets likely to be affected, and the degree of adverse impact that the proposed development could

[8] See *Understanding Historic Buildings: A Guide to Good Recording Practice* (Historic England 2017).

potentially incur. The assessment complies with EIA and [English] national planning policy requirements which aim to achieve a sustainable development process, so that heritage assets are conserved in proportion to their heritage significance. There is also sufficient detail included in this assessment to allow decision-makers to be confident that they can discharge their statutory duties. Although the proposed development would constitute incremental change within the setting of a limited number of designated heritage assets of the highest significance and sensitivity, the indirect harm is considered Minor or Negligible. There are designated heritage assets such as several WWII sites and remnants of the quarry industry; however, their loss should not result in a reason for refusal should proportionate mitigations measures be implemented, as long as a considerate preservation-by-record programme is installed.

Identified within the walkover survey were thirty-two sites. These were located via the SLR Walkover Survey and information supplied by the States of Guernsey's Historic Environment Record. Of these 32 sites, eight stand within the core of the Headland; six within the area of the proposed first phase of development.[9]

The direct impacts to the field system would be Severe resulting in substantial harm to the majority of the field embankments/boundaries. In addition to the extant field boundaries, a subterranean set of World War II tunnels MGU 2439), constructed by the German Army would also be severely impacted, as well as six sites that stand within the boundary of the proposed development including MGU 2139, MGU 2431, MGU 2432, MGU 2434, MGU 2436 and MGU 2438. All the above sites, with the exception of MGU 2139 are World War II defence structures, including the German Army electricity generating tunnel (MGU 2439). Although the physical impact to all sites is Severe, their heritage value is considered Low to Moderate.

In terms of indirect impacts to identified designated heritage assets (Tables 1 and 2, **Appendix 02**), the topography of the Headland conceals those heritage assets located on L'Ancresse Common. Those sites, such as the loophole Tower and its associated magazine (MGU 171 & MGU 588) may incur an impact; however, based on the local topography immediately north of these two sites, the indirect impact will probably be Low to Negligible.

In terms of indirect impacts to those Protected Buildings and Protected Monument to the south and west of the Headland, the natural topography of the landscape of the western and southern headland above the shoreline will provide necessary screening for the proposed development site; therefore, the indirect impacts will be Negligible.

[9] Site MGU 830 appears to have been destroyed by quarrying.

# 4.0 Ecology

## 4.1 Baseline Data Sources

In July 2017, SLR commissioned the Guernsey Biological Records Centre (GBRC) to undertake a data search of the headland and a 2km buffer.

GBRC supplied a species list (all Taxa) for the site and 2km radius which included interpretation of conservation status, date of records, exact location of the record, accuracy and recorder and the Guernsey plant species checklist.

A summary of records of species considered to be endangered or at risk is provided in Table 1 in **Appendix 03.**

In addition, the following sources of information have been reviewed by SLR for background information:

### 4.1.1 General Websites

- Birding in Guernsey[10];
- Ornithology Section of La Société Guernesiaise's website[11];
- Sustainable Guernsey[12]; and
- Société Guernesiaise[13]

### 4.1.2 Biodiversity Strategy

- Safeguarding Guernsey's Wildlife: A Biodiversity Strategy for Guernsey. Environment Department - August 2015; and
- A Strategy for Nature (SfN) has recently been adopted by the States of Guernsey[14], following on from the Biodiversity Strategy for Guernsey[15]. The high level SfN covers principles relating to the reducing of pressures on ecosystems and improving their resilience. Importantly it seeks to achieve sustainable development through 'net ecological gain'.

### 4.1.3 Habitat Audits

- Habitat Survey of Guernsey, Herm and Associated Islands 1999[16]. Environment Department 1999;
- Habitat Survey of Guernsey, Herm and Associated Islands 2010[17]. Environment Department 2010; and
- UK Overseas Territories and Crown Dependencies: 2011 Biodiversity snapshot. Guernsey: Appendices. Author: Dr Charles David Guernsey Biological Records Centre, States of Guernsey Environment

[10] http://www.guernseybirds.org.gg/
[11] http://www.guernseybirds.org.gg/
[12] http://www.sustainableguernsey.info/
[13] http://www.societe.org.gg/
[14] States of Guernsey Environment Department (2020) *2020 Strategy for Nature.* Available online: https://www.gov.gg/CHttpHandler.ashx?id=128405&p=0f
[15] States of Guernsey Environment Department (2015) *Safeguarding Guernsey's Wildlife: A Biodiversity Strategy for Guernsey.* Draft strategy available online: http://www.societe.org.gg/biodiversity/docs/Biodiversity_Strategy.pdf
[16] http://maps.digimap.gg/gsyHabitat.htm
[17] http://maps.digimap.gg/gsyHabitat.htm

Department & La Societe Guernesiaise. More information available at: www.biologicalrecordscentre.gov.gg

### Site Designation

- Approach to the Designation of Sites of Special Significance. October 2014. Environment Guernsey; and
- Appraisal of Sites of Special Significance By J Gilmour, B.Sc. & J Hooper, B.Sc. Environment Guernsey. 2015

### 4.1.4 Field Survey(s) in Chronological Order

The whole headland has been surveyed as shown by the green line on **Drawing CH 2.**

The following field surveys have been undertaken of the survey area between 2016 and 2021 in order to establish the baseline situation in respect of ecology. Reports of the surveys undertaken are included in **Appendix 04** to this report and comprise:

- Phase 1 Habitat Survey
- Reptile Survey (Appendix 1)
- Bat Survey (Appendix 2)
- Wintering Bird Survey (Appendix 3)
- Breeding Bird Survey (Appendix 4)

Where relevant, ecological surveys have been updated in 2020/21.

### Wintering Bird Survey 2016/17

Due to the coastal location of the site it was considered necessary to undertake surveys of birds over the winter period.

Three surveys based on the Common Bird Census (CBC) methodology[18] were undertaken by Mr Ben Garnett MCIEEM, a Senior Consultant with SLR on the 15th November 2016, 7th December 2016 and 6th January 2017.

Each survey session was undertaken in fair weather conditions during the morning. Each survey started approximately one hour after local sunrise and lasted for up to three hours.

During each survey session, the surveyor walked a repeatable route across the survey area, approaching to within at least 100 m of all points to ensure adequate coverage, but at the same time being careful to avoid double-counting birds.

Bird registrations were recorded on large scale field maps using British Trust for Ornithology (BTO) activity recording codes and two-letter species codes.

The wintering bird survey was repeated in 2020/21 due to the amount of time which has elapsed to ensure that the information pertaining to the use of the site by this group and individual species of note is up to date.

[18] Marchant, J.H. 1983. *Common Birds Census instructions*. BTO, Tring. 12pp.

### Breeding Bird Survey 2018

Due to the presence of scrub and other habitats and features (e.g. nest boxes) which had the potential to be used by birds for nesting it was necessary to undertake surveys of breeding birds.

Three surveys were undertaken based on the Common Bird Census (CBC) methodology[19]. The area was surveyed at dawn for up to three hours on the 23rd May, 16th June and 18th July 2018.

Weather conditions during each survey were warm and dry.

The May and June 2018 surveys were undertaken by Mr Chris Townend, a consultant ornithologist. The July survey was undertaken by Mr Andy Law CEcol, MCIEEM, a Principal Ecologist with SLR.

### Phase 1 Habitat Survey 2017/18

Initial interrogation of aerial photography and desk study records found that the study area largely comprised of un-developed land including semi-natural and man-made habitats. As such, it was necessary to undertake a habitat mapping exercise.

The habitats present within the survey area were surveyed to Phase 1 level (i.e. mapped according to broad habitat categories) on the 17th July 2017, 30th and 31st August 2017 and 17th and 18th July 2018 by Mr Andy Law CEcol, MCIEEM, an experienced Phase 1 surveyor and Principal Ecologist with SLR.

Weather conditions during all of the habitat surveys were warm and dry.

The surveys followed the standard methodology for Phase 1 habitat survey; this approach was developed by the Joint Nature Conservation Committee (JNCC) in the mid 1980's and has, as its core, the utilisation of a standardised series of colour, symbols and descriptive categories to record habitats, species and other physical features. The methodology was developed in order to allow a quick, universal, means of mapping semi-natural and other habitats at up to a county scale. A Phase 1 survey therefore provides a consistent approach to habitat recording and evaluation, and a means of identifying features which may be of value for protected species.

The Phase 1 Habitat survey was updated in 2020.

### Reptile Survey 2017

Initial interrogation of aerial photography and desk study records found that the study area contained habitats which could be used by reptiles such as coastal grassland.

A preliminary walkover survey of the study area was undertaken on 3rd September 2017 by ecologists from Island Guernsey using direct observational methods to detect the presence of reptiles with particular effort made to observe individuals in and around vegetation or likely basking spots.

A total of 64 artificial refuges, consisting of sheets of roofing felt of varying sizes were deployed within areas of suitable habitat on the 31st August 2017 and in the following days.

The refugia were given one week to 'bed in' before commencing a total of 7 further visits in suitable weather between 7th September and 24th October 2017 to determine presence or all reasonable likelihood of absence of reptile species.

[19] Marchant, J.H. 1983. *Common Birds Census instructions*. BTO, Tring. 12pp.

During each visit, the refugia were checked, wherever practically possible, during suitable weather conditions (dry, calm, ambient temperature 9-18$^{o}$C), either in the morning or afternoon inspecting both on top of and below each refuge. In addition, during each visit all other parts of the survey area were subject to a walkover survey with direct observational methods employed to detect reptiles.

Records of the location, species, sex and life stage were made.

### Bat Survey 2017/18

*Scoping*

The findings of the Phase 1 survey and desk study records were reviewed. It was found that the study area largely comprised of un-developed land including semi-natural and man-made habitats. As such, it was considered that the site could potentially be used by bats for foraging and commuting.

In addition, the presence of a bungalow and the stone Martello tower and store were noted which potentially could be used by bats for roosting.

The survey area was initially assessed as being of likely "low" potential value to bats as a foraging / commuting resource due to its isolated geographic location and exposed nature and the general absence of woodland/sheltered opportunities for foraging.

The man-made structures which are present were initially evaluated as having "low" potential to support bat roosts. The bungalow is of modern construction and in a good state of repair. The Martello tower and store provide no enclosed loft/voids other than locally where mortar is missing. The other structures such as the WW2 bunker, portacabin and rifle range sheds were either sealed or had no features which could provide opportunities for roosting by bats.

No trees were recorded within the survey area with the potential to support bat roosts.

The rock faces associated with Torrey Canyon Quarry were inspected using binoculars. No significant gaps or crevises were identified which could be used by bats for roosting.

*Approach*

The overall aim was to determine the likely importance of the application site for bats within the context of the use made by bats of the wider survey area and beyond that the value of the Island of Guernsey for bats in general.

The survey strategy in respect of bats was based on the recommendations contained with the third edition of the Bat Conservation Trust (BCT) Guidelines for Bat Surveys (2016) and comprised of a combination of daytime building inspections, dusk and dawn transects and automated recording.

*Summary*

Table 4-1 provides a summary of the bats surveys undertaken. Surveys were undertaken in the spring, summer and autumn seasons across 2017 and 2018 during suitable weather.

**Table 4-2**
**Bat Surveys (2017/2018)**

| Survey Description | Date | Personnel |
|---|---|---|
| Daytime Building Inspection of "Martello" Tower and Bungalow | 30th August 2017 | Andrew Law (AL), SLR (NE Licensed batworker – England and Wales)<br>Jamie Hooper (JH), Environment Guernsey (EG) |
| Dusk Transect Survey | 30th August 2017 | AL and Julia Denney, EG |
| Automated Recording (One ANABAT device – two locations) | 30th & 31st August 2017 | SLR and EG |
| Dusk Transect | 30th October 2017 | Environment Guernsey |
| Automated Recording (One ANABAT device) | 30th October 2017 to 6th November 2017 | Environment Guernsey |
| Dusk Transect Survey | 1st May 2018 | Phillippa Dean (PD) and JH |
| Dusk Transect Survey | 2nd May 2018 | Phillippa Dean (PD) and JH |
| Dawn Transect Survey | 3rd May 2018 | Phillippa Dean (PD) and JH |
| Automated Recording (Two ANABAT devices). | 1st to 3rd May 2018 | SLR |
| Automated Recording (One ANABAT device). | 18th May to 22nd May 2018. | Environment Guernsey |

#### Phase 1 Habitat Survey 2020

The original Phase 1 habitat survey was updated in September 2020 to ensure that it was still reflective of the baseline situation and the potential of the Application Site to support protected and notable fauna and flora.

#### Wintering Bird Survey 2019/20

The wintering bird survey was repeated in 2020/21 to ensure that the information pertaining to the baseline use of the site by this group and individual species of note is up to date.

The methodology employed was identical to 2016/17, however, additional three additional monthly visits were undertaken in the autumn and spring months of 2020/21.

## 4.2 Habitats

### 4.2.1 Desk Study

A review of available aerial photography[20] and comparison between the Island-wide Phase 1 habitat surveys which were undertaken in 1999 and again in 2010 show that the extent of maritime grassland decreased within the survey area during this 10 year period. Further comparison between the 2010 survey and SLR's 2017/18

[20] Internet search and Google Earth Pro.

habitat plan shows a further reduction in the extent of this habitat type. There is a long term trend of grazing being abandoned on coastal grassland and heath in Guernsey with an attendant increase in scrub, bracken, bramble and tree cover; a situation which has been mirrored at Chouet Headland.

The main site habitats are described below and are shown on **Drawing CH 2.**

The dominant vegetation type on Guernsey is grassland. The most threatened habitats are saltmarshes, dune slacks and open dune. The terrestrial habitats most important for their biodiversity include Dune, Coastal and Marshy Grasslands.

Initial interrogation of aerial photography and desk study records found that the study area largely comprised of un-developed land including semi-natural and man-made habitats. As such, it was necessary to undertake a habitat mapping exercise.

The habitats present within the survey area were previously surveyed to Phase 1 level (i.e. mapped according to broad habitat categories) on the 17th July 2017, 30th and 31st August 2017 and 17th and 18th July 2018 by Mr Andy Law CEcol, MCIEEM, an experienced Phase 1 surveyor and Principal Ecologist with SLR.

The site was re-surveyed on 28th September 2020 by Jamie Hooper BSc (Hons), MRSB, an experienced ecologist with Environment Guernsey Ltd.

The aim of the 2020 'walkover' survey was to update the 2017 survey and revise the habitat mapping as required

### 4.2.2 Field Survey – Main Habitats

**Drawing CH 2** illustrates the main habits within the headland, as surveyed by SLR.

*Scrub / Tall Ruderal (Target Note 1) – See Figure 5*

The dominant species are bracken (*Pteridium aquilinum*) and bramble (*Rubus fruticosus*) with more localised beds of nettle (*Urtica dioica*). Thickets of blackthorn (*Prunus spinosa*) and European gorse (*Ulex europeaus*) also occur on the lower slopes. Various species of non-native shrub/tree are present in discrete patches including Muttonbird scrub (*Brachyglottis rotundifolia*), Buttonwood tree *(Conocarpus erectus var. sericeus), tamarisk (Tamarix gallica*) and German ivy (*Senecio mikaniodes*).

Along the edges of tracks and where bracken/bramble is less dense, the diversity of plants is higher with a range of robust species such as red campion (*Silene dioica*), sea radish (*Raphanus raphinistrum subspecies maritimus*), bittersweet (*Solanum dulcamara*), lesser burdock (*Actium minus*), wood sage (*Teucrium scorodonia*), black horehound (Ballota nigra), Pellitory of the Wall (*Parietaria Judaica*), hedge bedstraw (*Galium album*), common ragwort (*Senecio jacobea*), common mallow (*Malva sylvestris*), hedge bindweed (*Calystegia sepium*), field bindweed (*Convulvulus arvensis*), fennel (*Foeniculum vulgare*), wild carrot (*Daucus carota*), hogweed (*Heracleum sphondylium*), wall barley (*Hordeum murinum*) and thistles (*Cirsium arvense, C.vulgare, Carduus tenuiflorus and C.nutans*).

**Figure 4-1**
**Bramble and Bracken Dominated Scrub**

*Semi-Improved Grassland Fields*

The fields were found to be species-poor and to be dominated by grasses such as cock's foot (*Dactylus glomerata*), Yorkshire fog (*Holcus lanatus*) and crested dog's tail (*Cynosurus cristatus*) with some white clover (*Trifolium pratense*) and cat's ear (*Hypochoeris radicata*). It is, however, unlikely that they receive regular inputs of fertilisers or manure. In one of the fields is a clump of Guernsey lily (*Nerine sarniensis*).

**Figure 4-2**
**Hay fields – Species-Poor Grassland and Boundary Vegetation**

*Coniferous Woodland (Monterey Pine) - Target Note 3*

A mature plantation of pine trees with no discernible ground or shrub layer.

*Standing Water / Inland Cliffs – Target Note 4 and Figure 3*

The cliff faces and water body are largely un-vegetated.

*Maritime Grassland – Target Note 5 and Figure 7*

Examples of mown, rabbit-grazed and un-grazed areas of maritime grassland are present.

Regular mowing has reduced the species complement and favoured species adapted to such conditions such as chamomile (*Chamaemelum nobile*), daisy (*Bellis perennis*), yarrow (*Achillea millefolium*), common stork'sbill (*Erodium circutarium*), scarlet pimpernel (*Anagallis arvensis*), dove's foot cranesbill (*Geranium molle*) and the uncommon Allseed (*Radiola linoides*).

The most naturalistic and species-rich examples were found around the top of the rocky shore by the public path. Frequently recorded species in the more diverse swards included birds foot trefoil (*Lotus corniculatus*), autumn hawkbit (*Leontodon autumnalis*), greater plantain (*Plantago major*), ribwort plantain (*Plantago lanceolata*), thrift (*Armeria maritima*), rock samphire (*Crithmum maritimum*), sheep's sorrel (*Rumex acetosa*), common restharrow (*Ononis spinosa*), common toadflax (*Linaria vulgaris*), wild carrot (*Daucus carota*), common fleabane (*Pulicaria dysenterica*), perennial wall rocket (*Diplotaxis tenuifolia*), sea radish (*Raphanus raphinistrum subspecies maritimus*), hare's tail grass (*Lagurus ovatus*), fine-leaved fescue grass (*Festuca tenuifolia***),** other fescue and bent grasses (*Festuca/Agrostis*) and sea beet (*Beta vulgaris subspecies maritima*).

Less commonly recorded species were parsley-leaved waterdropwort (*Oenanthe lachenalii*), buck's-horn plantain (*Plantago coronopus*), galingale (*Cyperus longus*), sheep's bit (*Jasione montana*) and sea campion (*Silene uniflora*).

Non-native / invasive species included hottentot fig (*Carpobrotus edulis*), agave cactus, pink sorrel (*Oxalis articulate*), Spanish bluebell (*Hyacinthoides hispanica*) and Duke of Argyll's tea plant (*Lycium halimifolium*).

**Figure 4-3**
**Maritime Grassland**

More ruderal areas comprised of bristly oxtongue (*Helminthotheca echiodes*), mugwort (*Artemesia vulgaris*), thistles, cock's foot grass (*Dactylus glomerata*), tree mallow (*Malva arborea*), smooth sow thistle (*Sonchus oleraceus*), frosted orache (*Atriplex laciniata*), spear-leaved orache (*Atriplex prostrata*), rye grass (*Lolium perenne*) and wild carrot.

### 4.2.3 Results of 2020 Survey

The habitats described above were found to still be present in 2020 with similar indicator species noted. The extent of each vegetation type as shown on the Habitat Plan (April 2019) was broadly similar.

*Scrub / Tall Ruderal (Target Note 1)*

This habitat occupied the extent recorded in 2017 and had further encroached into an area of Semi- Improved Grassland above and to the west of the Green Tip (Target Note 11).

*Semi-Improved Grassland Fields (Target Note 2)*

The fields had broadly remained as Semi-Improved Grassland. In autumn 2020, there were variable levels of encroachment of bracken around the perimeters. A hay or haylage crop had been taken from the northerly block of four fields earlier in the season whereas the southerly field was being grazed by cattle.

*Coniferous Woodland (Target Note 3)*

This area was unchanged. Some of the pines were noted as in poor condition or dead.

*Standing Water / Inland Cliffs (Target Note 4)*

This area was unchanged. The polluted quarry remains devoid of aquatic or marginal vegetation and the steep cliffs only supported scattered areas of scrub.

*Maritime Grassland (Target Note 5)*

Narrow strips of Maritime Grassland remained in situ around the perimeter of the site, mainly as verges and banks alongside the coastal footpath.

*Additional Observations*

i. The patches of Semi-Improved Grassland on the plateau have become rank through lack of regular management (Figure 4-4).

**Figure 4-4**
**Unmanaged area of Semi-Improved Grassland**

ii. The fragment of Semi-Improved Grassland within Bramble Scrub to the west of the Green Tip has decreased in size by around 50% due to encroachment (Figure 4-5).

**Figure 4-5**
**Remnant of Semi-Improved Grassland**

iii. The domestic curtilage of the house had not been maintained recently and the lawned areas had become rank (Figure 4-6).

**Figure 4-6**
**Unmaintained grounds of the house**

*Summary*

The habitats as mapped in 2017 have remained largely unchanged over the last three years. There has been a negligible loss of Semi-Improved Grassland and a lack of recent management in some locations has led to a downturn in overall condition, mostly on the plateau and within the grounds of the house.

### 4.2.4 Species

#### Background to Guernsey's Flora and Fauna

*Terrestrial Mammals*[21]

The Bailiwick has few native terrestrial mammals. The shrew found in Guernsey (and also Herm and Alderney) is the Greater White-toothed Shrew (*Crocidura russula)*, recently introduced to Ireland but otherwise not known in the British Isles. The Guernsey Vole, (*Microtus arvalis sarnius)*, is a subspecies of the Common Vole of Europe, and is only found in Guernsey.

Other rodents include the Wood Mouse (*Apodemus sylvaticus)* on all major islands and the introduced House Mouse (*Mus musculus)*, Brown and Black Rats (*Rattus norvegius) and (R. rattus)*.

The largest native mammalian carnivore is the stoat, (*Mustela ermine)* but this is believed to be extinct. Rabbits (*Oryctolagus cuniculus)* and Hedgehogs (*Erinaceus europaea*) are found in all the major islands but these were introduced.

Six species of bats have been observed in Guernsey, with caves on the south coast used as roosting sites. The species assemblage includes the rare grey long-eared bat.

*Invertebrates*

Guernsey is important for the conservation of several species of invertebrates which include mole cricket (*Gryllotalpa gryllotalpa*), Glanville Fritillary butterfly (*Melitaea cinxia*), blue-winged Grasshopper (*Oedipoda caerulescens*) and the Dung Beetle (*Copris lunaris*) which are either scarce on mainland UK, extinct or never occurred.

*Reptiles and Amphibians*

Guernsey supports three native species of amphibian and reptiles (i.e. common frog, smooth newt and slow worm) and one introduced species (Green Lizard).

*Birds*

The most important bird populations in the Bailiwick are its seabirds 1% of the World's Northern Gannets (*Sula bassana*) (c. 6000 pairs) breed on the Les Etacs (Garden Rocks) and Ortac off Alderney.

Guernsey has a healthy population of Barn Owls (*Tyto alba*) boosted by a scheme to provide large numbers of nest boxes.

[21] Extract from: UK Overseas Territories and Crown Dependencies: 2011 Biodiversity snapshot. Guernsey: Appendices. Author: Dr Charles David Guernsey Biological Records Centre, States of Guernsey Environment Department & La Societe Guernesiaise. More information available at: www.biologicalrecordscentre.gov.gg

*Plant Species*

Many of the UK Red Data Plant Book species are common in the Channel Islands because of their geographical position. Some species are of cultural significance as they are named after the islands, such as Guernsey Centaury and Guernsey fern and Guernsey spleenwort. Loose-flowered orchids, which do not occur in the UK, are a characteristic plant of damp meadows.

### 4.2.5 Summary of Baseline Survey Results – Flora

No plant species of particular rarity were recorded. The surveys recorded the presence of musk thistle (*Carduus nutans*), allseed (*Radiola linoides*) and common toadflax (*Linaria vulgaris*). All three of these species are considered to be "at risk".

A number of non-native / invasive plant species were recorded, some of which are likely to have originated from deliberate planting and others are likely to have spread from the green waste facility.

### 4.2.6 Summary of Baseline Survey Results – Fauna

*Amphibians*

The GBRC report returned records for slow worm, smooth newt and common frog from within the 2km search area.

The reptile survey undertaken in autumn 2017 recorded one juvenile slow worm. Due to the presence of a juvenile animal there must be a breeding population of this species which is likely to be small in size due to the limited extent of rough grassland and predation by rats and other predators.

No species of amphibian were recorded or are considered to be present based on the habitats which are present. It is considered unlikely that the waterbody present in the quarry void would support amphibians given its past use as a facility for the bio-remediation of oil.

*Bats*

The survey work undertaken in 2017/18 aimed to establish (1) whether bat roosts are present and could be affected and (2) whether the application site is of value to bats for foraging and commuting.

In respect of (1) above, structures/trees or other features within the survey area were inspected by a Natural England licensed bat worker during the daytime for evidence of bat roosts and/or the potential for them to occur. No bat roosts or potential roosting sites were identified.

In respect of (2) above, a combination of walked transects with bat detectors at dusk and dawn (with listening points at key stages) and remote recording was undertaken (with detectors being left in suitable locations for extended periods of time). The surveys aimed to achieve coverage in the spring, summer and autumn seasons.

All of the walked transects recorded very low levels of usage by bats. The August 2017 transect recorded 1-2 common pipistrelles foraging around the plantation of pines and the frontage of the quarry. An ANABAT left overnight on the edge of the pine plantation facing west (30th August 2017) and east (31st August 2017) also recorded common pipistrelle. The late October 2017 transect recorded no bats. The series of dusk and dawn transects in early May 2018 recorded virtually no activity by bats.

Further automated recording was undertaken in late October/early November 2017 which recorded very low levels of activity by mainly common pipistrelle and to a lesser extent Nathusius' pipistrelle. Further automated

recording in May 2018 recorded a similar pattern of bat use by these two species with higher levels of activity (as measured by bat passes per hour) by common pipistrelle. A small number of calls were provisionally assigned to "big bat" - on the UK Mainland this would usually be a noctule. No calls attributable to grey long-eared bats were recorded.

To summarise, the bat surveys undertaken have not detected the presence of roosts. They found that the survey area is mainly used by two species of pipistrelle bats, of which common pipistrelle was the most frequently recorded. All activity by bats was at a low level and localised in distribution to the sheltered south-facing parts of the survey area such as the edges of the conifer plantation.

The survey area are therefore not considered to be of high value to bats.

*Rodents*

The reptile survey also recorded the presence of small numbers of the greater white-toothed shrew (*Crocidura russula*). Brown rats were seen on a number of occasions during fieldwork.

*Invertebrates*

No formal invertebrate surveys have been undertaken. Brown argus (*Aricia agestis*) butterfly is present within the coastal grassland on the plateau. This species has a localised presence on Guernsey. Likely foodplants in this location are low Geraniums and common stork's-bill.

Strong colonies of gatekeeper butterfly and common blue butterfly were recorded in 2017 and 2018 which are common species on the Island. In addition, other common species included red admiral, meadow brown, large white, small copper, brown-tailed moth (*Euproctis chrysorrhoea*) and the common carder bee (*Bombus pascuorum*).

*Wintering Birds*

Thirty bird species were recorded during the course of the winter CBC surveys.

The bird community was dominated by gulls and in particular many thousands of herring gull *Larus argentatus.* At any one time there were usually at least 1000 herring gull roosting on shoreline rocks, with several thousand more on the neighbouring landfill site or flying to/from it. Although herring gull is a Red list species, and the other four gulls are Amber list for varying degrees of population decline, they are still common, and also a pest species at landfill sites.

The scrub and semi-improved grassland habitats had low general value for birds. Wren *Troglodytes*, dunnock *Prunella modularis*, robin *Erithacus rubecula*, goldfinch *Carduelis* and starling *Sturnus vulgaris* were frequently seen or heard in these habitats; all are common birds, although dunnock and starling are on the Amber and Red lists respectively. Starling is listed due to a UK and Channel Islands population decline of over 50% from 1990 to 2015, while the dunnock has suffered a longer term UK and Channel Islands population decline of 31%. A few other notable birds were seen here including individual song thrush *Turdus philomelos*, mistle thrush *T. viscivorus*, linnet *Carduelis cannabina* (all Red list), and three meadow pipit *Anthus pratensis* (Amber list).

*Breeding Birds*

The Breeding Bird Survey recorded 17 nesting species, comprising mostly of common species.

The survey area is notable for breeding long-eared owl (*Asio otus*) which uses old crows nests in the mature plantation of pine trees (Target Note 3). The pole/tree mounted nest boxes and quarry rock ledges support breeding / roosting kestrel (*Falco tinnunculus*) and barn owl.

A house sparrow colony is associated with the bungalow and its grounds.

No other notable bird species were recorded.

## 4.3 Appraisal

### 4.3.1 Habitat

The development of the quarry would result in the direct loss of habitats within the development footprint due to the need to expose the underlying rock. Based on the Phase 1 survey work the main habitats to be lost would be dense scrub/bracken, semi improved grassland, with smaller amounts of maritime grassland. In the context of the Island wide resource, losses would be small. Notwithstanding this, a small area of planted coniferous woodland lies within the development footprint; whilst this is a habitat with low ecological value, it can be of importance as a place of shelter for migrant birds, nesting birds such as raptors and as for insects which specialise in the tree species present (e.g. moths). In addition, it is scarce within the Island.

### 4.3.2 Species

#### Flora

Surveys of the application site and wider area have not recorded any particularly rare species of plant.

#### Mammals

Surveys of the headland recorded the presence of two species of pipistrelle bat (common and Nathusius'). Low levels of foraging by these species were recorded in 2017/18. This is attributed to the generally exposed nature of the headland and the limited availability of sheltered opportunities for foraging.

No bats roosts are considered to be present.

The survey area and application site are therefore not considered to be of high value to bats.

#### Birds

Surveys of the headland encompassing every season did not record the presence of a particularly notable assemblage of birds using the headland for breeding or wintering.

The presence of breeding long-eared owl, barn owl and kestrel was considered to be noteworthy in an Island context.

The bungalow supports a breeding colony of house sparrows, a species which is in steep decline in the UK Mainland, but which remains a reasonably common species on Guernsey.

#### Reptiles and Amphibians

Reptile surveys have recorded the presence of a "small" population of slow worm.

### Invertebrates

The wider survey area supports a colony of brown argus butterfly which has a restricted distribution on the Island.

## 4.4 Conclusions

No designated ecological sites such as Sites of Special Significance (SSS) would be affected by the development of a quarry on the headland, provided that dust suppression measures are adopted in respect of heavy goods vehicles.

Surveys have not recorded the presence of notable habitats.

Surveys undertaken for flora and fauna have not recorded any particularly rare or uncommon species.

A small population of slow worm was recorded within the wider survey area. Although no slow worms were recorded from within the development site it is possible that this species also occurs in the rough margins of the hay fields.

The survey area supports three species of raptor (barn owl, long-eared owl and kestrel) which nest/roost in purpose-built boxes, old crow nests in mature pines or cliff faces. The habitats present within the development site form part of a wider resource of rough grassland which supports their small mammal prey. A colony of house sparrows is resident in and around the bungalow. No other notable species of birds were recorded during the winter or breeding seasons; however, the site has a general value to birds in providing nesting opportunities for a variety of common species in buildings, low scrubby vegetation, cliffs, edges of standing water etc.

Bat surveys have not detected the presence of any roosts. Foraging activity by bats was attributed to two common species of pipistrelle bat. Activity levels were very low across the seasons and were restricted to sheltered areas on the south-facing flank of the site. The majority of the site is quite exposed to prevailing winds and lacks structured vegetation such as trees or hedgerows and as a consequence its value to bats is limited.

Recommendations have been made in respect of avoidance and mitigation measures required to ensure that impacts on species and off-site habitats are either avoided or their effects are reduced to acceptable levels. These relate to the timing of operations (e.g. the removal of vegetation outside of the bird nesting season) or measures required in advance of development commencing (e.g. reptile and raptor mitigation schemes).

Residual ecological impacts have been predicted in respect of house sparrow only which are considered to be of significance at local level.

# 5.0 Landscape and Visual Impact

## 5.1 Landscape Baseline

The Chouet Headland is a gently undulating promontory with visual connections to Lady's Bay and Grand Havre to the south, the Rousse Headland to the south west, and the open moorland areas associated with L'Ancresse Common to the south-east. To the north and west there is a strong and often direct connection to the open sea of the English Channel.

The headland is generally rural in appearance and located away from built up areas. The closest built up areas being Vale Marais (approximately 1km to the south east) and L'Islet / La Garenne (approximately 1-1.5km to the south). To the east, the gradually increasing topography of a working landfill site prevents visual connectivity with the eastern part of Mont Cuet and L'Ancresse/Pembroke Bay.

Despite being generally rural in appearance, Chouet Headland contains evidence of much previous development, ranging from historic coastal defences (Napoleonic and WWII) to previous quarrying and current waste management.

### 5.1.1 Character of the landscape

The Guernsey Character Study (Stage 1), undertaken in June 2013 and published by The States of Guernsey Government Department, describes the landscape of Guernsey and has been used to inform the assessment of landscape character as set out below.

Figure 8 (Landscape Character) within the Guernsey Character Study shows the application site is located within the Northshores Character type. Further to the south are the Wetlands and Lowland Hills character types. The Lowland Hills provide the southern and eastern backdrop to the landscape of the site.

Figure 13 of the Guernsey Character Study identifies some 49 Landscape Character Areas (LCAs), with the headland being located within LCA 1 - L'Ancresse Character Area. Each Character Area is also defined as being one of four general land uses; rural, semi-rural, built-up and urban. The "L'Ancresse" Character Area is defined as having a 'Rural' category. The Site has potential visual connectivity with LCA 11 - Les Vardes / Haut Coutis / L'Islet to the south/southeast, and LCA 49 - Vale Church to the south. Visual connectivity is more restricted for two other character areas that are part of the study area, namely LCA 5 - Braye du Valle and LCA 2 - Les Landes.

The headland has a coastal position and therefore seascape is equally important as landscape. No suitable published Seascape Character Assessments (SCA) have been identified for Guernsey, therefore this assessment proposes its own for the purpose of identifying landscape effects. Three SCAs have been defined to measure the level of effect on the marine 'landscape'. These three areas are as follows; the Grand Havre; Baie de Port Grat; and Open Sea/Baie de la Jaonneuse.

#### L'Ancresse

The topography of this area includes areas of exposed rock and higher ground above the general lowland landscape, including the northern coastline of Chouet and Mont Cuet, and the L'Ancresse Common. The exposed rock has resulted in the establishment of numerous historic quarries and subsequent landfill activities in the north of this character area.

The character area comprises large areas of coastal heath and rough grazing land much of this supporting its use as a golf course. Enclosure is limited with large open areas of heathland and very few agricultural field units.

Where present, field boundaries include stone walls, but are often in poor condition and overgrown by vegetation.

The scale of the landscape is large and exposed with open views towards the sea and the rising ground towards the south of the island, particularly from the areas of higher ground. The combination of heathland and golf course provides the most extensive area of terrestrial open space on the island. Open panoramic views are a noted characteristic of L'Ancresse Common.

This character area has a rich historical record with a number of Martello towers and other Protected Monuments present around the coastline at regular intervals, largely concentrated around Pembroke Bay, and in combination with other monument sites such as the Star Fort (PM127), Fort Pembroke (PM128) and Fort Le Marchant (PM126). Other protected monuments include 'La Varde Dolmen' (PM15) 'Les Fouaillages Dolmen' (PM97) and 'Platte Mare Dolmenon' (PM130) further south on L'Ancresse Common.

With regard to the headland specifically, Martello Tower (Protected Monument (PM117) and Chouet Batteries (PM134) are of particular note. The Martello Tower is the focal point for the Chouet Headland when viewed across the Grand Havre, with a visual connection across the bay to the Rousse Martello tower.

### Les Vardes / Haut Coutis / L'Islet

The higher ground in this character area is concentrated on the area of the existing Les Vardes Quarry, rising above the surrounding lowland landscape.

A complex network of local roads divides this area into numerous small landscape units, and in the case of Les Vardes Quarry one larger unit. Ribbon development has been historically established along these roads, with a mixture of remnant agricultural land and larger scale development located within the centre of landscape units surrounded by such ribbon development.

Land enclosure is formed by a mixture of residential plot boundaries (garden vegetation, hedges and fencing) and tall hedgerows around the remnant agricultural fields. The scale of enclosure is generally small scale but increases to medium scale in the west.

The long-term settlement of this area has resulting in numerous historic buildings towards the more sheltered eastern side of the area. In addition, protected monuments such has the Megalithic chamber, Sandy Lane, have been preserved and add to the historic settled nature of the character area.

Preserved monuments of note for this study are the Rousse Tower (No 11), battery and magazine (PM115) and adjacent burial 'cists' (PM133), below the high-water level. These monuments are situated on the Rousse Headland where views across the Grand Havre towards the proposed development are present.

The enclosure by vegetation generally restricts views within this character area to short distances and glimpses. Although the coastal edge frequently has distant views to the sea.

### Vale Church

This character area is entirely lowland, with the exception of a small rocky outcrop which is the location of Vale Church (St. Michel du Valle Protected Building PB1180). The character area is dominated by the church, and associated Mentone (PB1179) and cemetery, which are largely encircled by residential development. More open coastal heath is present to the west, with boat storage and a large pond.

The area of the church is designated as a conservation area which forms the majority of the character area and provides the character area with a strong historic nature.

Visually the church steeple is a prominent feature in the local landscape and provides a strong visual connection to the coastal area to the west. However, the enclosing residential belt and associated vegetation provide an enclosed nature for views within the character area with generally only glimpsed views out. Of more note are the views from the raised ground around the church to the south.

### Les Landes

This is a semi-rural area where the underlying landform and character dominate, but the landscape is enclosed by built features restricting long range views. There are clusters of buildings and ribbon development along the main roads which enclose and impede visual connections to the remaining open space between roads.

### Braye du Valle

This LCA is identified in the Island Development Plan as a built-up area with a medium level of development with large scale buildings such as the Guernsey Clematis Nursery, Alliance supermarket and Moonpig Factory. Residential development tends to have extended from the main roads via secondary side roads, as oppose to the linear ribbon development elsewhere. An exception to this general characteristic is present within the study area to the south of the Vale Church where the LCA crosses more open land around Vale Pond which is classed as part of the Pont Soif to Pont du Valle Site of Special Significance (SSS) in the IDP. This area includes the brackish pond and salt marsh of Vale Pond and a small area of coastal land. The SSS continues along the coast through the following LCA.

### Seascape Character Areas

The Grand Havre SCA comprises the bay of Grand Havre, enclosed by the headlands of Rousse and Chouet. The bay is enclosed and sheltered with large areas of sand exposed at low tide as well as rocks around the edge of the low water mark. The area is influenced by adjacent recreational uses such as the shoreline path, L'Ancresse Common and tourist attractions such as the Rousse Martello Tower. Its sheltered nature makes it important for harbouring boats.

The Bais de Port Grat SCA is more exposed than that of the Grand Havre and characterised by extensive areas of exposed rock. These areas of rock include Quenon, Grands Moulinets, The Knife and La Marquie, some of which form part of the boundary with the Grand Havre in the east. To the west the area is open to the sea. Beach areas are limited to the curve of shoreline between Pulias Pool and the Rousse Headland, protected from the sea by extensive rock areas.

The Open Sea/Baie de la Jaonneuse SCA includes the English Channel to the north of the rocks of the Baie de Port Grat, and the Baie de la Jaonneuse north of the Chouet Headland. This area is predominantly open sea with very occasional small areas of rock exposed. It is wild and vast in nature with the rocky shoreline edge generally an area of spray and waves even in calm weather.

## 5.2 Visual Baseline

The focus of local views is generally centred on Ladies Bay and Grand Havre, one of the main bays in north Guernsey. The Rousse and Chouet headlands frame sea views from the coastline of the bay.

To the west of Rousse visibility is affected by the sinuous coastline and extensive areas of intertidal rocks, which reduce the prominence of the Chouet headland in any views present. Further visibility to the west is prevented beyond the coastline and inland vegetation near Pulias Pool.

To the east of the Chouet headland views are limited to a short section of coastline, and views east of the Marine Wildlife Observatory are screened by the existing landform of the adjacent landfill site.

### 5.2.1 Visual receptors

Potential visual receptors in the area with theoretical visibility include the following:

- Inhabitants of properties at Rousse, visitors to the Peninsular Hotel and residential properties on the southern side of Lady's Bay (fronting Route Du Picquerel and adjacent roads). A small number of properties at Mont Cruet;
- users of public highways such as Mont Cuet, Route Du Picquerel and a number of car parks around the bay supporting recreational purposes, including at Rousse, Picquerel Point, Pont St Michel, Amarreurs Harbour, Roc Salt Restaurant and the south side of the Chouet Headland. (recreational, local residents or workers); and
- recreational users of the surfaced, off road, cycle and walking route present around the edge of the Ladies Bay / Grand Havre. Visitors to the strategic views identified in the Guernsey Character Study, and these include panoramic views at Rousse and L'Ancresse Common.

In addition, users or passengers on vessels on the sea (recreational or workers) are also theoretically affected. However, the main ferry route from Portsmouth passes the eastern coast of the island before landing at St Peter Port, and the nearest ferry route to the north of the island is over 7km offshore. However, private boat users could pass close to the Chouet headland and Grand Havre includes 3 minor arrival points for private boats at Chouet, Les Amarreurs and Rousse (marinas, slipways and moorings), as identified in the 2013 Guernsey Character Study.

## 5.3 Appraisal

### 5.3.1 Landscape

The proposed development may potentially affect the following landscape receptors:

- physical disturbance of landscape elements and features within the site and adjacent landscape;
- alteration to aesthetic and perceptual aspects such as scale, simplicity, openness and sense of tranquillity and wildness; and
- alteration to overall landscape character and key characteristics.

#### Alterations to Aesthetic and Perceptual Aspects

Changes to aesthetic and perceptual aspects occur principally within the development footprint and its immediate landscape setting, with effects on the wider landscape setting being limited to visual connections with other landscape character areas and features due by the size and scale of the new elements and their visibility.

#### Overall Effects on Landscape Components and Character

The alterations to overall landscape character and key characteristics result from a combination of changes to physical elements and features and the changes to the aesthetic and perceptual aspects of views/inter-visibility. Such effects occur both within the application site and its immediate landscape setting (and these are considered together).

The sensitivity of the Chouet Headland is to be considered within the context of prior use of the headland for quarrying, built development (coastal defences), existing waste operations and adjacent landfill. The magnitude of any change relates largely to the loss of landform and resultant physical change to the topography.

The proposed development does not add or remove elements from the existing character of the Chouet Headland. The distinctive Martello Tower on the Chouet Headland would be retained and the visual connection between the Chouet Headland and Rouse Headland maintained.
The proposed development would not directly affect the Vale Church Conservation Area or alter any visual connectivity between the conservation area and the Chouet Headland. In many views from around the Grand Havre the steeple of the Vale Church is a key feature, linking the church to the coast. However, none of these views are orientated to take in the steeple in the same frame of view as the Chouet Headland so that both are seen at the same time.

The more important effects would be those on the landscape character areas of L'Ancresse and Les Vardes / Haut Coutis / L'Islet. This is due to perceived changes in the visual connections between these two LCA and the Chouet Headland.

Although visible from the western side of L'Ancresse Common and the coastline of Grand Havre the level of landscape change would not be sufficient to alter the composition of the landscape or dominate the key visual connections for these character areas.

In the Grand Havre SCA, the Chouet Headland would still enclose the entrance to the bay from the open sea, but the skyline of the headland would be changed and the bay slightly more open due to this. However, the change would not add or remove any important features of the existing landscape character, just modify the existing elements.

### 5.3.2 Visual

The extent of visual effects would generally be restricted to the coastal edge between Pulias Pool and Mont Cuet, Garden vegetation, built development and landform prevent visual effects from being perceived further inland. In addition, viewers on private boats approaching and entering the bay of Grand Havre from the north and north-west would be affected.

The visual effect would consist of two operational stages, firstly the stripping of soils and overburden from the surface, and extraction of the top layers of rock. Secondly, the extraction void deepening and descending below the level of the adjacent landscape. In the first stage earthmoving machinery and disturbance would be very evident on the landform of the headland. In the second stage the extraction process would be screened from view and the restoration process undertaken around the periphery of the quarry void. The second stage would result in less disturbance and a gradual merging of the disturbed area into the adjacent landscape. The first stage would be adverse in nature, with the second stage starting as adverse but becoming neutral in nature as the restoration establishes.

The most prominent effects have been identified for Rouse Headland and in the vicinity of Roc Salt Car Park. This level of effect would extend for viewers on the paths around the Chouet Headland, where proximity to the development generates significant change to the visible landscape.

The visual effects identified above would be created by proximity to the proposed development and the soil and overburden stripping this would entail. Once those early stages are completed and restoration of the peripheral areas of the proposed quarry carried out, the level of effect is predicted to reduce. The remaining change in the view would relate to the part removal of the skyline of the Chouet Headland, rather than the addition of elements to the view.

Similarly, views from the path around the headland are likely to remain significant due to proximity, and high level of visual change.

The visual effects from other areas would be less, and largely related to the proximity of the viewer.

## 5.4 Conclusions

Overall this assessment has not identified any significant landscape effects as a result of the proposed development, other than on the Chouet Headland itself, where the change in topography and loss of vegetation would be a significant change.

Moderate landscape effects have also been identified for the L'Ancresse and Les Vardes / Haut Coutis / L'Islet LCAs and the Grand Havre SCA. Moderate effects can be significant, with value, susceptibility, size/scale of effect, and whether the effect is found across a number of receptors or in a pattern that intensifies the overall impact, all carefully considered to identify significant Moderate effects. In the case of the proposed development it is considered that the change would only be perceived in certain parts of the LCAs and that the scale and size of change within visual connections between the LCAs and the proposed development would not be sufficient to generate a significant effect. With regard the Grand Havre SCA, lower angles of view between the seascape area and the Chouet headland would reduce the degree to which the reduction in the Chouet Headland skyline was perceived, and thus the landscape effect is not considered significant.

More of the identified visual effects have been considered significant due to their concentrated and directed nature, thus having a greater effect on the viewer, compared to the more diluted landscape effects. The main source of significant visual effect would be the disturbance generated by the stripping of soils and overburden, with these effects being removed from view as the extraction process worked downward into the ground. Similar disturbance is already present in many of these identified views, caused by waste management operations and/or landfill operations at Mont Cuet.

# 6.0 Noise

## 6.1 Baseline

Noise monitoring has been undertaken to determine the existing noise environment at the nearby noise-sensitive receptors. All measurement instrumentation was calibrated before and after the measurements. The calibration chain is traceable via the United Kingdom Accreditation Service to National Standards held at the National Physical Laboratory. No significant drift was observed.

To assess the potential impact of the development upon existing receptors close to the site, daytime noise measurements were taken at the following locations representative of the soundscape at the receptor:

- Location 1 – Adjacent to the Roc Salt restaurant on Mont Cuet Road, approximately 150m to the south-east of the quarry workings;
- Location 2 – Property off Mont Cuet Road, approximately 290m to the south-east of the quarry workings; and
- Location 3 – Adjacent to L'Ancresse Golf Club on La Jaonneuse Road, approximately 590m to the east of the quarry workings.

The results of the noise surveys are presented Table 6-1.

**Table 6-1**
**Summary of Measured Noise Levels, free-field, dB**

| Location | Date | Period | $L_{Aeq,T}$ | $L_{A90}$ | $L_{Amax}$ |
|---|---|---|---|---|---|
| Location 1 | Thursday 6th July 2017 | 14:36 | 51.2 | 39.9 | 70.8 |
| | | 15:25 | 51.6 | 43.1 | 75.2 |
| | Friday 7th July 2017 | 12:23 | 44.3 | 36.3 | 56.9 |
| | | 13:38 | 56.2 | 38.2 | 80.3 |
| | Saturday 8th July 2017 | 10:16 | 52.3 | 40.5 | 74.2 |
| | | 11:41 | 50.3 | 35.0 | 60.4 |
| Location 2 | Thursday 6th July 2017 | 11:59 | 41.2 | 34.9 | 57.7 |
| | | 16:19 | 40.9 | 31.6 | 57.9 |
| | Friday 7th July 2017 | 12:48 | 45.4 | 40.1 | 57.8 |
| | | 14:03 | 42.3 | 34.2 | 74.2 |
| | Saturday 8th July 2017 | 10:57 | 51.0 | 31.9 | 76.3 |
| | | 12:01 | 37.0 | 31.2 | 47.7 |
| Location 3 | Thursday 6th July 2017 | 13:33 | 52.6 | 36.0 | 75.9 |
| | | 14:59 | 42.3 | 36.7 | 59.4 |

| Location | Date | Period | $L_{Aeq,T}$ | $L_{A90}$ | $L_{Amax}$ |
|---|---|---|---|---|---|
| | Friday 7th July 2017 | 15:54 | 48.2 | 36.3 | 72.3 |
| | | 13:23 | 52.6 | 36.0 | 75.9 |
| | Saturday 8th July 2017 | 10:38 | 42.2 | 33.9 | 57.9 |
| | | 11:18 | 40.7 | 35.2 | 51.5 |

The soundscape at all the noise-sensitive locations considered may be described as distant road traffic and natural sounds such as birdsong.

## 6.2 Appraisal

Surface minerals extraction sites, by their nature, generate noise due to the use of heavy machinery. During the proposed development the potential risk of noise impacting on the nearby noise-sensitive receptors would vary depending on the type of activities being undertaken at the time and the effectiveness of any noise control measures that are in place.

### 6.2.1 Quarry Development

In the absence of specific guidance in Guernsey, discussions have been had with the Environmental Health department at the States of Guernsey. This has indicated that any assessment should be undertaken in accordance with the National Planning Policy Guidance and associated Planning Practice Guidance, which contains details regarding noise from mineral operations as previously presented in MPG11.

In this respect, the relevant guidance states:

"*Mineral planning authorities should aim to establish a noise limit, through a planning condition, at the noise-sensitive property that does not exceed the background noise level (LA90,1h) by more than 10dB(A) during normal working hours (0700-1900). Where it will be difficult not to exceed the background level by more than 10dB(A) without imposing unreasonable burdens on the mineral operator, the limit set should be as near that level as practicable. In any event, the total noise from the operations should not exceed 55dB(A) LAeq, 1h (free field). For operations during the evening (1900-2200) the noise limits should not exceed the background noise level (LA90,1h) by more than 10dB(A) and should not exceed 55dB(A) LAeq, 1h (free field ). For any operations during the period 22.00 – 07.00 noise limits should be set to reduce to a minimum any adverse impacts, without imposing unreasonable burdens on the mineral operator. In any event the noise limit should not exceed 42dB(A) LAeq,1h (free field) at a noise sensitive property".*

Based on the anticipated compliment of plant and machinery the worst case predicted noise levels associated with the initial phase of development would be as follows:

- Location 1 – 52.3dB(A)
- Location 2 – 48.6dB(A)
- Location 3 – 46.1dB(A)

These predicted limits are all above the PPG criterion of setting a noise limit that is 10dB(A) above the background noise level, but all are below the absolute maximum of 55dB(A). It should be noted that the noise predictions are worst case, when all plant is operational and working at the closest part of the site to the receptor. As such the predicted levels would only occur for a small period of the overall life of the development.

With additional mitigation based around operational practices experience shows that predicted noise levels can be reduced by around 5dB(A).

### 6.2.2 Traffic

According to the DMRB, *"a change in noise level of 1dB is equivalent to a 25% increase or 20% decrease in traffic flow"*. This change in noise level, in accordance with the IEMA guidelines, equates to a difference which is just perceptible under laboratory conditions; however, a change or difference of 3dB is perceptible under most normal conditions.

By comparing the total 'baseline' and 'baseline + development' flows it can be seen that the increase in traffic would be below 25%. However there is a significant increase in HGV movements.

Calculating the Basic Noise Level using the methodology outlined in the Calculation of Road Traffic Noise indicates that the increase in noise level as a result in the overall change in flow and increase in percentage HGV's would result in a 0.2dB increase of each of the assessed roads. As such, traffic noise would have a negligible impact.

## 6.3 Conclusions

The noise assessment was based on a baseline sound survey undertaken over midweek and weekend periods at locations considered representative of the nearest noise-sensitive receptors to the development site.

The assessment has considered the potential noise impacts of the operation of the proposed development and has been undertaken in conjunction with BS5228:2009+A1:2014.

All sound prediction has been undertaken using the proprietary noise modelling software Cadna/A which incorporates all the relevant calculation algorithms within BS5228:2009+A1:2014.

The assessment has shown that the predicted noise levels from on-site quarrying operations would be below the absolute noise limit of 55dB $L_{Aeq,1hour}$ outlined within the PPG guidance.

The assessment has also shown that with the adoption of mitigation measures in the form of good site practices the residual impacts at the nearest noise-sensitive receptors would as a worst-case be minor.

The assessment for development related traffic movements has shown that the increase in HGV movements would lead to a negligible impact on all the roads considered.

# 7.0 Transportation

## 7.1 Baseline

Access to the headland site is via Rue des Grand Camps (which leads onto Mont Cuet Road at the junction with Les Hures) which runs south east from the headland to connect with Les Clotures Road and L'Ancresse Road. From here Les Clotures Road connects east towards La Fontella Vale and L'Ancresse Road links south towards La Tonnelle.

Initially, extracted rock would be processed at the headland using a mobile processing plant and transported by HGV's to Les Vardes Quarry for further processing and dispatch. In so doing, HGVs would travel along the following roads:

- Mont Cuet Road;
- L'Ancresse Road;
- Road between L'Ancresse and junction with La Route De L'Islet;
- La Route De L'Islet;
- La Route du Picquerel;
- Route du Port Grat; and
- Route de Pulias (to the junction of Les Vardes Quarry).

The second phase of the development would then see the reverse, with rock extracted at Les Vardes Quarry (from underneath the plant site) and transported to a new processing plant site at Chouet Headland.

The final phase of developing the headland would result in the final reserves at the headland being worked and processed at the headland, with aggregates dispatched to the local market using the most suitable route.

### 7.1.1 The Highway Network

Mont Cuet Road is a single carriageway with two-way flow leading off the application site in a south-easterly direction before a sweeping bend to the east adjoins the road to La Jaonneuse Road, Les Clotures Road and L'Ancresse Road via a crossroads junction with priority to La Jaonneuse Road and L'Ancresse Road. Give-way road markings on Mont Cuet Road and Les Clotures Road are visible and clear to inform this layout.

L'Ancresse Road follows on from Mont Cuet Road to the south west as a single carriageway with two-way flow. Unlike Mont Cuet Road there are residential properties fronting the link along the eastern side, and fields when heading north-east. This link ends at Route Militaire with a staggered crossroad priority junction with Ville Baudu Road extending east and La Route de L'Islet, which extends west.

La Route de L'Islet, a single carriageway road, extends west from the junction for approximately 250m before an almost 90 degree bend where it continues south west towards L'Islet. The full length contains central white line road markings. A second staggered crossroads then gives way to La Route du Picquerel in the north; Les Petites Mielles in the south; and Les Tracheries Road in the west.

La Route du Picquerel is a single carriageway road with two-way flow and central white line road markings. It extends to the north and then continues north west until a bend left after which it changes to Route du Port Grat.

Route du Port Grat is of the same road description as La Route du Piquerel and heads mostly in a westerly direction until linking with Route de Pulias which continues for a further 140m until adjoining with the access lane to Les Vardes Quarry.

There appears to be a limited area of dedicated footway and no pedestrian crossing facilities along the extent of the route from the headland to Les Vardes Quarry. The route along Route du Port Grat accommodates a footway along the southern edge of the road, as does La Route du Picquerel along its eastern edge through L'Islet. There are footpaths that extend within grassland between the road and the coast, in locations such as Route du Port Grat and La Route de L'Islet; however these do not provide direct pedestrian routes.

### 7.1.2 Existing Traffic Flows

Survey specialist Axiom Traffic Limited (Axiom) were commissioned to undertake traffic counts. The traffic surveys included two Automatic Traffic Counts (ATC) and two Manual Turning Counts (MTC). These were placed at the following locations:

- ATC 1 – L'Ancresse Road;
- ATC 2 – Route du Port Grat;
- MTC 1 – La Jaonneuse Road/ Mont Cuet Road/ L'Ancresse Road/ Les Clotures Road; and
- MTC 2 – La Route du Picquerel/ Les Tracheries Road/ Les Petites Mielles/ La Route De L'Islet.

The one week period during which the surveys were completed did not contain any public or bank holidays, nor did it fall within any school holiday periods; the data collected is therefore considered representative of the typical conditions on the local road network.

#### ATC Data

The ATC captured classified directional flow data continuously over a 7-day period between Tuesday 20th June 2017 and Monday 26th June 2017. The total vehicle numbers through an average weekday are provided for each location surveyed in Figures 7-1 and 7-2 below.

**Figure 7-1**
**Average weekday flows (total vehicles) for L'Ancresse Road**

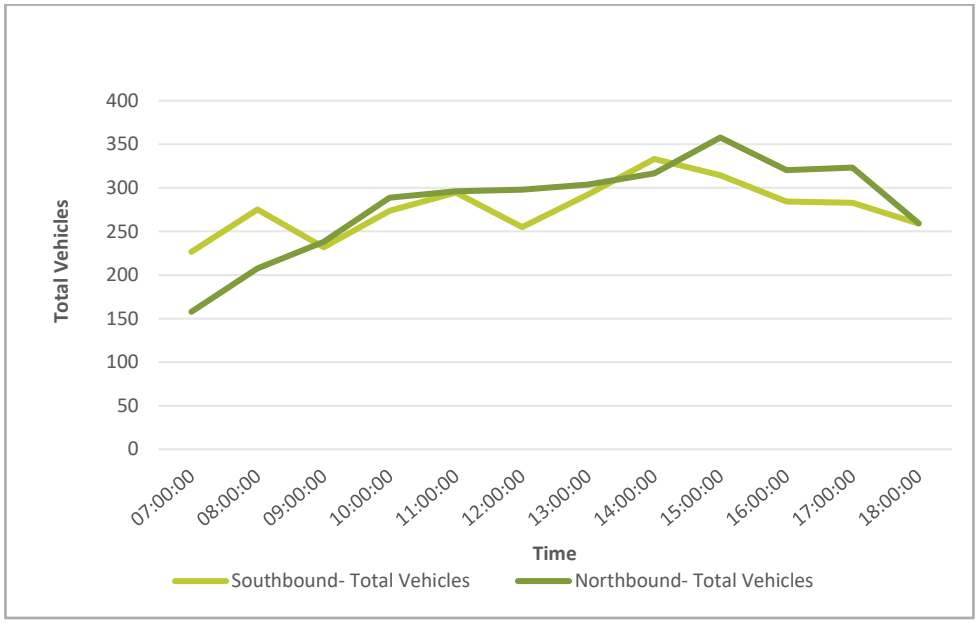



**Figure 7-2**
**Average weekday flows (total vehicles) for Route de Port Grat**

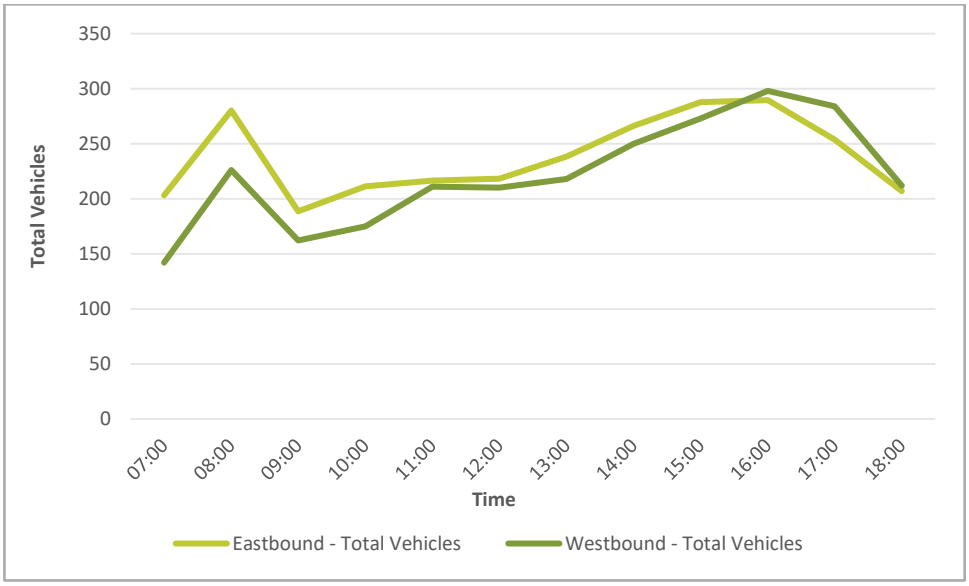



Figure 7-1 shows that the current traffic flows through an average weekday are similar for each direction on L'Ancresse Road. The southbound flows are slightly higher in the morning and the northbound flows are slightly higher in the afternoon and evening; however as the difference is not significant, and as the flows rise gradually through the day for each direction, there is no obvious commuter travel pattern to the data. Figure 7-2 shows a similar pattern for Route de Port Grat, with the eastbound flow higher in the morning, however there is an obvious peak in both flows at 08:00; from here the eastbound flow remains slightly dominant until after 15:00, with both directional flows rising gradually through the day. The time period that most stands out as the peak for both roads is between 15:00 and 16:00.

The average weekday (Monday to Friday) peak hour (15:00-16:00) and 12 hour (07:00-19:00) traffic flows are summarised below, with figures provided for total vehicles and HGVs in Table 7-1, with the Saturday 12-hour flows provided in Table 7-2.

**Table 7-1**
**Average 5-day Traffic Flow data (Monday to Friday)**

| Location | Period | Northbound | | | Southbound | | | Two-Way | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | | Total | HGV | %HGV | Total | HGV | %HGV | Total | HGV | %HGV |
| L'Ancresse Road | Peak Hour (15:00-16:00) | 358 | 8 | 2% | 315 | 6 | 2% | 673 | 14 | 2% |
| | 12-hour (07:00-19:00) | 3367 | 76 | 2% | 3323 | 63 | 2% | 6690 | 139 | 2% |
| | | Eastbound | | | Westbound | | | Two-Way | | |
| Route de Port Grat | Peak Hour (15:00-16:00) | 288 | 6 | 2% | 273 | 3 | 1% | 561 | 9 | 2% |
| | 12-hour (07:00-19:00) | 2860 | 55 | 2% | 2656 | 38 | 1% | 5516 | 93 | 2% |

A review of the traffic flow data for each route confirms that between 1% and 2% of the vehicles on the roads are HGVs. The data also confirms that there is no significant dominant directional flow on either road. L'Ancresse Road has a higher flow of total traffic over the 12 hours, with 6690 vehicles compared to 5516.

**Table 7-2**
**Saturday Traffic Flow data**

| Location | Period | Northbound | | | Southbound | | | Two-Way | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | | **Total** | **HGV** | **%HGV** | **Total** | **HGV** | **%HGV** | **Total** | **HGV** | **%HGV** |
| L'Ancresse Road | 12-hour (07:00-19:00) | 3431 | 60 | 2% | 3542 | 69 | 2% | 6973 | 129 | 2% |
| | | **Eastbound** | | | **Westbound** | | | **Two-Way** | | |
| Route de Port Grat | 12-hour (07:00-19:00) | 2740 | 31 | 1% | 2536 | 27 | 1% | 5276 | 58 | 1% |

The 12-hour flows for a Saturday are slightly higher on L'Ancresse Road than on an average weekday, although the numbers of HGVs appear to be slightly lower, while the 12 hour flows on Route de Port Grat are slightly lower for all vehicles.

## MTC Data

The MTC was undertaken on Tuesday 20th June 2017, covering a 12-hour period between 07:00 and 19:00; the data provide the turning movements for each arm of the two junctions surveyed, with vehicle types classified. The MTC data has been used to create turning flow diagrams to produce a visual summary of the traffic movements at the junction of La Jaonneuse Road/ Mont Cuet Road/ L'Ancresse Road/ Les Clotures Road and the junction of La Route du Picquerel/ Les Tracheries Road/ Les Petites Mielles/ La Route De L'Islet.

The peak period for each junction has been determined from the review of the ATC data, with the hour from 15:00 to 16:00 selected. The turning flow diagrams show the numbers of total vehicles and numbers of heavy goods vehicles for each time period. The turning flow diagrams are set out in Figures 7-3 and 7-4.

**Figure 7-3**
**Turning Count for Mont Cuet/L'Ancresse Road junction – from 15:00 to 16:00**

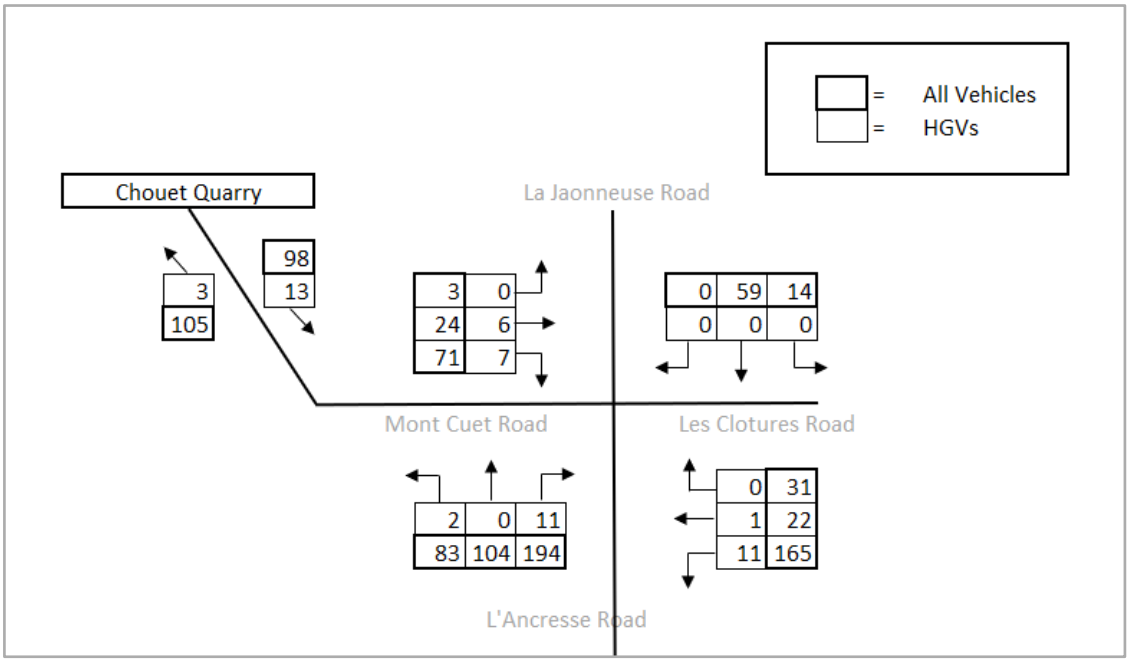



Figure 7-3 provides a summary of the existing movements on the first junction along the route from the applications site to Les Vardes quarry. This shows that the largest flows are on Les Clotures Road and L'Ancresse Road, for both the total vehicle and HGV movements. The existing flows on Mont Cuet Road include the movements to and from the landfill site adjacent to the application site, which can be seen here with larger HGV numbers on this arm of the junction (16 two-way movements). The movement of vehicles between Les Clotures Road and L'Ancresse Road is shown to be the highest, with 359 two-way total vehicle movements and 22 two-way HGV movements.

**Figure 7-4**
**Turning Count for Les Petites Mielles/La Route de L'Islet junction (15:00 to 16:00)**

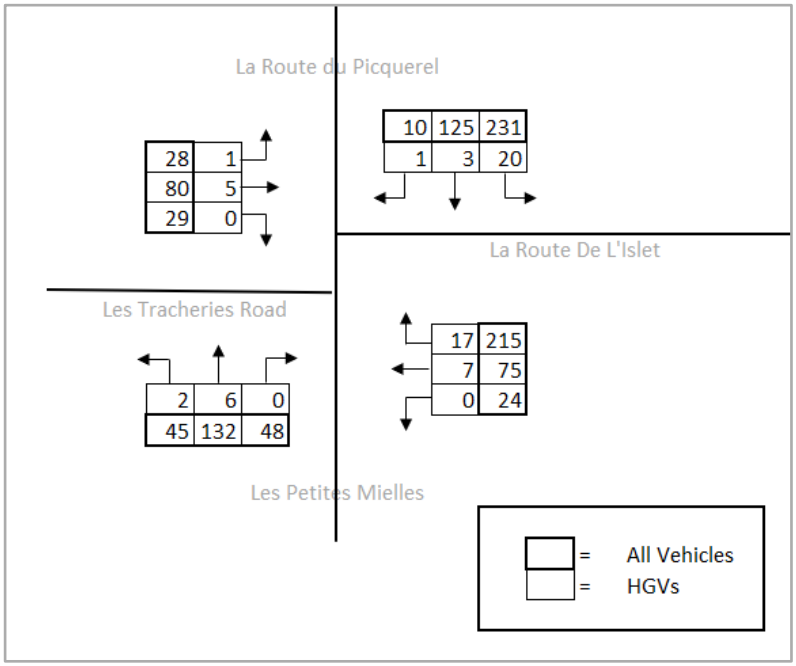



Figure 7-4 provides a visual summary of the movements at the second junction along the route to Les Vardes quarry. It can be seen that during this peak period the largest movement of all vehicles can be seen between La Route de L'Islet and La Route du Picquerel, with 215 vehicles turning right from La Route de L'Islet onto La Route du Picquerel and 231 vehicles making the opposite movement. Similarly the largest numbers of HGVs also make these movements.

### 7.1.3 Accidents

A total of seven accidents were recorded throughout the study area over a five year period up to 2017. Six of the seven accidents resulted in minor injuries with the most recent resulting in major injuries; there were no fatalities recorded during the five year study period. There have been no recorded injury accidents within the study area during the years of 2013 or 2016.

## 7.2 Appraisal

The quarry would generate on average 125,000 tonnes of material each year, all of which would initially be transported to the Les Vardes Quarry for processing. The vehicles have been confirmed as 14 tonnes capacity HGVs and so there would be on average 31 loads per day or 3 loads per hour (using a 10 hour working day).

Based on the data from the ATC, Table 7-3 below set out the existing traffic flows for the network peak period for an average weekday and the 12 hours flows for an average weekday for L'Ancresse Road.

**Table 7-3**
**Traffic Flows (Two-way) for Opening Year Scenario – L'Ancresse Road**

| | 2022 Base | | Proposed Development | | Base + Proposed Dev. | | Percentage Increase | |
|---|---|---|---|---|---|---|---|---|
| | **All Veh.** | **HGVs** | **All Veh.** | **HGVs** | **All Veh.** | **HGVs** | **All Veh.** | **HGVs** |
| Peak (15:00-16:00) | 673 | 14 | 8 | 3 | 681 | 17 | 1% | 21% |
| 12 Hour (07:00-19:00) | 6690 | 139 | 72 | 62 | 6762 | 201 | 1% | 45% |

It is clear from the tables above that the impacts of all of the additional vehicles derived from the site would be negligible in terms of total vehicle numbers with a 1% increase. However, the increase in HGVs is significant in, with a 21% increase on L'Ancresse Road in the peak hour; during the 12 hour period L'Ancresse Road would see an increase of 45%. While the percentage increase is significant, it should be noted that the numbers of HGVs are currently low, with HGVs counting for less than 2% of all traffic on these routes.

## 7.3 Conclusions

An assessment of the impacts on the local transportation network as a result of the developing a quarry on the headland has been undertaken. To ensure a robust assessment, traffic movements have been considered for the maximum export from the site within the operational period, which equates to 125,000 tonnes per annum.

A full environmental impact assessment has been undertaken, considering the potential transport related impacts associated with the proposed development. The assessment has determined that the volume and composition of the proposed development traffic would have no significant impact on the operation and safety of the local road network, and the amenity of local residents.

In conclusion, it is considered that the proposed development traffic would have no adverse impact on the surrounding road network.

# 8.0 Vibration

## 8.1 Baseline

In order to be able to extract the rock it will be necessary to use controlled explosive charges. The detonation of explosive charges in a borehole (often referred to as a 'shot hole') generates stress waves causing localised distortion and cracking of the rock mass. Outside of this immediate vicinity of the blast permanent deformation does not occur. Instead, the rapidly decaying stress waves cause the ground to exhibit elastic properties whereby rock particles are returned to their original position.

Despite the substantial design process involved in determining the parameters of the blast, such as borehole diameter, spacing, depth, amount of explosive etc., all blasts will generate vibration. This vibration occurs both through the ground and through the air (as a pressure wave).

Research has concluded that the maximum value of particle velocity in any stress wave is the parameter of significance. Recognised best practice is to measure blast-induced vibration using a seismograph in terms of unfiltered time histories of three component particle velocities from which the peak values can be identified. As set out in BS 7385-2: 1993 measurements are taken on a well-founded hard surface at the base of the building on the side of the building facing the source of vibration; this is because in most instances, consideration is being given to compliance with prescribed limits. The vibration monitor is covered with a sandbag to ensure good contact with the ground and that the monitor does not bounce in response to a blast.

With experience and knowledge of the factors which influence ground vibration, such as blast type and design, site geology and receiving structure, the magnitude and significance of the blast induced waves can be accurately predicted at any location.

The accepted method of predicted peak particle velocity for any given situation is that of *'scaled distance'*. BS 6472-2:2008 states that in order to predict the likely vibration magnitude, a series of measurements at several locations should be taken from one or more trial blasts. For this assessment data gathered from monitoring production blasts at Les Vardes Quarry has been used (a total of 996 blasting events has been used in the assessment). The scaled distance value (s) for any location may be calculated as follows:

$$s = d/\sqrt{C}$$

where:

d is the separation distance (blast to receiver) in metres; and

C is the Maximum Instantaneous Charge (MIC) weight in kilograms (kg) i.e. maximum weight of explosive per delay interval in kg.

## 8.2 Appraisal

Recorded vibration values have then been plotted against scaled distance on logarithmic scales to give a blast regression line. Differing geology and blast design result in a degree of dater scatter. As noted in the Institute of Quarrying publication[22] (page 146) the statistical method adopted in assessing the vibration data is that used by Lucole and Dowding. The data is presented in the form of a graph showing the attenuation of ground vibration with scaled distance and results from log - normal modelling of the velocity distribution at any given scaled distance. The plotted data are generally presented with the mathematical best fit or mean (50%) line through

[22] The Use of Explosives in Quarrying. T E White and P Robinson. The Institute of Quarrying

the data, calculated by least squares regression, together with an upper confidence level, which is generally taken as 95%.

Analysis of the recorded vibration data from Les Vardes Quarry has been used to create a regression line, showing both the 50% and the 95% confidence limit and is shown in Figure 8-1. The regression line plot shows that the corresponding scaled distance value for a vibration criterion of 10.0mm/s PPV at 95% confidence level is 32.2mkg$^{-1/2}$.

**Figure 8-1**
**Blasting Regression Line Model**

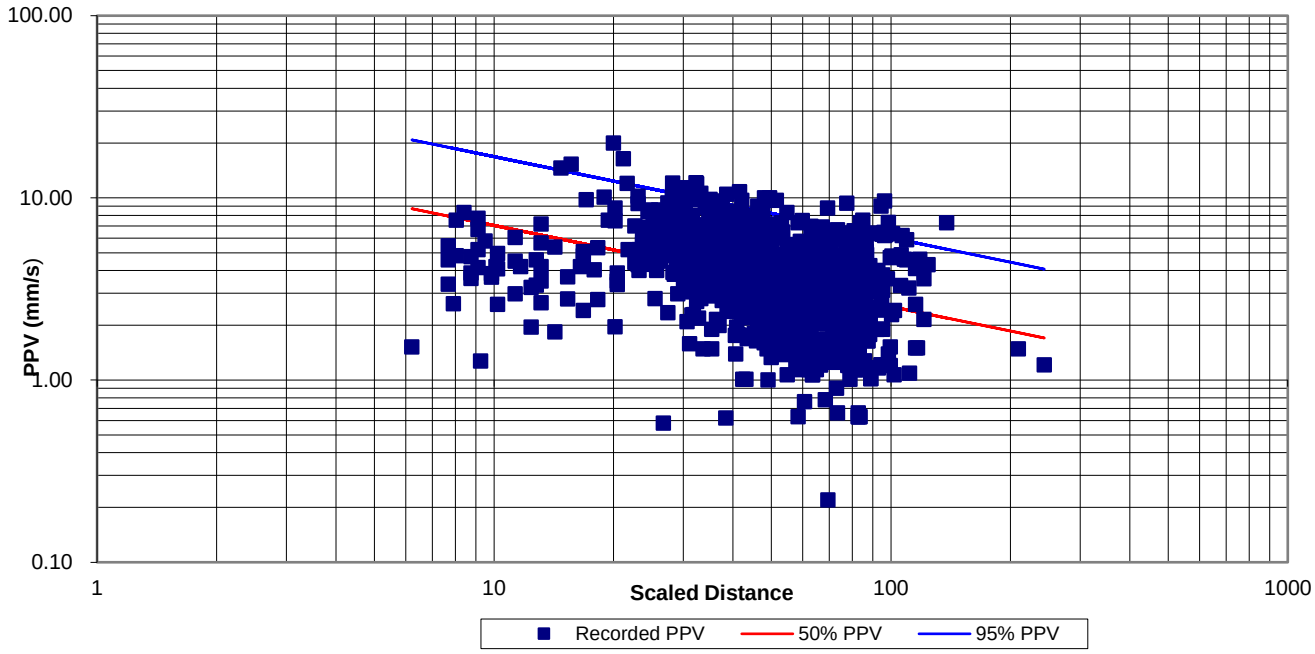



Table 8-1 shows the allowable maximum instantaneous charge weight to comply with this criterion at given separation distances.

**Table 8-1**
**Allowable maximum instantaneous charge weights**

| Blast/receiver separation distance (m) | Allowable maximum instantaneous explosive charge weight to comply with 10mm/s criterion (kg) |
|---|---|
| 50 | 2.41 |
| 75 | 5.41 |
| 100 | 9.63 |
| 125 | 15.04 |
| 150 | 21.66 |

| Blast/receiver separation distance (m) | Allowable maximum instantaneous explosive charge weight to comply with 10mm/s criterion (kg) |
|---|---|
| 175 | 29.48 |
| 200 | 38.50 |

Where it is predicted that the levels of vibration at a receptor would exceed the relevant criteria then it would be necessary to reduce the MIC. One method of achieving such a reduction is to 'deck' the explosives within the borehole. This technique splits the column of explosives in two (or more), separated by inert material. If blasting is required at closer distances than that where double decking would be a successful strategy, other charge reduction methods would have to be employed. These could be more complex decking strategies or changes to the blast geometry and / or the use of smaller diameter boreholes.

These are matters for the operator as part of the detailed design of individual blasts and adherence to blast vibration limits, rather than for the imposition by planning condition of prescriptive blast design requirements.

In terms of receptors, the closest residential properties are located to the south (L'Eternite) and south-east (La Morada) of the proposed quarry. L'Eternite is around 130m from the closest part of the proposed quarry workings and La Morada is over 200m. in comparison, the closest properties to Les Vardes Quarry are within 60m – 90m of the quarry workings.

To limit the environmental effects of blasting, limits are imposed on vibration levels based on the 95 percentile and maximum limit. For Les Vardes Quarry, the limits are 10mm/s. However, much higher vibration levels are required to cause damage to a property.

## 8.3 Conclusions

An assessment of predicted blast-induced vibration levels has been made to nearby vibration-sensitive receptors. The predictions are based on 996 blast induced vibration events which were measured at various locations around the nearby Les Vardes Quarry and considered representative for Chouet Quarry.

Using the measured data a blast regression line has been plotted and a maximum instantaneous charge weight of 16.27kg has been derived at of 130m which is the approximate distance to the nearest vibration sensitive receptor.

The assessment has shown that the criterion of 10.0mm/s PPV at 95% confidence can be achieved by suitable blast design using the suggested instantaneous charge weights.

Therefore, vibration generated by blasting events is not considered to be a limiting factor in blasting within the proposed quarry.

# 9.0 Water Environment

## 9.1 Baseline

### 9.1.1 Geological Setting

#### Soils

The vegetation across the headland includes 'semi-improved' grassland. Semi-improved grassland is a transition category made up of grasslands which have been modified by artificial fertilisers, slurry, intensive grazing, herbicides or drainage.

Information about the soil underlying the grassland has been taken from the Soil and Land Evaluation for Guernsey (2010). Whilst the exact location of the site is not assessed the L'Ancresse area is classified as Grade 4 soil due to very severe droughtiness limitation. These soils are of poor quality with severe limitations which significantly restrict the range of crops and/or level of yields. It is mainly suited to grass with occasional arable crops the yields of which are variable.

#### Superficial Geology

The superficial geology comprises raised beach deposits located in the La Chouet area. This comprises gravels and fine grained material cemented by iron minerals.

In the immediate vicinity of the headland, the deposits are likely to comprise 1m – 3m depth of topsoil and clay underlain by fractured granitic bedrock.

#### Bedrock Geology

The headland is underlain by the Bordeaux Diorite Complex, comprising a range of lithologies, but generally hard, relatively coarse grained granodiorite to dioritic rocks.

The Complex is seamed with weakness associated with joints and narrow dykes. The fracture diameter has been reported as being 'open'[23] in some areas. However, in the walkover, the Torrey Canyon Quarry showed very tight fracturing. This is supported by the very low permeability results for the aquifer in the area of the proposed quarry.

The top of the bedrock is likely to be weathered to a soft, friable material. The depth of the weathered zone may be over 30 metres below ground.

Radon is of potential concern in Guernsey because the geology of the island is made up of a number of different types of granite that contain natural uranium in the bedrock. Most buildings in Guernsey are sited on potentially radon-emitting geology or bedrock.

### 9.1.2 Potential Contamination

Information supplied by the States of Guernsey[24] indicates that there is no Made Ground on the proposed application site. The land use history, described in a Phase 1 Land Quality Risk Assessment Report, supports this as the land has been fully agricultural since the 19th century. The site walkover did not identify potential source of contamination in Ronez Field either, but potential off site sources included:

[23] Cucakovic, M., 2014, An Evaluation of Chouet Head Quarry. MSc Dissertation, Engineering Geology Department, Newcastle University. Page 10.
[24] Borehole construction information supplied to SLR via email August 2017.

- Torrey Canyon Quarry to the west of the application site which has held oil in water since the 1970's; and
- Mont Cuet Landfill located to the east of the site - this is an operational landfill site which accepts domestic and construction waste.

The Phase 1 Report indicates that the area of land to the west of the proposed site (in and around where the Torrey Canyon Quarry is sited) has a history of quarrying activity within proximity of the application site. Many of these former quarries have been backfilled.

### 9.1.3 Hydrogeological Setting

With the exception of military fortifications (refer to Section 3 above) and small quarries the headland has not been developed and predominantly has a history of agricultural uses. A landfill, Mont Cuet, is operational and is located to the east of the headland.

The Torrey Canyon Quarry is also located to the west of the proposed development. This is a flooded quarry which has been used to store crude oil which was removed from Guernsey's beaches in the 1967 following the Torrey Canyon disaster. In addition anecdotal evidence suggests that, when retreating from the Island, the German's placed munitions in the quarry. A more detailed breakdown of the site history and setting can be found in SLR(2017)[25] .

### Aquifer Characteristics

The geological setting and hydrogeological characteristics within the vicinity of application site are summarised in Table 9-1. In summary the site is underlain by superficial raised beach underlain by deposits of diorite.

**Table 9-1**
**Summary of Aquifer Characteristics**

| Age | Parent Unit | Description | Aquifer Characteristics |
|---|---|---|---|
| Quaternery | Raised Beach Deposits | Wind-blown silt (1 - 3m thick) | The superficial deposits comprise gravels and fine grained material cemented by iron minerals in places. In the immediate vicinity of the site the deposits are likely to comprise 1m – 3m topsoil, sand, silt and clay.<br>Exposure in the Torrey Canyon quarry wall suggests that there might only be <1m of superficial deposits in the immediate vicinity of the site.<br>Examination of the borehole records provided by the States of Guernsey indicates the depth to bedrock (which includes superficial and fractured bedrock) ranges from 5-10m below ground. This information has been used to provide depth to bed rock contours presented in the attached drawing. |

[25] SLR (2017) Chouet Quarry, Guernsey, Phase 1 Land Quality Risk Assessment Ref: 403.06370.00001. Rev 2 Prepared for Ronez

| Age | Parent Unit | Description | Aquifer Characteristics |
|---|---|---|---|
| Lower Palaeozoic | Bordeaux Northern Diorite Complex | Granodiorite comprising coarsely grained, crystalline, plutonic intrusive igneous rocks. | Negligible primary porosity and permeability. The water table lies within 3 to 8 metres of the ground surface, and the main aquifer, in which the majority of groundwater flow takes place, is situated in a 25m thick zone immediately below the water table. However the Geological Society states there is little potential for groundwater flow beneath low lying land towards the north of the island where the fractured bed rock has a clay matrix or the degree of fracturing is not as pronounced.<br><br>Beneath this depth there is some groundwater flow in deeper fractures, but borehole yields from the greater depths are commonly less than those from the shallow weathered zone. This reduction in aquifer yield with depth provides an element of self-protection, whereby base-flow discharge from the aquifer and abstraction from boreholes is automatically reduced as the water table falls.<br><br>The fractured bedrock is likely to be contributing to the groundwater flow across the site.<br><br>In-situ permeability testing was undertaken in two boreholes in the area of the proposed quarry during the July 2017 sampling event. The results of the assessment are shown in Table 13-6 below. |

The BGS hydrogeological report indicates the following:

- The groundwater body is itself divisible into three contiguous levels. Where present there is an upper granular aquifer within superficial deposits of alluvium and raised beach material. Beneath this is the main aquifer which is contained within the shallow weathered zone of the bedrock. This is underlain by a deeper aquifer with groundwater flow restricted to occasional dilated fractures. Bedrock mainly consists of ancient crystalline metamorphic rocks.
- Borehole information obtained from States of Guernsey indicate that there is over 10m of material (comprising superficial deposits and fractured bedrock) that overlies the bed rock across the site.

The information obtained from the States of Guernsey regarding the depth to groundwater and also the depth to bedrock, support the published information presented by the Geological Society.

The following observations regarding the geology at the site were made during the site visit:

- there are limited thicknesses of superficial deposits recorded across Torrey Canyon Quarry, immediately to the west of the proposed quarry; and
- the quarry faces within Torrey Canyon Quarry are variably fractured. The fractures appear tightly held with variable orientation. Photographs of the quarry are presented in the SLR (2017) Phase 1 Desk Study for La Chouet Headland

## Recharge Mechanisms

Guernsey has a temperate maritime climate, with prevailing wind directions from the west. Average annual rainfall (1907 to 1980) is reported as ranging from c. 790mm to c. 850mm. The potential evapotranspiration has been taken from Jersey data (in the absence of suitable data from Guernsey) and is c. 613mm per year. Regionally, stream flow (of which 60% is derived from groundwater recharge as base flow) is c. 226mm and groundwater recharge is estimated as c. 128mm/year.

Given the thin sequence of superficial deposits in the general vicinity of the application site, it is considered that the majority of effective rainfall will form groundwater recharge to the fractured bedrock aquifer. The groundwater surface sits in the fractured bedrock as identified by the site boreholes.

Any groundwater infiltrating through the superficial horizon and fractured bed rock is expected to recharge the underlying bedrock aquifer via vertical leakage.

## Groundwater Levels and Flow

A number of boreholes have been monitored by the States of Guernsey over a number of years at the application site. The 2011-2017 monitoring data have been collated and are presented in Table 9-2 below.

**Table 9-2**
**Summary of Groundwater Elevation**

| BH No. | Min of Water Level (mAGD) | Average of Water Level (mAGD) | Max of Water Level (mAGD) |
|---|---|---|---|
| 2020 | -0.01 | 0.62 | 1.51 |
| 2021 | 0.07 | 0.69 | 1.70 |
| 2022 | 6.22 | 6.55 | 7.00 |
| 2023 | 2.22 | 2.60 | 3.29 |
| 2026 | 2.18 | 5.68 | 8.80 |
| 2027 | 4.51 | 5.33 | 6.89 |
| 2031 | 1.67 | 2.15 | 2.99 |
| 9122 | -4.31 | -2.77 | -0.32 |
| 9130 | -0.96 | 0.16 | 2.43 |
| 9131 | -1.30 | 0.03 | 2.61 |
| 9133 | -3.05 | 0.05 | 3.62 |
| 9134 | -2.60 | -0.88 | 1.21 |
| 9135 | -2.47 | 1.16 | 2.60 |
| 9136 | -1.98 | 1.77 | 4.02 |
| 9137 | -3.21 | -1.86 | 0.89 |

Groundwater contours indicate that the groundwater flow direction in the vicinity of the headland is towards the Mont Cruet landfill to the east. This might suggest that there is some groundwater management being undertaken in the landfill site. Although information from Guernsey Water indicates there is no licensed groundwater abstraction in the area, the landfill site does operate a leachate treatment system (with discharge to the sea) which might be locally influencing groundwater flow.

This appears to be supported by the groundwater hydrographs for boreholes 9122, 9133, 9137 and 9134 which appear to indicate pumped levels and recovery over periods of time. The maximum head in the boreholes is around March with a minimum head in November of the same year. Boreholes more distant from Mont Cuet, such as 2027 and 2022, do not show the same hydrograph responses over the same time period. Boreholes 9136 and 2023, which are close to the sea (as with 2027) also so not show the same hydrograph which suggests any differences seen closer to the landfill are not due to tidal variation.

There also appears to be a localised groundwater drainage feature to the within the southern part of the headland, south west of the first phase of extraction. When this is compared to the depth to bedrock, this feature coincides with relatively thick sequence of fractured bedrock/superficial deposits. Therefore, it is likely that a preferential flow path exist for groundwater in this location of the site.

The hydraulic gradient does increase in the vicinity of the coastline. In the immediate vicinity of the Torrey Canyon quarry the hydraulic gradient appears to be different depending on the orientation of the former quarry:

- Borehole 2026 immediately to the north has a groundwater elevation similar to the water level, in the flooded quarry;
- Borehole 2021 immediately to the east has a groundwater elevation lower than the quarry water level.
- Borehole 2021 has a much thicker sequence of material overlying the bed rock (12.2m compared to 6.3m in borehole 2026) and therefore the groundwater is likely to be draining preferentially to the east at this location. There is no visual evidence of significant permanent groundwater inflows taking place into Torrey Canyon Quarry, either from the seaward or the landward quarry faces. Onsite in-situ permeability testing in borehole 2021 is recorded as $5.7 \times 10^{-9}$ m/s (see below).

As part of the July 2017 fieldwork permeability tests were completed in 2 boreholes at the site; the results are summarised below:

**Table 9-3**
**Summary of Permeability Data**

| Borehole Number | Permeability (m/s) |
|---|---|
| 2021 | $5.679 \times 10^{-9}$ |
| 9131 | $2.12 \times 10^{-7}$ |

The groundwater elevation observations and permeability measured during the July 2017 sampling indicates that the groundwater velocity in the area of the proposed quarry is likely to be low.

Competent granodiorite aquifers typically demonstrate low transmissivities, which supports the results of the in-situ permeability assessment, resulting in narrow and deep drawdown cones in response to pumping; even more so given the unconfined nature (and high storage values) of the aquifer in question. Consequently the zone of influence (ZOI) associated with any dewatering strategy is likely to small. In order to make a preliminary assessment of the ZOI, a simple calculation was made utilizing the highest transmissivity value calculated from slug testing conducted in July 2017 ($2.1 \times 10^{-7}$ m/s) and a specific yield (0.02) typical of fractured rock.

Using a Cooper-Jacob solution, a ZOI of less than 5m was calculated with a drawdown of 15m. The calculation is preliminary in nature. The phreatic surface is located in the slotted screen of the wells which sit in the superficial deposits and fractured bed rock. Therefore, it is likely the presence of potentially more permeable strata, has been accounted for in the preliminary testing and analysis undertaken. Consequently, whilst this is a preliminary assessment, it is useful to demonstrate that under typical conditions the ZOI should be anticipated to be small.

## Water Resources and Abstractions

The headland is not located in a Water Catchment Area as defined by Guernsey Water. Commercial enterprises that operate within a Water Catchment Area require a formal Permit for Development from Guernsey Water, if planning and building consent is given by the Environment Department. The Permit will contain Guernsey Water's conditions for the site to prevent pollution, or a risk of pollution, arising to the Public Water Supply.

Guernsey Water's pollution legislation does not permit trade effluents to be discharged into surface water. Guernsey Water has reported that there are no current abstraction license applications, pollution incidents or discharge licenses located at the development site.

Guernsey Water outlined potential issues for contamination of surface water that is currently located within the Torrey Canyon Quarry:

- Guernsey Water are aware that the quarry contains oil which is a result of a spill off the coast of Guernsey known as the Torrey Canyon oil spill;
- This occurred in 1967 when the SS Torrey Canyon super tanker hit a reef off the coast of Cornwall resulting in an estimated 25 to 36 million gallons of crude oil being spilled.

The Mont Cuet Landfill site is located to the east of the headland. This accepts a mixture of waste materials from the island and is operational. The site has a leachate and gas management system.

## Groundwater Quality

Groundwater quality sampling and analysis has been completed by the States of Guernsey using the boreholes at site. Review of the water quality monitoring records shows the following:

- The concentration of major ions is similar to that reported in the BGS (2000) study which indicates they are a result of mixing between rainwater and sea-spray. This is also supported by the electrical conductivity measurements which are shown in Figure 13-3. The highest concentration relates to boreholes located closest to the sea (9136 and 2023). Over time the concentration in boreholes 9034 and 9022, which are further inland, have increasing conductivity which is probably related to salinization/mixing in the groundwater.
- The organic load markers (BOD, COD and DOC) are not considered elevated and therefore don't show the presence of significant concentrations of petroleum hydrocarbons. The only anomaly is the groundwater in 9130 which has high BOD, COD and DOC.
- The elevated oxidised nitrogen compounds are consistent with shallow groundwater across the island and reflect infiltration of rainwater through the surrounding agricultural land.
- Ammonium is elevated at locations 2027 and 9130. The organic carbon is also relatively elevated and suggests this is a function of the site use as a biomass recycling facility(2027) and anthropogenic source (9130).
- The concentration of iron is consistent with the understanding that any superficial raised beach drift deposits are cemented by iron minerals. Although it is very high in groundwater adjacent to the landfill site (9137). This may be due to reducing conditions in the groundwater which causes greater concentrations of iron to be soluble (typically when the dissolved oxygen is < 2mg/l).

Additional groundwater sampling was undertaken by SLR in July 2017. This was to identify the presence or otherwise, of organic compounds which might be present in the Torrey Canyon Quarry and/or associated with the groundwater in close vicinity to Mont Cuet landfill. The main conclusions from the sampling and analysis are as follows:

- The major ion analyses indicated the majority of the groundwater was sodium – chloride waters, with the exception of borehole 2020 which was sodium carbonate dominant groundwater.
- The wide variety of analysed volatile organic compounds, speciated total petroleum hydrocarbons and semi-volatile hydrocarbon were not detect at significant concentrations.
- Trace concentrations of chlorinated and polyaromatic aromatic hydrocarbons were detected in borehole 2022 in the Torrey Canyon Quarry. This is most likely related to the historic cleaning of hydrocarbon sampling tools or similar. The chlorinated hydrocarbons were not detected in the quarry surface water or in any of the other groundwater sampled.
- Trace concentrations of xylene and phenol were detected in borehole 9134. This is located in Ronez Field and given the lack of significant concentrations elsewhere in this area, it is considered most likely this has resulted from a small spill probably during agricultural activities in the field.
- Given the anecdotal evidence regarding the German's disposing of munitions in the quarry, an explosive residue suite was also included in the analysis of the surface and groundwater closest to the quarry. There were no explosive resides detected in the borehole closest to the Torrey Canyon quarry.

### 9.1.4 Hydrological Setting

#### Surface Water Features

The closest surface water feature to the application site is the Torrey Canyon Quarry where historical storage of crude oil has occurred. Visual and olfactory information from a site walkover also suggests hydrocarbons are present, although the surface water here has undergone a number of years of treatment. More information regarding the quarry and its contents are included in detail within the Phase 1 Report (Appendix 13-3)

During the site walkover it was not possible to identify any other surface water features such as land drains, springs or rivers associated with the study area . The proposed quarry area is bounded to the north and south the sea.

The walkover did note a small diameter (50mmID) uPVC or HDPE pipe apparently directing drainage from the biomass Recycling Centre onto the northern beach. The exact purpose of the pipe is not known but it appears to be a localised surface water control feature of low significance.

#### Surface Water Quality

Surface water in Torrey Canyon Quarry was sampled during the July 2017 water sampling event. This showed that whilst there was observable historic crude oil in areas of the site surface, the surface water chemistry had the following characteristics:

- no detectable speciated hydrocarbons;
- no detectable explosive residues (anecdotal evidence indicates there may be munitions in the base of the quarry); and
- trace concentrations of polyaromatic hydrocarbons were present in the water which is not surprising given the history of oil containment in the quarry.

This confirms that the trace organic compounds identified in the Torrey Canyon surface water are not identified in groundwater immediately next to the quarry and therefore migration from the quarry is not occurring or has not occurred over the last 40 years. In addition, the lack of detectable hydrocarbon adjacent to the landfill suggests if hydrocarbons are present in leachate in the landfill, these are not impacting the groundwater.

## 9.2 Appraisal

### 9.2.1 Hydrogeological and Hydrological Flow Regimes and Flooding

The proposed quarry would not have any significant effect on the regional groundwater flow regime within the bedrock aquifer, either during future quarrying activities or following restoration, given the following:

- The area of the island is designated as a Safeguarded Zone for mineral extraction;
- The permeability of the bedrock is measured as being very low at depth;
- No groundwater inflows have been observed from the quarry faces in areas such as the Torrey Canyon Quarry;
- There are no visible surface water streams present surrounding the application site;
- The closest surface water receptor will be the marine environment;
- There are no groundwater abstractions in the area of the application site;
- The proposed site is not located in a groundwater catchment area;
- Groundwater levels in the area would be reduced due to the dewatering likely to be required in the proposed quarry. However there are no obvious receptors which might be impacted by the dewatering;
- Based on the preliminary calculations, the Zone of Influence of any quarry dewatering is unlikely to include the existing Torrey Canyon Quarry which comprises hydrocarbons in the surface water. Hydrochemical analysis has shown that this surface water is not influencing the groundwater quality in the area;
- The very low permeability in the aquifer immediately adjacent to the Torrey Canyon Quarry confirms the containment of the hydrocarbons in the quarry is still occurring after a number of years since the crude oil was first contained in the quarry;
- Based on the preliminary calculations, the Zone of Influence of any quarry dewatering is unlikely to include the existing Mont Cuet landfill;
- Hydrographs suggest there may be some form of localised groundwater control in vicinity of the landfill, possible associated with the leachate treatment system;
- Hydrochemical analysis has shown that the chemistry of the groundwater close to the landfill does not appear to be influencing the groundwater quality in the proposed quarry area; and
- The area is not deemed to be at a risk from flooding.

### 9.2.2 Potential Effects on Groundwater and Surface Water Quality

During the operation of the quarry there is a risk of contaminated runoff being generated from the following potential sources, as a result of:

- intercepting potentially contaminated groundwater from the area to the west Torrey Canyon Quarry) and east (Mont Cuet Landfill) of the site;
- inducing saline intrusion;
- accidental spillage of fuels, lubricants and other potentially contaminating liquids; and
- suspended solids within surface water runoff.

The sensitivity of the groundwater surface water receptor, in terms of quality is assessed as 'high', given the proximity to the coastline.

Pollution prevention and control measures are currently employed by the applicant at other quarries it operated on Guernsey and Jersey; therefore, it is considered that the magnitude of change on groundwater quality due to spillage of fuels, lubricants and other potentially contaminative liquids would be 'negligible'. This assessment is also based on the relatively small areal extent of potential spillages due to the relatively small number of vehicles that would be accessing the quarry during the operational and decommissioning phases.

Any suspended solids generated within surface water runoff would also 'settle out' within the quarry sump and settlement lagoons and so this potential effect is not considered further.

Given the above, the significance of potential direct effect to groundwater and surface water quality would be 'negligible', and consequently there is no requirement for additional mitigation measures to protect water receptors. Consequently, these potential effects can be scoped out of further assessment.

The groundwater and surface water sampling indicates there appears to be limited or no interaction with water in the Torrey Canyon Quarry and that in the area of the Mont Cuet landfill. The following has been considered regarding these two areas of potential impact:

- the quarry and the landfill have been in existence for a considerable length of time;
- these structures do not appear to have influenced the groundwater quality over this period of time;
- the lack of interaction is supported by low and very low intrinsic permeability of the bed rock across the area;
- preliminary calculations indicate that the Zone of Influence of the quarry dewatering is unlikely to intersect the Torrey Canyon surface water, Mont Cuet landfill leachate or the sea (inducing saline intrusion); and
- the groundwater and surface water is already saline.

It is therefore not unreasonable to assume that these conditions would remain during the lifetime of the proposed quarry development and would not be altered by the quarry dewatering. Notwithstanding this, precautionary measures would be required during the groundwater management in the proposed quarry and surrounding area, as discussed below.

## 9.3 Conclusions

As a consequence of the site design, site setting and embedded mitigation, no significant effects are predicted. Notwithstanding this, and like other operations managed by the applicant, confirmatory monitoring would be undertaken to confirm there are no residual effects. The monitoring protocol would be agreed with States of Guernsey.

# APPENDIX 01

**Table 1**
**Recommended Dust Control Measures**

| Activity | Dust Control Measures |
|---|---|
| General | • Planning and design of the scheme to make provision for water supply to ensure supply can meet site demand at areas such as plant site and during perimeter bund construction along the southern boundary<br>• Existing woodland / hedgerows to be retained along site southern site boundaries where possible. Additional planting along southern boundary<br>• Provide training on dust mitigation to personnel as part of any site / job induction procedure<br>• Maintain good communication between operator and surrounding communities |
| Site Preparation and Restoration | • Water suppression to be available when screening mounds are being constructed within 200m of off-site receptors<br>• No vehicles to traverse near the base of screening mounds unless explicitly required<br>• Screening of mounds to be seeded at the earliest opportunity and thereafter maintained free from weeds<br>• Temporary cessation of soil stripping / bund construction during conditions whereby high winds are from the northerly sectors and activities are present within 200m of activities |
| Plant Site:<br>Processing, Materials Handling & Stockpiling | • Drop heights of mineral into stockpiles / dump trucks minimised<br>• Use of water bowsers/spray systems to dampen stockpiles during dry / windy conditions<br>• Paved surface area of plant site to be swept regularly<br>• Mobile plant to be maintained / serviced as per manufacturers recommendations<br>• Visual checks of mobile plant to ensure dust suppression working and effective |
| On-site Transportation | • Use of water bowsers/spray systems to dampen haul roads<br>• No plant/vehicles shall cross any area of unstripped topsoil or subsoil or areas of loosened ground, except where unavoidable for the purposes of undertaking permitted operations<br>• Speed limit usually controlled to 10mph<br>• Haul roads are maintained to remove potholes and dips which trap dust and cause plumes |
| Off-site Transportation | • Wheel wash facility to be used by all vehicles that enter site;<br>• Wheelwash to be serviced and maintained as per manufacturers recommendations<br>• Access tracks to loading / unloading area to be hard paved and separate from those routes utilised by on-site dump trucks All loaded vehicles transferring material off-site to be covered<br>• Induction of staff members to include awareness of trackout and to report signs of trackout beyond the site boundary to the relevant person<br>• A separate paved parking area for off-site non-HDV vehicles (i.e. staff cars) with no access to working areas / plant site to reduce track-out onto public highway |

# APPENDIX 02

**Table 1. List of Sites present on the States of Guernsey's HER that are present within the Study Area**

| HER UID Reference Numbers | Site Name | NGR | Description |
|---|---|---|---|
| MGU 171 | No. 10 (Pre) Martello loophole Tower | 37566 50510 | Late 18th/19th century defensive structure. |
| MGU 449 | Chouet Battery No. 1 | 37497 50553 | Late 18th/19th century defensive structure. |
| MGU 450 | Chouet Battery No. 2 | 37497 50553 | Late 18th/19th century defensive structure. |
| MGU 565 | Flint findspot at Chouet | 37566 50568 | Later prehistoric artefact |
| MGU 588 | Chouet magazine | 37594 50504 | Late 18th/19th century defensive structure. |
| MGU 830 | Strongpoint 'Kraehennest' | 37660 50606 | World War II defensive structure |
| MGU 2139 | Flint findspot at Chouet | 3786 5044 | Later prehistoric artefact |
| MGU 2430 | Telephone switching post N (C3) | 3786 5050 | World War II Transmitter site |
| MGU 2431 | 8cm mortar and trenches, associated with MGU 830 | 3768 5060 | World War II defensive structure |
| MGU 2432 | 5cm M19 Automatic mortar bunker, associated with MGU 830 | 3768 5062 | World War II defensive structure |
| MGU 2433 | Small shelter, associated with MGU 830 | 3759 5051 | World War II defensive structure |
| MGU 2434 | Machine gun post and trenches, associated with MGU 830 | 3755 5055 | World War II defensive structure |
| MGU 2435 | Site of 10.5cm K331 (f) Casemate, associated with MGU 830 | 3747 5056 | World War II defensive structure |
| MGU 2436 | 10.5cm K331 (f) Casemate at Chouet | 3751 5062 | World War II defensive structure |
| MGU 2437 | Multi loop-holed turret (Mehrschartenturm), associated with MGU 830 | 3749 5067 | World War II defensive structure |
| MGU 2438 | 10.5cm K331 (f) Casemate (associated with MGU 830) | 3759 5068 | World War II defensive structure |
| MGU 2439 | Electricity Generating tunnel (Ho. 31) | 375 505 | World War II defensive structure |
| MGU 2469 | Army Observation Post (M2) and Navel Tower | 3794 5065 | World War II defensive structure |
| MGU 3677 | Stone axe from Mont Cuet | 37967 50743 | Later prehistoric artefact |
| MGU 4893 | Minesweeper 2070 off Chouet | 37325 50857 | Wreck |
| MGU 5243 | Unidentified vessel off Chouet | 37325 50857 | Wreck |
| MGU 5341 | Roman coins from Chouet | 38013 50585 | Roman coinage |
| MGU 5569 | Flint findspot at Mont Cuet | 3796 5074 | Later prehistoric artefact |
| MGU 6284 | Stone ring from Chouet Point | 3804 5062 | Neolithic artefact |
| MGU 6903 | Stone Platform at Chouet | 3746 5057 | Late 18th/19th century defensive structure |
| MGU 6923 | Flint findspot at Chouet | 37525 50069 | Later prehistoric artefact |
| MGU 6957 | Cottages at Mont Cuet | 37705 5053 | Post-medieval dwelling |

**Table 2. Additional sites identified from the Walkover Survey (undertaken in May 2018)**

| SLR Ref. No. | Site Name | NGR | Description |
|---|---|---|---|
| SLR 001 | Quarry (Torrey Canyon oil storage site) | 376 506 | Former 18th/19th century quarry site that was later used to store some of the crude oil from the stricken super tanker Torrey Canyon in 1967. |
| SLR 002 | Field system located within the Development Site | 37 50 | Five rectangular fields (oriented E-W) located within the eastern section of the Development Site, each field is delineated by drystone walled boundaries. Date range: medieval to post-medieval. |
| SLR 003 | Worked and dressed gate posts and attached gate furniture | 37 50 | A series of squared dressed and worked granite gate post, providing access to each of the five fields. Date range: post-medieval to modern. |
| SLR 004 | Possible later prehistoric standing stones | 37 50 | Two irregular-shaped stones with tapered point, standing c. 1.5m in height and surviving as a gate posts. Located in the boundary of Field No. 2 and accessed via the Rue des Grands Champs. |
| SLR 005 | Historic quarries within the western part of the Chouet Headland | 375 506 | Severn historic quarries were in operation during the 19th century, two of these are still exposed, and the remaining five have been backfilled. One Quarry, locally known as Green Waste Quarry is visible. |

# APPENDIX 03

## Table 1
## Data Search Results (At Risk and Endangered Species only)

| Species/Group | Latin Name | English Name | Status |
|---|---|---|---|
| Insects | *Callophrys rubi* | Green hairstreak | At Risk |
| | *Nepa cinerea* | Water Scorpion | At Risk |
| | *Asilus crabroniformis* | Hornet Robberfly | At Risk |
| | *Copris lunaris* | Horned Dung Beetle | Endangered |
| | *Gryllotalpa gryllotalpa* | Mole Cricket | At Risk |
| Arthropods | *Cypris bispinosa* | large mussel-shrimp | Endangered |
| Flowering Plants | *Ranunculus sceleratus* | Celery-leaved Crowfoot | At Risk |
| | *Ranunculus baudotii* | Brackish Water-crowfoot | Endangered |
| | *Ranunculus trichophyllus* | Thread-leaved Water-crowfoot | Endangered |
| | *Ranunculus peltatus* | Pond Water-crowfoot | Endangered |
| | *Saxifraga tridactylites* | Rue-leaved Saxifrage | At Risk |
| | *Euphorbia amygdaloides* | Wood Spurge | At Risk |
| | *Linum catharticum* | Fairy Flax | At Risk |
| | *Radiola linoides* | Allseed | At Risk |
| | *Lythrum salicaria* | Purple-loosestrife | At Risk |
| | *Matthiola sinuata* | Sea Stock | At Risk |
| | *Arabis hirsuta* | Hairy Rock-cress | At Risk |
| | *Cakile maritima* | Sea Rocket | At Risk |
| | *Crambe maritima* | Sea-kale | At Risk |
| | *Rumex hydrolapathum* | Great Water Dock | At Risk |
| | *Herniaria ciliolata ciliolata* | Fringed Rupturewort | At Risk |
| | *Silene nutans* | Nottingham Catchfly | Endangered |
| | *Silene conica* | Sand Catchfly | Endangered |
| | *Dianthus armeria* | Deptford Pink | Endangered |
| | *Anagallis tenella* | Bog Pimpernel | At Risk |
| | *Centunculus minimus* | Chaffweed | Endangered |
| | *Galium constrictum* | Slender Marsh-bedstraw | Endangered |
| | *Cicendia filiformis* | Yellow Centaury | Endangered |

| Species/Group | Latin Name | English Name | Status |
|---|---|---|---|
| | *Exaculum pusillum* | Guernsey Centaury | Endangered |
| | *Echium vulgare* | Viper's-bugloss | Endangered |
| | *Cynoglossum officinale* | Hound's-tongue | At Risk |
| | *Calystegia soldanella* | Sea Bindweed | At Risk |
| | *Hyoscyamus niger* | Henbane | Endangered |
| | *Linaria vulgaris* | Common Toadflax | At Risk |
| | *Plantago major intermedia* | Greater Plantain (hybrid) | At Risk |
| | *Stachys palustris* | Marsh Woundwort | Endangered |
| | *Mentha pulegium* | Pennyroyal | Endangered |
| | *Parentucellia viscosa* | Yellow Bartsia | At Risk |
| | *Pedicularis sylvatica* | Lousewort | Endangered |
| | *Orobanche purpurea* | Yarrow Broomrape | At Risk |
| | *Carduus nutans* | Musk Thistle | At Risk |
| | *Scorzoneroides autumnalis* | Autumn Hawkbit | At Risk |
| | *Hieracium umbellatum bichlorophyllum* | Umbellate Hawkweed | At Risk |
| | *Aster tripolium* | Sea Aster | Endangered |
| | *Erigeron acris* | Blue Fleabane | Endangered |
| | *Eryngium maritimum* | Sea-holly | At Risk |
| | *Eryngium campestre* | Field Eryngo | Endangered |
| | *Oenanthe fistulosa* | Tubular Water-dropwort | Endangered |
| | *Bupleurum baldense* | Small Hare's-ear | Endangered |
| | *Falcaria vulgaris* | Longleaf | Endangered |
| | *Torilis japonica* | Upright Hedge-parsley | At Risk |
| | *Alisma plantago-aquatica* | Water-plantain | Endangered |
| | *Triglochin maritima* | Sea Arrowgrass | Endangered |
| | *Potamogeton natans* | Broad-leaved Pondweed | Endangered |
| | *Zostera marina* | Eelgrass | At Risk |
| | *Asparagus prostratus* | Prostrate Asparagus | At Risk |
| | *Sparganium erectum* | Branched Bur-reed | At Risk |

| Species/Group | Latin Name | English Name | Status |
|---|---|---|---|
| | *Schoenoplectus tabernaemontani* | Grey Club | Endangered |
| | *Bolboschoenus maritimus* | Sea Club-rush | At Risk |
| | *Eleocharis palustris* | Common Spike-rush | At Risk |
| | *Eleocharis multicaulis* | Many-stalked Spike-rush | Endangered |
| | *Carex flacca* | Glaucous Sedge | At Risk |
| | *Carex demissa* | Common Yellow Sedge | At Risk |
| | *Carex oederi* | Lesser Yellow Sedge | Endangered |
| | *Carex caryophyllea* | Spring-sedge | At Risk |
| | *Carex pilulifera* | Pill Sedge | Endangered |
| | *Carex nigra* | Common Sedge | Endangered |
| | *Milium vernale sarniense* | Dwarf Millet | Endangered |
| | *Festuca filiformis* | Fine-leaved Sheep's-fescue | Endangered |
| | *Vulpia fasciculata* | Dune fescue | At Risk |
| | *Poa bulbosa* | Bulbous Meadow-grass | Endangered |
| | *Agrostis canina* | Velvet Bent | At Risk |
| | *Phleum arenarium* | Sand Cat's-tail | Endangered |
| | *Danthonia decumbens* | Heath Grass | Endangered |
| Bats | *Plecotus austriacus* | Grey Long-eared Bat | Endangered |
| Birds | *Hirundo rustica* | Swallow | At Risk |
| | *Anthus pratensis* | Meadow Pipit | At Risk |
| | *Carduelis cannabina* | Linnet | At Risk |
| Fungi | *Hygrocybe conicoides* | Dune Waxcap | At Risk |

# APPENDIX 04

**Reptile Survey (Appendix 1)**

**Bat Survey (Appendix 2)**

**Wintering Bird Survey (Appendix 3)**

**Breeding Bird Survey (Appendix 4)**

# DRAWINGS

N

Land Fill Site

Chouet

Mont Cuet

Martello Tower

Martel

a Lochante

R8

R7

R1

R2

E1

E2

R3

R4

R5

R6

R8

PC

La Varde Dolmen

Ladies Bay

Hommet de Grève

Baie des

P

0 100 200 300 400m 600 800 1000

Metres 1:10,000

NOTES

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LEGEND

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CHOUET HEADLAND

PLANNING APPLICATION

**AIR QUALITY RECEPTORS**

**CH 1**

Scale: NTS

Date: march 2019

CL_AQ_receptors (002).dwg

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LEGEND

- APPLICATION SITE BOUNDARY
- SURVEY AREA
- CONIFEROUS PLANTATION
- SCATTERED MATURE CONIFERS
- BARE GROUND
- HARDSTANDING / BARE GROUND
- SI — MOWN GRASSLAND
- SI — SEMI-IMPROVED GRASSLAND
- BUILDINGS / STRUCTURES
- A — AMENITY GRASS
- MARITIME GRASSLAND
- Q — ARTIFICIAL QUARRY
- SCATTERED SCRUB
- EARTH / STONE WALL

- TREE
- PLANTED CONIFEROUS WOODLAND
- NON- NATIVE HEDGE
- TALL RUDERAL
- STANDING WATER
- BRACKEN / BRAMBLE / BLACKTHORN/ INTRODUCED SCRUB / GORSE
- 1 — TARGET NOTE
- KESTREL / OWL BOX x3

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PLANNING APPLICATION

**PHASE 1 HABITAT PLAN**

CH 2

Scale 1:1500 @ A3

Date APRIL 2019

403.06370.00001.27.ECO1.1 Phase 1 habitat plan.dwg

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